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FOR THE

ARCHITECT, ENGINEER, ARCHÆOLOGIST, CONSTRUCTOR,
SANITARY REFORMER, AND ART-LOVER.

CONDUCTED BY

H. H. STATHAM,

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

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"Every man's proper mansion-house, and home, being the théâtre of his hospitality, the seate of self-fruition, the comfortablest part of his own life, the noblest of his sonne's inheritance, a kinde of private principedome, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned."

"Architecture can want no commendation, where there are noble men, or noble mindes."—SIR HENRY WOTTON.

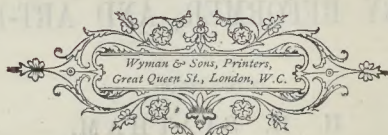
"Our English word TO BUILD is the Anglo-Saxon Bylban, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."—DIVERSIONS OF PURLEY.

"Always be ready to speak your mind, and a base man will avoid you."—WILLIAM BLAKE.

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## The Treatment of Westminster Hall.



THE complete evidence taken before the Committee on the "restoration" of Westminster Hall is now published, and a very wonderful volume it is, and one which is likely to become eventually a kind of historical curiosity, preserved in libraries as a record of the very extraordinary confusion of mind from which the present generation suffers in regard to the whole question of architecture. That nearly 160 double-column folio pages of printed evidence should be considered a necessary prologue to deciding what to do with one side of an ancient building, which had been exposed to view in the process of destroying some modern buildings which had abutted against it, and had been removed because they were no longer wanted, is in itself a sufficiently curious and significant fact. In a sense it no doubt argues, as one witness observed, the very great interest felt in old buildings at the present day. But it also indicates still more strongly the vacillation, the indecision of purpose, the abnormal worship of precedent, which characterises the view taken of the art of architecture at the present day by so many persons both within and without the pale of the architectural profession. We can fancy the astonishment, the bewilderment, of the masculine and strong-minded Norman builder, if he could have foreseen that, eight centuries after he had worked his work, weeks and months would have been passed in debate on the kind of structure that could be best fitted in to preserve a piece of his wall-building; for out of that in the first instance the whole contro-

very arose. We can fancy the astonishment equally of the builders under Richard II., three centuries later, if they could have foreseen this sitting of committees and calling of witnesses to find out what they really did, to endeavour to guess at the possible form of the portion of their work which had disappeared, in order that the men of the nineteenth century might go back five hundred years and do it again, not for any practical purpose in the main, but because it once was there, and once had a presumable practical purpose which can now only be guessed at. Nor is it by any means on one side or other of the question only that there is such an extraordinary display of the unpractical, unreal, illogical manner in which architecture is constantly regarded now. The evidence offers a perfect *mélange* of absurd, exaggerated, and incongruous views of the most opposite character, offered by persons taking the most opposite views of the subject. It is difficult to know whether to be most amused at the inverted view of architecture taken by the chairman of the committee and his supporters, who regard architecture as restoring something by guesswork and then finding a use for it, or at the utter sacrifice of all considerations of architectural effect or fitness on the part of the gentlemen of the "let-alone" faction, who propose to leave a great stone building with a cage of timber and plaster or of corrugated iron stuck against it to preserve it, and then to get rid of the results of their ingenuity by "planting it out" to hide the effect.

The appended measured drawings of the old work, coloured according to date, and the reproductions of old views and plans, showing Westminster Hall at different dates, form a highly interesting collection of archaeological illustrations, and give a practical value to the volume which certainly it would hardly otherwise possess, for a large proportion of the evidence may be regarded as little else than

beating the air. There is a good deal of amusing sparring in it, and the natural abilities of the chairman as a cross-examining barrister are as fully brought out as his temper and animus towards those who take the unpardonable liberty of holding views different from his own, and whom he seems to have regarded as *ipso facto* beings of an inferior order, to be treated *de haut en bas* and asked impertinent questions. But the real problem of the case is often obscured and lost sight of amid all these cross questions and crooked answers, many of which are obviously prompted by a desire not so much to throw useful light on the question as to recommend the speaker's own particular views and discredit those of some one else.

The question is capable of being reduced to a pretty simple form. Is Mr. Pearson's design a restoration of what was there before? and, if so, is it desirable, on architectural and practical grounds, to carry it out? Bearing upon this primary question comes the secondary one,—Was the flank of the Hall originally intended to be open to view as part of an architectural whole, and is it intended that it should be so in future? This latter point is a very important one; for it concerns the question of completing or not completing the greatest modern English building.

A great deal of archaeological evidence has been given on one side, and called in question on the other, as to whether Westminster Hall was, in the time of Richard II., when the flying buttresses were built, seen, and intended to be seen, as part of an architectural *coup d'œil* from the westward. Mr. Brewer adduces considerable evidence to show that there were a number of buildings undergoing repair in the time of Edward II. and Edward III., which, from the manner in which they are mentioned, would appear to have been on the west side of the Hall, and Mr. Pearson discredits this evidence by saying (what is quite



true) that many of these buildings are mentioned as near the Exchequer or in connexion with it, and that unless we can prove that the Exchequer was on the west side of the Hall, the evidence proves very little as to the position of these buildings; and he refers to the position of the Exchequer in Lediard's plan, 1740, where it is shown on the east of the Hall. That is a late-date plan, however, to go upon. But the very name, "Fish-yard," which no one disputes was applied to a courtyard on the western side, seems to indicate that on that side were likely to be such buildings as offices and kitchens, and Mr. Brewer quotes a reference to the "Salsaria or Salting-house under the Exchequer," and on our supposition the Salting-house would have been on the west side, in the same neighbourhood as such a place as the Fish-yard. We merely mention this as an indication of the kind of argument that may be made on one side or the other. But it is really very much beside the mark. What is quite clear is that as far back as we can get positive evidence, we find buildings shown or referred to on the west side, and that the very names which long lingered there go to indicate that this use of the site was of long standing. Mr. Pearson seems determined to think otherwise, because he is accused of making an architectural front where there never was one before, and he wants it to be supposed that the west side was originally open. For our own part, we cannot understand how any reasonable person could regard this as probable; it is contrary to the usual custom of Medieval building, in which the Hall was usually central, and all the positive evidence is against it as far as it goes. But from our point of view the question is of very minor consequence, even to Mr. Pearson. The design he has made, if we accept it as a restoration of what was there, is by no means so beautiful or elaborate as to necessitate the idea that it must have been intended to be seen; we should have had no difficulty in supposing that Richard II.'s builders put up something of that kind even behind some inferior buildings which blocked out the view. The contradictory opinions in the evidence about Westminster Hall being "intended" or "not intended" to be seen we regard as nonsense. We do not suppose there was any deliberate intention one way or another. The roof unquestionably must have been seen from a distance, the sub-structure probably not, except here and there. The flying buttresses would have been built as they were, quite independently of that. Mr. Pearson seems to forget that if he supposes "the Exchequer" to be on the east side, and therefore all Mr. Brewer's buildings connected with it to be on that side also, the Hall was then blocked up on that side at all events; yet the buttresses and flying buttresses were on that side all the same; Sir Charles Barry removed the last of them. From our point of view, we regard the argument as idle either way. The question is not, Was the Hall open to view then? but, Is it best to leave it so now? We record, however, our distinct belief that as a matter of fact it always was built up and hidden more or less on the west side, not on "Medieval principles," to use a silly expression which occurs somewhere in the evidence, but simply because the adjacent site was convenient for use; and we think all the reliable evidence and all the probabilities go that way.

As to the question how far Mr. Pearson's design is a restoration of what was there before, the evidence leaves our mind in regard to that question unaltered. We certainly cannot accept Mr. Brock's view that the upper tier of wall arches was to take the ends of roof timbers, and the lower one the ends of struts to the roof timbers. That there were two stories of some kind between the buttresses we think is established. Mr. Brock, however, makes a point in his evidence in regard to the fact that the chasings in the flying buttresses where the roof cut them are at different heights, and that, therefore, there was not a continuous design along the whole length in one height, but, perhaps, a raising of stories at various times in different places. He declines to accept the indication of the parapet also, and states that

the features of the buttresses supposed to be the section of the parapet coping are only little gables on the returns of the buttress coping, and that they also are not all the same height. Mr. Pearson does not refer to this last point in his second examination. It is a fact of measurement about which there need be no mistake. Mr. Brock's theory is that there was a cloister between the buttresses, but that in Richard II.'s time it was a one-storied cloister, and that the upper floor was a later addition. This might be tenable if we could get rid of the upper story of wall arches, but Mr. Brock's strut theory will not do that. We believe that in a very general way Mr. Pearson's theory of the kind of thing that was there is correct. We only decline to call it a restoration at all in the true sense of the word. No restoration can have any historical value unless there is unquestionable authority for everything. How much there is authority for is admirably shown in the diagram handed in by Mr. Micklethwaite, which is one of the most pointed pieces of evidence that has been offered. He gives side by side a diagram of a bay of Mr. Pearson's "restoration," and alongside of it a diagram showing the precise amount of evidence on the walls themselves. All those who are told to regard Mr. Pearson's design as a restoration should look at this diagram, "Plan handed in by Mr. Micklethwaite," in the Appendix to the Report. It does not affect the question of Mr. Pearson's addition from an architectural point of view, of course; but it disposes of the pretence of "restoration." Let us, at least, have things called by their right names.

The next question is whether the addition proposed is, though not a restoration, a desirable and admirable one on architectural grounds. Evidence is not of so much value on this head, as, in the main, it only results in saying that this person approves and that one does not, and the weight of the evidence depends mainly on the personal value which may attach to the judgment of each witness, arising from considerations as to his ability, generally recognised professional position, and so on. We purposely put aside for the moment the question as to the effect of this restoration on the ultimate completion of Sir Charles Barry's work, though, as we have before remarked, it is intimately connected with that question. Even apart from that, it is difficult to narrow down the issue, as dealt with in the evidence, to the definite architectural question, because with the leading architectural witnesses in its favour the question is obviously blended in their minds, consciously or unconsciously, with the idea of the merit of the work as restoration. Mr. Waterhouse, Mr. Christian, Mr. Brooks, Mr. Blomfield, and Mr. J. O. Scott, are all mainly if not entirely in favour of Mr. Pearson's scheme. This is a strong roll of names, but it must be remembered that they are all (if we except Mr. Waterhouse, who has rather forsaken his first love in regard to Gothic) architects whose school, so to speak, is allied to that of Mr. Pearson, and who may naturally be expected to favour a Gothic restoration. One or two points in their evidence may be touched on. Mr. Brooks (question 2,020) puts it that the fact of the flying buttresses is evidence that rooms within the buttresses were intended, otherwise they would not have been built so. This is perhaps assuming a little too much. Flying buttresses arose, of course, from the necessity of carrying the thrust of the centre vault of a church over the aisles without intruding on the floor space of the latter; but it does not follow that a mere liking for the effect, and the acquired habit of building in that way, might not have influenced Medieval builders in some cases. He is in favour of Mr. Pearson's higher scheme. Mr. Waterhouse expressed at first the opposite view, because the lower design showed the windows and the flying buttresses better. He afterwards desired to modify that view; but we observe that, on cross-examination by Mr. Peddie, he still admitted that the effect of the flying buttresses, as seen above the lower building proposed, would be exceedingly fine, and that it was very desirable to retain that effect if possible. In regard to the objection of some witnesses,

that the Medieval builders would never have thought of building those buttresses and then burying part of them in a roof, Mr. Pearson unquestionably "scores" by his appended section of part of the Canterbury Cathedral and Westminster Abbey buttressing, and of course there are other instances of this. But Mr. Pearson forgets to ask the question, Did the Medieval architects do well in doing that? Is it not a clumsy treatment, injurious to the architectural effect, whether Medieval builders did it or not? To us it appears unquestionably so; but that is the complaint we make about the whole thing from first to last; it is all precedent, precedent; people seem quite afraid of thinking for themselves and endeavouring to do the thing in the best way it can be done now, which is the proper part for any genuine architect to take. Mr. J. O. Scott, again, admits that the lower design, which shows the flying buttresses fully, is to be preferred architecturally on that ground, but he prefers the higher "antiquarian value" of the loftier cloister. As we have observed, it has no antiquarian value; it could only have such if there were absolute facts to go upon instead of conclusions; and even then its "antiquarian value" as mere copy might be more than questioned. Mr. Christian calls the scheme a "reconstruction," not a restoration, which is the right way to put it, and he speaks, in a much more practical and architectural spirit than some of the other witnesses, in regard to the constructional value of a longitudinal wall between the buttresses to give them support and guard against their settling one way or another when rebuilt. That might be provided against to some extent by much better and more scientifically-constructed foundations than the Medieval architects ever troubled themselves to make; but still, if the flying buttresses were rebuilt there is no doubt a wall of some kind between them would be a constructive gain, and perhaps also an architectural one. At the same time Mr. Christian admits, in cross-examination by Mr. Peddie, that to build cross walls between the buttresses and the Hall would give vastly greater strength; which is, of course, self-evident, but it would be ridiculous to build such buttress walls out to the distance of the flying buttresses, and the effect would be very bad. From a purely engineering point of view, the thing would, of course, be to remove the flying buttresses altogether (which must in any case be taken down and rebuilt), and build sufficient buttresses against the wall of the Hall. Cross walls filling up the whole space between the present buttresses and the building would be a waste of material. Of course, we do not wish the case to be considered from a purely engineering point of view; we are merely alluding to the logical result of taking such a view.

Our impression of the whole matter is that architecturally it might be worth while to rebuild the buttresses and flying-buttresses with a rather low cloister and ambulatory between them, which would fill them up architecturally, and strengthen them constructively, and would make an agreeable sheltered walk, and to design this in keeping with the rest of the work, but with no pretence of restoration of what was there before (which in detail is all conjecture), but with the best architectural design in keeping with the surroundings. Sir Charles Barry, or any other equally powerful and original architect, would probably have made no bones of pulling the old buttresses down and treating the building in the best way for practical necessities and architectural effect at the moment; and (however shocked people may be to be told so) that is what a Medieval architect would unquestionably have done. The absurdity which runs through the whole inquiry consists in the inversion of every principle of architectural common-sense by which it is first proposed to restore something which (in the form proposed) is not wanted, which is mostly conjecture even as restoration, and then to pretend that it is done for practical reasons; to make low and ill-lighted committee-rooms, opening one out



another, and reached by staircases which ill obtrude in a most unsightly manner on the area of the Hall,\* not because those are the best rooms or that is the best place for them, but because an archaeological whim is wanted to be carried out, and it is necessary to retend a use for it. The whole attitude of the Chairman and of some others of the Committee on this subject, as evinced by their questions, is really quite childish, regarded from a truly architectural point of view; and as to the support given to them by some eminent architects, we can only say that it is perfectly inexplicable to us, and when architects of standing take such a view of their profession as this and put the cart before the horse in so absurd a manner, it is really not surprising that we hear men of science and others who are among the really strong men of this generation express frequently very modified respect for the architecture and the architects of the time. The business of architecture, if it is to be worth anything, is with the present, not with the past, and there will be nothing great done in modern architecture until that is learned and acted upon.

We have only space for a few words in regard to the very important question, about which we may have more to say, as to the effect of this proposed scheme upon the ultimate completion of Barry's design for the Houses of Parliament. The consideration of this is specially stated to be within the scope of the Committee, but they have not thought it worth while to publish any illustration of the plan and design of Sir Charles Barry for what he regarded as the completion of his work. They have published, however, mis-statements in regard to it; as, for instance, that it would involve the removal of St. Margaret's Church, which, as we will show by a plan next week, it will not, nor did Barry ever contemplate that removal as part of the completion of the Houses of Parliament,—only as a part of a much larger Westminster Improvementscheme. Other points in regard to it we may refer to more intelligibly when we publish the plans and section, which will correct some of the illusions on the subject. On this head Mr. Ayrton's evidence is worth reading; for, though Mr. Ayrton is certainly not an architectural connoisseur, it cannot be denied that in some of his pithy replies he goes to the common-sense of the matter. He stands up strongly for doing nothing that would stand in the way of the ultimate completion of Barry's intended buildings west of Westminster Hall, while at the same time saying, quite rightly, that they should be built when they are wanted (as they are sure to be), not before. Speaking of the proposed double cloister, he says:—"I do not know with what intention the rooms are to be built there. If the intention were settled, then one could consider the building, but you cannot reasonably erect a building without knowing what the intention is," which is just what some people cannot be got to see. Our modified proposal of a low cloister would be recommended for reasons mainly constructional and architectural; it would be an agreeable and suitable way of treating the side of the Hall, whether the new wing of the Houses of Parliament were ultimately built or not; it would not stand in the way of their completion; it would not pretend to be restoration (as we should propose it); it would preserve the Norman wall; it would leave the flying buttresses open to view, and there would be no spoiling of the area of Westminster Hall by steps projecting into it. The scheme proposed by the Committee will spend money on buildings which will obscure the side of the Hall and the buttresses; will give ill-lighted, low rooms, awkward to reach, and unsuited for their proposed purpose; and the proposed building projecting from the Hall at the north-west angle would interpose a mean and low building at the most prominent point as seen from Parliament-street, and astonish the world with the spectacle of a grand committee-room

built over a horse-shed, an arrangement which no architect in his senses would make if fitness and suitability of arrangement were, as they should be, the first consideration; and it would completely stand in the way of the completion of Barry's design. The mere recommendation of such a scheme shows a want of perception of architectural fitness and common sense which is perfectly ludicrous.

We have one word for ourselves in conclusion. We observe that the report of the evidence duly records the impertinent questions which the chairman asked Mr. Stevenson, as to whether he wrote the article in the *Builder*, and if he knew who did (questions 1356-9). The question was asked in the evident hope of eliciting that it was the "Society for the Protection of Ancient Buildings," of which Mr. Stevenson is a prominent member, that was pointing all the attack upon him. As Mr. Shaw-Lefevre is so unable to appreciate points of architectural criticism that he apparently cannot understand the difference between two perfectly opposite positions, we may explain, once for all, what we should have thought any one might have been able to gather for himself,—that our views are in the main completely opposed to those of the said Society; and that our columns are not available for the exploitation of the doctrinaire fancies of any individual or any society. If any of the witnesses with whose views the Chairman so obligingly confounds us had wished to express himself in our pages, he would have been invited to do so under his own name and on his own responsibility. Our criticism is made on general grounds of architectural truth and common sense, of which we think we understand a good deal more than Mr. Shaw-Lefevre and his Committee can teach us.

#### NOTES ON SCULPTORS' MATERIALS.

BY GEORGE SIMONS.



Every art a perfect knowledge of the materials employed, of their characteristics and applicability to various purposes, is absolutely needful to insure a satisfactory result for labour expended.

The sculptor's art forms no exception to this rule, and when we remember, as every artist may, the lamentable results that have ensued from want of attention in some instances, and from downright ignorance in others, to say nothing of the serious loss of time that always must occur when we seek to obtain from one material results which are foreign to its real character, I think I need make no apology for reminding my fellow-workers of what, no doubt, many of them already know, nor fear to encounter their censure because the present article does not contain anything new.

The art of sculpture consists chiefly of three processes, namely, modelling, casting, and carving. I mention them in this order because it is that in which they occur in practice, and for the same reason I shall treat, in the first place, of the materials used for modelling.

Clay is, of all materials, the one which is of most importance to the sculptor. Its plastic qualities are perfect, and are only changed when subjected to the action of fire.

Clay in a perfectly pure state is not very pleasant to work, except for very small things, as it is too greasy in its nature to work freely, and adheres to the fingers and modelling-tools to an extent that is rather disagreeable. It is usual, therefore, to select a clay that contains a certain quantity of sandy earth or loam, and most clays are found naturally mixed with some of this, but rarely in the proportions required. There is a yellow clay dug from the bed of the Tiber that is much used in its natural state by Roman sculptors, but although it is very pleasant to use, and of a charming colour, it is not so tough as the bluish-grey clay that is found at some distance from the river. This latter is excellent in quality, but cold in colour; I therefore did what most of the Roman sculptors were in the habit of doing,—mixed it with the yellow clay, the

result being most agreeable both in appearance and to work.

The common brickfield clay is by no means unpleasant to work, but usually requires to be well worked through by hand after it has left the pug-mill, not only to remove impurities such as bits of stick or stone, but chiefly because the clay as delivered from the mill is far too dense for comfort in modelling, and should be picked in pieces and kneaded with the fingers, which relieves it from this characteristic. This remark, by the way, holds good with all the clays, whether natural or manufactured; they all require hand-puddling before they are fit to be used by the sculptor. Old clay,—that is to say, clay that has been used many times over by the sculptor, that has been allowed to get dry several times, and has been frequently wetted up again, and much picked over to remove bits of plaster and other impurities that get into it when it is moulded,—is far better than any other, being tougher and less liable to crack and split, the worst defect clay can have, and also it is lighter, and, if I may say so, more spongy in character. A clay for modelling works of moderate size, *i.e.*, of life-size or rather over, requires to possess the following characteristics. It must be tough so as to carry its weight well, and hold well to the framing of the figure; at the same time it must be not too rich, but rather must contain a fair amount of loam, in order that it may work freely and easily. It must also be more or less spongy in character, because it must absorb rapidly and easily the water sprinkled on it, and also must allow it to evaporate with equal ease, because it is very often convenient to allow the clay to partially harden during certain stages of the work, and again to render it very soft at other times by sprinkling on those parts which seem to require it, and a great deal of the comfort of one's work depends on this power of keeping it in the most favourable conditions of softness, and of varying this softness at will. I shall have more to say on this subject when we come to terracotta.

If the clay is too spongy it will be deficient in toughness, and consequently will require a very elaborate framing inside the figure to hold it together. This, of course, is a drawback; it is, therefore, necessary to adjust the balance between toughness and sponginess according to the size of the work. The larger the work the less difficulty there is in constructing a powerful and elaborate framing, and the more need for a poor and spongy clay in order, as far as may be, to get over the difficulty of removing or adding considerable quantities with ease and rapidity, a thing which it is impossible to do when the clay employed is too rich and tenacious.

The next important material for modelling is unquestionably wax. This is made in a variety of ways, and for various objects. The ordinary modelling wax which is sold in the shops is red in colour, and becomes unpleasantly sticky in the hands, and, moreover, is usually made with an admixture of boiled linseed oil, which gradually makes a hard skin on the surface by the action of the air, and this skin once formed does not again recover its plasticity. The best wax that I have ever found is composed very simply as follows:—Dissolve in a pipkin a quantity of good pure yellow beeswax. Add to this about one-tenth part of Venice turpentine, and stir well together, but never allow the wax to boil. Add to this whatever colouring matter you please in the form of dry powder, and keep on adding the powder until your wax assumes the right consistency. You must test this from time to time by taking some out on the end of a stick and cooling it off. It should, when worked in the hands, become perfectly plastic and manageable before getting sticky; indeed, it should not get sticky until far too soft for comfort in modelling. It is the turpentine that makes it sticky, and you must add wax if it needs it. When kneaded in the hands it should draw out very considerably before breaking. This quality may be largely increased by the addition of a portion of resin. This wax, however, is only of use for modelling, and cannot be used for casting by the *cire*

\* The London and Middlesex Archaeological Society alone seem to have appreciated this, and protest strongly against it in their letter to the chairman under date March 19th.



*perdue* process, because its bulk is composed of earthy matter, held together by the wax; consequently on the wax being melted the earthy matter would remain in the mould and spoil it. Wax for bronze casting is made in several different ways, but, perhaps, it will suffice to give two recipes. The first is that which was used by the celebrated sculptor, Girardon, for casting the statue of Louis XIV., and consisted of ten parts of yellow beeswax to one part turpentine, one part lard, and one part of white Burgundy pitch, all by weight. The second is, on the authority of M. Mariette, the compound used by Bouchardon for the equestrian statue of Louis XV., and consisted of 1 lb. of yellow wax to 1 oz. of tallow, and a  $\frac{1}{2}$  oz. of resin. I do not think this latter can have been pleasant to work.

It is usual to colour these compositions by the addition of sulphide of mercury (vermilion) or of some vegetable stain. The colour is merely added to please the eye of the artist, and any colour will do provided that it disappears leaving no trace at a low red heat. A very excellent casting-wax is made by using only bees'-wax and Venice turpentine; but it has one drawback, it is so transparent that it is difficult to sufficiently appreciate the forms one is modelling. It was, however, much used by some of the best Italian artists. As a body for wax used for making piece-moulds, finely-sifted wood ashes are preferable to anything I know. The wax is melted and the ashes stirred in, as in making modelling-wax, but the proportion of ashes used is very large, as this wax is required to be quite hard, except when warmed and kneaded over a charcoal brazier, when it should become quite plastic. This wax is much used in piece-moulding over marble, especially in those parts of a statue where it is difficult or dangerous to use plaster. It is usual to powder the surface of the wax with French chalk before taking the impress.

After wax and clay we have still other materials for modelling to consider. Some of these are based on plaster, whilst others are more like clay. The plaster compositions are usually either an admixture of plaster and glue, with or without cow-hair or chopped tow or other fibrous matter worked into the plaster, or they are composed of plaster and alum usually calcined together in various proportions. These plaster compositions are, however, very unpleasant to work, and should only be used where the work is so far beyond ordinary size that it is impossible to use clay advantageously, or in the construction of statues for temporary decoration. When it is desired to make these latter, common hay-bands steeped in plaster and glue, and twisted around the framing of the work, afford a rapid and effectual means of building up a figure; which, after the surface has been roughly worked over with a little more plaster, is ready to receive the head, hands, and feet, which it is usual to model in clay with some care, and to cast in plaster while the body is in course of preparation. The draperies are made of loosely-woven canvas, and are dipped in thin plaster and glue, and then arranged in folds whilst the plaster is still liquid. I have seen many very effective figures produced in this way both in Italy and in Germany, and, indeed, an heroic statue of Schiller by Professor Shilling, of Dresden, constructed in this manner stood during the celebration of his centenary festival in the Alt Market of that city, whence it was removed to a private garden, where it stood for a very good time, I think some seven or eight years, not much the worse for wear. It is, however, obviously not a material that is suited for permanent decoration; at least, not when exposed to wind and weather.

The great drawback to the use of clay for sculptural modelling,—indeed, the only drawback,—is to be found in the fact that whenever exposed to the atmosphere, moisture is evaporated from its surface. This causes the clay to shrink as it becomes dryer and harder, and also to split and crack in a manner that not unfrequently involves the destruction of the work, or at least a serious loss of time spent in repairs, to say nothing of the inconvenience of having the entire studio kept unpleasantly

damp by the evaporation and by the sprinkling of water on the work to supply by absorption the moisture taken from the clay by the atmosphere.

In order to avoid this inconvenience many attempts have been made by sculptors of all countries to make an artificial clay, if I may so call it, that should remain practically unchanged by time, retaining indefinitely its plasticity.

This has been to some extent achieved, and yet not to the extent of entirely realising the ideal material sought after. The usual process has been to take a good modelling clay and deprive it of its water by the substitution of oil, glycerine, or other such compound, so that evaporation no longer went on at ordinary temperatures. The result is what is commonly known as oil-clays; but these clays are not as free to work as the ordinary water clay, though good enough for many purposes, especially for work of rather small size. They do not work quite like clay, but are rather a link between clay and wax. Other attempts have been made to produce a clay that should always remain moist by the admixture of some deliquescent chemical; but this was not a success, for two reasons, partly because the clay so treated was found to be injurious to the skin, and partly because it was not easy to hit the exact mixture that should counteract the evaporation and no more.

The most successful attempts have lain in the direction of producing what I may, perhaps, call a plastic soap, very little, if at all, soluble in cold water. To this group belongs "Plastilina," as it is called. I do not know its exact composition, but it looks like clay and works nearly as freely as clay; but it is of a greasy soapy nature, and when newly made it has a strong odour which is not quite pleasant. It will not leave the hands unless acted on by a strong solvent, such as soda or Hudson's soap powder, in cold water, but will dissolve with ordinary soap in hot water. It is made at Genoa by the inventor, Sig. Gindici. I have given it a very thorough trial, as I have used it constantly for seven years or more, and have modelled in it works of all sizes from sketches a few inches high to heroic statues. I found it notably of great advantage whilst modelling a life-sized study of a lion at the Regent's Park Gardens. I was engaged on this work for several months, and it was a great comfort to be able to dispense with the damp cloths at night, and the sprinkling during the day that would have given me much trouble and anxiety had I been obliged to use the ordinary clay. It is also very useful for making alterations on a statue that has already been cast in plaster. At the time of my leaving Rome I had a statue of Dionysos seated on a tiger, almost completed in clay. I could not remain to finish this work, so I determined to cast it in plaster and remove the cast to London and finish it there in plastilina. I gave the cast a coat of paint of the colour of the plastilina and then finished the work, cutting into the plaster wherever I required to do so, and at once colouring it over where the white plaster was exposed, and adding plastilina in other parts as required. The work thus retained all the appearance of clay with a good many of its advantages, whilst by driving pins through the plastilina into the plaster below, I was enabled to point the marble from it just as if the entire group had been plaster. Wax would have answered as well, except that it is more tedious to work, besides being more expensive. In using plastilina there is one great precaution to be observed. Your framing must consist of no metal save iron or tin. If brought in contact with brass, copper, lead, or steel, it eats these metals away very rapidly, and forms at the same time a sort of oxide that splits and breaks the work in all directions, and destroys to a considerable extent the plastilina itself. Plastilina does not, however, hurt the skin in the least degree; but when using it beware how you touch your eyes without first carefully washing your hands. If you do not take this precaution, you will feel the smart for half an hour.

A very good plastic soap can be made of

flour of sulphur and lard, wax, and a little clay to give it colour. Any coloured earth will do, and fine wood ashes if procurable. If ashes are not to be had, any very fine powder will do, with a slight admixture of pearl-ash, as without an alkali it will not work smoothly under the finger. All these compositions improve after being kept a few weeks.

Although it is claimed for these compounds that they remain unaltered by time, such is not the case; and after a few years they shrink in bulk, and lose a part of their plasticity. This, however, is easily restored by working into them a sufficient quantity of crude vasiline. I have found this answer admirably.

After the materials used in modelling have been considered those next in importance to the sculptor are those used in moulding, and of these the most generally useful and, indeed, absolutely indispensable is plaster.

There is, probably, no material used in the arts that varies more in character than this, and, consequently, the greatest care must be used to ascertain its qualities and characteristics before using it for any important work. Benvenuto Cellini insists much on this, and draws an interesting comparison between the plaster of Paris and that used in his own country, a comparison, by the way, much to the disadvantage of the latter, which, he says, has more than once misled artists who did not know its qualities, and therefore lost their labours. Indeed, I can heartily endorse what he says of the French plaster and of its superiority over that of Italy. English plaster is, in many respects, unrivalled, but it is usually, and I believe I might say invariably, so charged with sulphur as to make it almost useless for some purposes. The qualities to be desired in plaster are that it should not begin to set too soon; that it should remain for a considerable time in a creamy state; and that, when once set, it should become very hard. If, combined with these qualities you have freedom from sulphur and a warmish rather than a bluish white tint, you have indeed secured an excellent material. The French plaster has all these qualities. The reason why plaster should set slowly is twofold. It is not only to give the sculptor or moulder time for his operations, but also because a plaster that sets rapidly also swells and warps considerably. All plasters do this to some extent, and to obviate this defect it is usual to add to them something that will retard the setting without weakening the plaster. This is frequently lime, which, indeed, answers the purpose very fairly. Lime-water is also used, and glue, ammonia, wine, stale beer, and a host of others have all been used with more or less success. Sulphate of zinc added to the water in a very minute quantity has a marked effect in retarding the setting and increasing the ultimate hardness of plaster.

The reason that plaster should be free from sulphur is because the sulphur is almost certain, sooner or later, to show itself in yellow patches, most offensive to the eye, and also because plaster containing much sulphur is quite useless for making the mixture used in bronze-founding for making moulds and cores in the waste-wax process. The castings are always unsound when the plaster contains much sulphur.

It sometimes happens that plaster is required to set rapidly, as, for instance, when portions of the human figure are to be moulded from the living model; in this case the addition of a small quantity of salt to the water will have the desired effect, and here it may not be amiss to remark that if warm water be used the cast from the live model will not have that disagreeable texture which arises from the sudden effect of the cold on the skin.

The material next in importance to the sculptor for casting is loam, with which he makes the moulds for casting his works in metal. There are many qualities of loam. Some are natural,—that is to say, they are dug from the earth in the state in which they are used; others are artificial.

Loam being nothing more or less than a



compound of refractory sand held together by a very small admixture of clay, it is easy to make a loam having almost any desired characteristics. Such artificial loams are usually called by the sculptor, *Potée* or *Luto*; they are very little, if at all, used in this country, for which reason I shall devote more space to them than to the other.

The natural loams are dug from pits or, in some instances from the beds of streams; the former, according to Cellini, are much to be preferred. The loams used in London are usually those from Hampstead or Lewisham, which are excellent for ordinary castings; for the best work, however, the loam from Fontenay-aux-Roses is to be preferred, and, indeed, has been in the highest repute for centuries past.

In the selection or preparation of a loam, several somewhat contradictory characteristics are to be sought for. The loam should be extremely fine and close, rather rich in point of fact, in order that it may receive the impress of the object to be moulded with the greatest perfection. On the other hand, it should be very coarse and porous, in order that the gases generated by the contact of the metal may be able to escape through the thickness of the mould without causing a disturbance in the still fluid metal. If we could have the interior surface of a mould so constructed as to present a mere superficial skin of some material which would be perfectly close and impervious in texture and utterly incombustible, and have the walls of the mould of some other incombustible substance possessed of very great porosity, the porosity increasing as the distance from the inner surface of the mould, then we should have probably the best possible conditions for insuring success. We can, however, only secure these conditions in a partial degree, and every *Potée* or *Luto* is composed with a view to those qualities of density or porosity on which so much depends.

Space will not permit me to enter into all the various recipes which have been handed down to us from former times, or have been practised in our own day; one or two, however, I must give. Perhaps the oldest, and certainly not the worst, was compounded of finely-pulverised iron scale, bone ash, Tripoli powder, and French plaster, mixed together and tempered with water in which cow-dung had been dissolved. Another recipe, which also has the sanction of antiquity, is as follows:—To one load of horse-dung add two loads of broken white crucibles and three loads of loam of Châtillon, tempered with urine and white of eggs. This rather curious mixture was used by no less an authority than Jean Balthazar Keller.

Plaster and brickdust, in various proportions, are also successfully used, but only for moulds of very moderate size, and so much depends on the quality of the plaster, and indeed on that of the brickdust also, that it is very difficult to give any definite instructions as to proportions for the use of this very simple compound, which is, however, very greatly employed in Italy.

Besides these materials, Portland, Keene's, and Parian cement are occasionally used by sculptors. The former is little used, except by the makers of artificial stone garden sculpture, which is chiefly remarkable for showing how a good statue, no matter how feebly reproduced, may still retain some grace and dignity, even under the most adverse circumstances and with the most objectionable surroundings. Portland cement is so unpleasant to work that, except for repairs, or under very exceptional circumstances few sculptors would, I think, care to use it. It has, of course, the great advantage that it stands splendidly.

Parian and Keene's cements are useful materials, as being much stronger than ordinary plaster. They can be successfully employed for external work provided they are rendered waterproof by the application of one or another of the stone-preserving fluids. Without this precaution the rain and frost will soon break them up.

The other materials with which a sculptor is constantly required to deal are terra-cotta,

stone, and metal. Terra cotta is, perhaps, of all materials the most fascinating and the most provoking. It seems so simple and easy, and it is so very troublesome. As every one is aware, terra cotta is merely the Italian for baked earth, and, therefore, any work in clay that has been through the kiln is terra cotta, from a common tile or drain-pipe to a Parian statuette or a Dresden shepherdess. Seeing then the vast range of terra cotta and the utter impossibility of doing it anything like justice in an article like the present, I shall confine myself to a very few general remarks. The clay used for terra-cotta sculpture may be either a fine rich clay or it may be poor and porous. The former is suitable only for works of small size, the latter is used for such as are of considerable dimensions.

It is in all cases advisable that these works should be hollow, and as thin as is consistent with strength. I should have said *indispensable* were it not for the fact that works of solid clay have been occasionally successfully fired; these, however, are merely the exceptions that prove the rule. There are two ways of producing the hollow work. One way is to build it up solid in clay, and when the clay has become tolerably hard the surplus material is dug out from the inside. In this case the work is often divided into several pieces; these are each separately dug out to the required thickness, and are then put together again to form a whole. The other plan is to build up the work hollow from the first. This is, I think, the better mode of procedure, and that which is usually adopted except for works of small size, when the former plan will be found the most expeditious. A third and very excellent plan is to model the figure in clay in the ordinary manner, and then to mould it in plaster. Not a waste mould, but a *piece* mould is required, for the next step is to line this hollow mould with clay to the thickness required. The clay has to be pressed in with considerable force, and great care must be taken to avoid imperfect cohesion between the pieces of clay thus employed. The hollow "squeeze," as it is called, is left in the mould to shrink, and when it is able to bear its own weight the mould is removed piece by piece, and the squeeze is dried for the kiln. Terra cotta that is intended only for interior decoration may be fired at a comparatively low temperature, as it does not matter whether it is porous in a high or a low degree. But when intended for outside work, the clay should be fired as hard as it can fairly stand. The red clays will not stand so great a degree of heat as the buff and yellow and white clays, nor do they require it, as they can only attain a certain degree of hardness, and anything beyond that would only destroy their form and colour. All firing should be done very gradually, the heat being allowed time gradually to "soak" into the substance of the clay. Unburned clay is a wonderfully good non-conductor of heat, and it is very common for works to crack in the firing, because the heat is raised so that the outer surface is very hot, whilst inside it is perhaps scarcely warmed at all. An equally dangerous time is that of cooling, and if the kiln is incautiously opened the surface of the work is sure to be aired; that is to say, that wherever the work has caught a chill there will be a perfect network of fine cracks, or sometimes of big ones. For work that has to stand out of doors, "airing" is to be particularly avoided, as these fine cracks are often more dangerous when acted on by rain and frost than one good honest crack would be, for the latter could be filled in and rendered harmless.

Of course, the great drawback to the use of terra cotta is the difficulty in getting it free from warp, and also its porosity. The former can be only obviated by incessant care during all stages of its manufacture, and the latter by the use of some preserving fluid to render it non-absorbent.\*

**Jacobstow (Cornwall).**—It is proposed to restore the parish church here, at a cost of 700l.

\* To be concluded in our next.

## NOTES.

**THE** view of the growth of London which was recently presented by Mr. Price Williams to the Statistical Society, covers ground familiar to many of our readers. For the most forcible appeal to the imagination nothing can exceed the mute eloquence of the figures of this preliminary Report of the Census of 1885. There we learn that while, at the beginning of the century, out of ten inhabitants of England and Wales one lived in London, the proportion has risen to one in seven. The Greater London of the Registrar-General's weekly returns contained, in 1881, 645,818 inhabited houses, built over an area of 697 square miles. The growth of the population over this densely-peopled area has been from 3,222,720, in 1861, to 4,764,312 in 1881, or at the rate of 47·8 per cent. in twenty years, and of 22·6 per cent. in the last decade. There has been a very curious contrast between the mode of the growth of London from 1834 to 1867, and that from that date to 1881. In the former period, while several broad and compact districts were built over, and while the central nucleus increased very largely, one particular feature was the pushing out of lines of buildings along the course of the main roads, by as much, in some of them, as from three to four miles. During the last fourteen years of the time compared, on the contrary, extension along the lines of road has been generally but little marked, a stretch of about a mile and a half along the Edgware-road, and around the railways there intersecting, being the most noticeable. But the intervals between the lines shot out in the earlier period have been busily filled up during the latter: so that the growth of the solid nucleus, with but few interstices left open, has been nothing less than prodigious.

**INTIMATELY** connected with the growth of the population of London, and with the house room provided for their accommodation, is the yet more portentous growth of the rental, and of the rateable value of the houses. In 1871 the metropolis, then containing, according to the report of the Local Government Board, 417,767 houses, was rated at 19,830,051l. In 1881 the corresponding number of houses was 486,286, and the rateable value 27,544,446l.; showing an advance in the latter of from 47·4l. to 56·6l. per house. The increase in the total value was thus 38·9 per cent. in ten years, against a growth of 17·20 per cent. of the population. A comparison of this kind shows where lies the nucleus of the difficulty attending on the question of the housing of the working classes. And not of the working classes alone; for unless a corresponding activity in trade and manufacture accompanies this apparently irresistible increase in one of the main articles of necessary expenditure, poverty must be on the increase. Over the whole of England, after deducting the metropolis, the increase in rateable value has been 28 per cent. in the decade against 13·84 growth in the population. It is conceivable that as this fact becomes known, it may tend to apply some check to the enormous growth of this great realm of brick and mortar.

**IT** is satisfactory to think that the canal system in this country is having some very practical attention bestowed upon it, which may prove the commencement of an important movement in developing the internal waterways of the country. The last straw has been laid on the back of the Staffordshire freighters by the railway companies' unreasonable charges, and, in consequence, a scheme, estimated to cost one million sterling, is being promoted by the South Staffordshire Railway and Canal Freighters' Association, for deepening the Grand Junction Canal between Birmingham and London, so as to allow the passage of steamers of 120 tons burden. The unfairness of the present arbitrary system of rating the traffic has been a grievance of old standing, and one that is not likely to be rectified as long as the companies are not forced to remedy it. We are told that sugar



is charged a carriage rate of 20s. per ton from London to Birmingham, a distance of only 113 miles, whereas from Greenock to Birmingham, a distance of 312 miles, the charge is only 25s.; and the equally exorbitant rates for iron, metals, and building materials generally, have been matters of complaint for years past. There is no doubt that the project of the Manchester Ship Canal has been the outcome of the high rates from Liverpool, and there is equally little doubt that existing canals will shortly be utilised, or new ones made in favourable districts. It may, perhaps, be a matter of some difficulty to protect the banks of an ordinary canal from the wash of steamers, which, when the latter are even of small burden, is a somewhat destructive agent, but precautions can be taken against this.

AT the annual meeting of the Hellenic Society, on Thursday, June 25th, the Hon. Secretary (Mr. G. A. Macmillan) read the report, which stated that the balance in hand to meet the expenses of the coming year was 880l., and there had been an increase of forty-two members and subscribers. Professor Newton, in an address from the chair, referred to the importance of the excavations at Naukratis, to which the Society had made a grant, and urged the importance of Mr. Wood's excavations at Ephesus. Mr. R. S. Poole subsequently gave some further particulars in regard to the results of the excavations at Naukratis, from which place forty-two cases of antiquities were on their way home, many of which would probably go eventually to the British Museum.

A CONFERENCE was held on Friday last week in the room of the Society of Arts (when the chair was successively occupied by Mr. S. Morley, M.P., Sir G. Campbell, M.P., and Lord Aberdeen) on the promotion of Industrial Villages. A letter was read from the Rev. Harry Jones, referring to the mischief that was done by "the entry of heedless multitudes into large cities" in search of work which could be as well carried on in the country. He thought insecurity of tenure often led to the forsaking of the country, and that a sure position as dwellers and craftsmen in a village would do much to cure "the unwholesome appetite for London life and work which now drives and disappoints so many." Papers were read by the Rev. Henry Solly, Professor Foxwell, and Mr. G. J. Holyoake. A resolution was carried to the effect "that this conference is of opinion that the promotion of industries in rural districts is urgently necessary as one of the most direct and effectual means of correcting the evils from which society in England is now suffering. The conference, therefore, earnestly recommends this movement to the favourable attention of capitalists and others interested in the prosperity of England, and trusts that means will be found of turning to practical account the large amount of valuable information now in the hands of the council."

THE Railway Companies scored a point with regard to the vexed question of terminals by the judgment delivered on Wednesday last by Mr. Justice Wills, in which he was supported by Mr. Justice Manisty. Messrs. Hall & Co., lime merchants, &c., of Croydon, had opened the question before the Railway Commissioners, arguing that the Brighton and South Coast Railway Company were acting illegally in making charges for terminal services over and above the statutory maximum rate. The Commissioners, in concurring, held that all the expenses of accommodation, sidings, &c., were necessarily incurred by the company to enable them to undertake the conveyance of traffic, and that they were, therefore, not services or matters for which they might lawfully make any charge beyond their maximum rates. They assented, however, to state a case in order that the opinion of the Judges might be taken. The latter have reversed the decision of the Railway Commissioners, stating that the company has a right to charge for the accommodation referred to; and that the Commissioners ought to see that the line between the conveyance of goods and the other services ren-

dered by the company was strictly kept. This is a point upon which the Commissioners have almost invariably been against the railway companies,—though, perhaps, rather upon legal than moral grounds. Of course, the case will be further prolonged if possible, the decision being somewhat of a departure from precedent, and the applicants have already asked for leave to appeal. It appears uncertain whether the Judges have power to give the leave, but they have expressed their willingness to do so if they have. Otherwise the case will go back to the Commissioners to be dealt with in accordance with this last decision, and they will have to address themselves to the task of fixing a reasonable sum for the charges in dispute, and there is, no doubt, the case will be placed "on record" by every railway company.

FROM a letter of Lord Brabazon to the *Times* of Tuesday last, it seems that the idea of lighting some of the East-end squares at night as places for a stroll in the evening has had very favourable results. The experiment was tried on June 13th in Trafalgar-square, Stepney, which was brilliantly illuminated with coloured lights, and between 1,000 and 2,000 persons entered the ground during the evening, "most of whom had never seen anything of the sort before." The squares in Piccadilly and Clerkenwell, by permission of the Duke of Westminster and the Marquis of Northampton, are to be lighted up in the same way in the evenings, and the Metropolitan Public Gardens Association have started a special fund for lighting. If the poor can be so easily given a little more enjoyment and variety in their lives every effort should be made to support the scheme.

A WRITER in our contemporary, the *Globe*, deals in a picturesque fashion with the interesting subject of Tilbury Fort, and falls into the usual mistakes of one who has no sound knowledge of the architectural, archaeological, or historical aspect of his subject. The contribution is a specimen of the entertaining, briskly-written articles with which the daily press abounds, and may be cited as a caution to the unsuspicious reader not to rely upon the accuracy of the statements which such articles contain. As a corrective in this particular case, it may be well to set down here concisely thus much. The work erected by Henry VIII. consisted of a mere block-house,—a twin structure to that which he built on the opposite shore at Gravesend. Plans, views, and detail drawings of the work exist in the King's Library at the British Museum. It was pulled down about the middle of the last century, and not a fragment of Henry VIII.'s Fort now remains. The present fort is wholly the work of Charles II. Evelyn notes in his diary, March 21, 1672, that it was then newly begun. The gateway, which is so prominent from the river, and figures in Clarkson Stanfield's celebrated picture of "Wind against Tide," was completed in 1684, and is in all probability the work of Sir Christopher Wren. The fort was designed by Sir Martin Beckmann, his Majesty's Chief Engineer, who, as Captain Beckmann, was associated with Wren in the defensive works at Tangier. Wren was, at the time that Sir Martin was engaged upon the Tilbury defences, his Majesty's Chief Surveyor for Public Works, and it is highly probable that he was engaged to design the gateway in question, which resembles very strongly his manner. It is too good for a second-rate artist. The carving and enrichments are excellent. Queen Elizabeth certainly never occupied a room in this gateway, nor, indeed, any portion of the defensive works which we now see, for the very good reason that the great Queen had been laid in her grave half a century before one stone of the present structure had been laid upon another.

THE Tour de Bourgogne, commonly known as the donjon of Jean sans Peur, at Paris, a medieval relic, surrounded by the houses in the Rues Mauconseil, Française, Saint-Denis, and Petit-Lion-Saint-Sauveur, which has been uncovered by the opening of the first section of the Rue Étienne-Marcel, is said to

be in danger of falling, and the Commission des Monuments Historiques has appealed to the City of Paris to provide the necessary funds for its preservation. The tower, which was attached to the wall of Philip Augustus and the Hôtel d'Artois, of which the last vestiges have disappeared, is quadrangular on plan, of hewn stone, pierced with arched openings, and terminated by a machicolated battlement. Jean sans Peur was very fond of this residence, and sculptured his arms in one of the bays, a plane and a plumb-line, which he adopted in opposition to the knotty stick selected as an emblem by the Duke of Orleans. The City of Paris recently expended a sum of 150,000 francs (6,000l.) on the "restoration" of this interesting building, and it seems extraordinary that a still further sum should be required for its preservation.

AN appeal has been made to the Metropolitan Board of Works by the Lewisham District Board to purchase Severndroog Castle and grounds, adjoining Kidbrook-common, with a view to adding the grounds to the common and preserving both for the use of the public as a recreation ground. Severndroog Castle was erected in 1784 by the widow of Sir William James to commemorate the capture of the castle of Severndroog on the coast of Malabar, April 2, 1755, in which he lost his life. The castle is of brick, in Strawberry Hill Gothic, and is situated on a wooded eminence adjoining Shooter's Hill-road, near the Herbert Hospital, and from the summit extensive views are obtained over London and the adjacent country.

A CURIOUS discovery has been made in taking down for rebuilding the comparatively modern church at Iping, erected only about forty years ago on the site of a building known to have been of early Norman date. The demolition of the ancient church at this period must ever be a matter of regret, and the uselessness of the work is shown by the necessity of rebuilding now what was then poorly erected. When the work was removed to the original level the foundations of the ancient church were met with. Below them the architect, Mr. Loftus Brock, F.S.A., found a number of fragments of ancient pottery, which prove to be of Romano-British date. The occupation of the site at this very early period is therefore indicated, and the discovery is worthy of record, since it affords another example of a somewhat similar find beneath a Sussex church. Remains of fully a dozen different vases and urns have been met with. Among them, derived from other portions of the site, are fragments of Norman pottery with the usual finger-marked patterns. The floor-line of the most ancient of the churches erected on the site was cut through and found to be formed of beaten mortar similar to what is met with in some of the Roman villas as well as in some early churches. A portion of a Saxon plaster strip was taken from the old Norman foundations, used as old material, indicating apparently that a Saxon church of stone had preceded the Norman building. This will be preserved in the new work, as well as a curious thirteenth-century sepulchral slab of very small size, which has lain in the churchyard for many years.

PROFESSOR NEWTON will resign his position as keeper of the Greek marbles at the British Museum, at Christmas, being desirous to escape from the large amount of routine work which the position entails, and to give his remaining time to the prosecution of archaeological study in a more unfettered manner. His resignation will leave a gap which it will be by no means easy to fill up adequately, and considerable interest and curiosity will probably be felt as to who will be his successor in the office which he has so brilliantly filled for many years. It is to be hoped that his successor, whoever he may be, will receive more liberal and less tardy support in the effort to utilise fully the store of interesting and valuable remains of antiquity which are still practically useless to the public from want of proper opportunity for their display. A walk



with Mr. Newton through what he calls "his cellars" is sufficient to show how much there is of interest that is buried out of sight, and though the valuable collection of Roman mosaics is formally open to the public, the conditions of light and arrangement under which alone these works can be at present seen render real study of them all but impossible.

THE offer of baronetcy to Mr. Millais and Mr. G. F. Watts is a new step in the recognition of art and artists in official circles, and is to be commended in so far as it shows a disposition to place art, in reference to such distinctions, on its proper level in relation to science. It is not surprising, however, to hear that Mr. Watts has declined the honour offered to him. Distinctions of that kind hardly sit well on an ideal artist living apart from the world and its ways, and who cannot well be raised in public estimation by any such formal title.

#### THE CLERK OF WORKS.

The clerk of works may be described as a professional refugee. He is not born, but made,—by circumstances, not by design. He is the neutral axis, so to speak, of the calling to which he is allied, and towards which its elements levitate or gravitate, as the case may be. The superior artificer who does not in due course develop into a builder becomes a clerk of works; the builder who has lost his business, and the architect who never succeeded in getting any, alike find shelter and subsistence under that ancient and honourable title. Since the days when Dan Chancer, soldier, courtier, Poet Laureate, was appointed clerk of the works to the Royal Palaces of Windsor and Westminster, the like offices have been often filled by men whose talents have been rather remarkable than relevant. The modern clerk of works is "a man so various" as to defy classification, and it is proportionately difficult to catch a passable likeness of him. There could scarcely be found a better subject for a portrait than H. He was in many respects an ideal clerk of works, and he conformed strictly to the rule, inasmuch as he was not specially educated to occupy the position in which he was ultimately placed. He was, in fact, a living contradiction of the proverb which affirms, with the customary inaccuracy, that as the twig is bent the tree is inclined. As a twig he was sedulously bent towards some phase of the Dissenting ministry; and he was persuaded when very young to attempt for a time some form of ministrations. As a tree he had no inclination whatever in that direction. A taste for the bench and the lathe,—for the study of applied mathematics and the science of building,—took complete possession of him. All his spare moments, and many which could not well be spared, were given up to those pursuits, and all his friends possessed some evidence of his skill in practical mechanics. He remained always something of a student, and, when neither cabinet-making nor turning, was only happy with his books. He was the friend of London and Tredgold, and it is believed, of Peter Nicholson also. The ecclesiastical movement which sprang up half a century ago quickly enlisted his sympathies, and soon engrossed the whole of his energies. He sketched and measured old churches, took squeezes of their carvings, and "rubbed" their brasses with exhaustive ardour. The acquaintances he made while thus engaged led to the offer of an appointment as clerk of works to a projected church; and the zeal and capacity he then displayed led to further similar employment. No one ever discharged his duties more assiduously or more conscientiously. He took from the first a high view of his position, and comported himself as the local representative, the veritable *alter ego*, of the absent architect. Tall, and spare in figure, and of reserved and gentlemanly demeanour, he made an impression upon all who were brought within his influence; and exacted from all the last measure of deference and respect. His dress was quiet and unostentatious, but in perfect taste, and, apparently, much above his station: his linen was always of spotless purity, and he was a very Brummel in the matter of neckerchiefs. He was abstemious in diet, and an abstainer from all intoxicants. In his youth he had been distinguished in the cricket-field as a pedestrian, and he

made light of the scaffold climbing and such like exercises as his new occupation brought. Strange workmen stared to see in the clerk of works this tall, slight, gentlemanlike, well-dressed, and even somewhat dandified figure, and at first were prone to indulge in speculations as to the result of his attempting to scale the more inaccessible heights of the structure which they were assisting in raising. But a very short experience sufficed to dissipate their hopes or fears. The quiet ease with which he would practically demonstrate his views and wishes in the joiners' shop or at the mason's "banker," while discouraging modestly on the rationale of the matter in the aptly-chosen language of a university professor, never failed to tell upon those about him. As he was careful to exact due respect from all, he was no less careful to deserve it. No equivocal transactions with contractors, no bribes, however specially disguised, ever sullied his hands. He was a gentleman, though a poor one, and an exemplar of the fact that it is not necessary to be a boor to be a "practical man"; and that constructive knowledge and ability may be consistent with the due disposition of the letter H. He was content for a bare subsistence to efface himself, and to place all his gifts unreservedly at the service of his employers. He found his reward in the reflection that he was doing with all his might that which his hand had found to do, believing, with Caleb Garth, that "it is a fine thing to come to a man, that of getting a bit of good contriving and solid building done, that those who are living and those who will come after will be the better for."

He may be taken as a specimen, not too common perhaps, of the clerks of works produced by "gravitation." Those who have reversed the process are, perhaps, the more numerous class; and it may be observed that they have generally but a poor opinion of their professional superiors. The clerk of works who has no faith in the architect who employs him is a melancholy creature in whom "unfaith is aught is want of faith in all." No doubt his scepticism is sometimes defensible. But sometimes it is the result of that imperfect sympathy about which Charles Lamb discourses with so much unctious, and which is probably in varying degrees a failing with us all. "If I'd been hard to design the building," said a gentleman of this persuasion, slowly but resolutely, "I should 'ave done something very different from that." We thought it probable, but did not say so. "In what respect?" (we asked, after a pause) "would you have varied Mr. Pennethorne's elevation?" for to his refined and graceful pencil the design in question was due. "How?" he rejoined, drawing his fat right hand from his trouser's pocket and flourishing it at the building generally. "Why! I should 'ave treated the 'ole thing more free-er." Perhaps he would. We will not use the same freedom with him or the class to which he belongs, which comprises men of the strictest integrity and the highest ability, and deserve in many ways our warmest respect.

With what pencil shall we attempt a portrait of our esteemed friend R., the paragon, the quintessence, the admirable Crichton of the whole race of clerks of works! A literary Ouleus, Holl, and Millais rolled into one could not do justice to the manly strength, the winning charm, of his many-sided mind and character! Born in a cathedral town, and bred in a builder's yard, he passed successively through the offices of a quantity surveyor, an architect, and a land agent. The latter recognised the copious knowledge, the ready skill, and all the sterling qualities of the man, and recommended him to the notice of the Duke of —, who was then in search of a trusted adviser in the multitudinous building matters pertaining to his vast estates. Two or three mansions of the highest class and a hundred homesteads, with lodges, cottages, stables, kennels, and miles of enclosures of all sorts, were placed under R.'s sole control. The duties he was called upon to discharge were not only onerous, but diverse beyond all description, and ranged from the installation of the electric light at "the Hall" to the repair of the nursery toys. He has the administration of brickfields and stone quarries without end, and a whole army of artificers execute his orders. Drainage schemes and schemes for water supply are constantly on his hands, and buildings by the score for ever under erection or repair. He is a builder on the very largest scale, in all but the profits; and he works as hard as a Primo Minister, without his honours and holidays.

He has business in several counties, and gives his personal attention to all. On horseback from daylight till dusk, he contrives to spend more hours over the drawing-board than many an architect in fair practice. He has to meet men of every occupation, each on his own ground, and to hold his own with them all. The tenant who wants more barns and shedding receives a lesson in the economy of the farmstead, and the builder who would outwit the ready and versatile clerk of works learns early to give up the fruitless contest. With infinite tact he steers a middle course between the upper servants on the one side, and the lower gentry on the other, and while allying himself with neither faction, contrives to conciliate both. His workmen are attached to him with something of the old feudal feeling of fidelity, and he exercises over them a beneficent and paternal government,—finding odd jobs for the old men and openings for the young ones, and a civil word and a good turn for all. He is the idol of the children at the Hall, teaching the boys to row or to ride, and devising for the girls the most surprising of dolls' houses and captivating of toy cupboards. He is a valuable member of the local cricket club and foremost in all the sports of the park,—a dead shot, a daring horseman, riding across country so straight that the jolly huntsmen stare at him till the tears of delight and wonder well up in their admiring eyes. At the rent audit he is superb, makes the best speech and sings the best song, and wins all the farmers' hearts by the assumption of a brusque, hearty manner, and a broad Dorset dialect.

But the pride of his heart is his steam fire-engine and its smart brigade. It is a joy to see him on a Sunday afternoon, after the last strawberry has been washed down by the last glass of claret, light his cigarette, and, strolling across "the yard," hover round the bright beauty, testing a valve here and touching a nut there. Every hose and bucket religiously in its place, the fire laid, the wood tinder-dry and anointed with paraffin, and the matches ready at hand. His "brigade" is formed of his own men, trusty stalwart fellows, prompt, alert, zealous, and obedient to the least sign from their master, and both horses and men are drilled with the regularity and precision of a martinet. Alarms at unexpected moments are sounded, and the splendid machine, steam up and manned for action, is out in ever so few seconds. The honest farmer breathes again when he sees the spunking team approach his blazing stacks, and the Hall and its priceless treasures are secure under such skilful surveillance. It is a proud moment when R., casting a last keen glance at the preparations, mounts unfurled the lofty box, and, gathering up the "ribbons," tools his eager steeds through the tortuous streets of the sleepy little town and along the quiet country roads with unerring precision, and at a pace which would make Captain Shaw himself stare and gasp. He discharges duties more multifarious, and quite as delicate, as those of an ambassador to a foreign Court, for emoluments scarcely above those of an ambassador's butler. He has, it is true, a pretty house, set in a trim lawn and begirt with banks of cyrings and rhododendron, and beyond an old-fashioned walled garden, bright with flowers and fragrant with lavender and boy's-love and old-fashioned herbs,—a veritable pleasure, exuberant in dainty fruits and nourishing essences. And well does he deserve them all.

#### LETTER FROM PARIS.

THE *Salon* has only just closed its doors, and preparations are going on at the Palais de l'Industrie for the exhibition of work which will take place shortly, and will be, thanks to the efficient concurrence of the Municipal Government, an exhibition of great interest from the popular education point of view.

We shall have occasion to speak again of this, and to notice the handiwork executed in the different schools created in the city of Paris for work in iron and wood. The Health Exhibition held last year at South Kensington has already given some opportunity for observing in London the progress made in these schools of trade apprenticeship, to which the congress of architects has awarded two special recompenses.

In our last we gave the principal awards in the *Salon*; we may now complete the list by saying that for architecture the *premières médailles* were awarded to MM. Lefort (Palais



de Justice of Rouen), Guateoson (Portal St. Maclou at Rouen), Boileau (monument to Gambetta), Darcy (Château de Mehun-sur-Yèvre). M. Guateoson has obtained, as well as M. Depasse, a travelling scholarship ("bourse de voyage"). MM. Pons, Cavelier, and Camat have obtained *secondes médailles*. The *troisimes médailles* have been awarded to MM. Nodet, Baes, Chaine, and Poncet; and "honorable mention" has been given to MM. Lechâtellier, Renaud, Raffet, Stourrier, Degebre, Bouscass, Leroy, Charles Normand, Lacombe, Despieux, and Bernard Joanny.

We may add with satisfaction that the appreciation of the work of M. Daillion, the "Reveil d'Adam," has been fully confirmed by the "Conseil Supérieur des Beaux-Arts," who have awarded the author of this statue the "Prix du Salon" by seventeen votes against fourteen given to M. Fritel, author of "Solum Patriæ." If we now add that the Conseil Municipal has shown itself this year unusually parsimonious, and has purchased only the very mediocre group by M. Hiolin, entitled "Le Loup," and the mannered statue by which M. Gaudex has represented the musician Lulli in the guise of a scullion playing the violin, we shall have done with the annual *Salon*, the attendance at which during the last week has been sensibly affected by the distressing heat from which we have been suffering in Paris.

If the administration has shown itself parsimonious this year in regard to the fine arts, it has not the less pursued its large projects in regard to public improvements, and proposes to commence in September the new Bourse de Commerce, of which we have already spoken. This important operation, which will compel the completion of the Halles Centrales, and in consequence the suppression of the tortuous and unhealthy streets situated in the heart of Paris, and will have, besides, the effect of clearing the approaches to the new Hôtel des Postes, which is now nearly completed.

This fine edifice, with arrangements so well suited to modern requirements, is the work of M. Guadet, the architect, under whom it was commenced in 1879. It takes the form of an immense quadrilateral, of which the principal front, towards the Rue de Louvre, is 76 mètres long. The façade on the left occupies, towards Rue Etienne Marcel, a length of 119 mètres; that on the right, Rue Gutenberg, 77 mètres; and the rear façade, Rue Jean Jacques Rousseau, 84 mètres. The cost is about 14 million francs. The inauguration of the new building will probably take place this autumn, and, as soon after as possible, the unsightly sheds will be removed which disfigure the Cour de Carrousel. It is only then that the municipality will be able to form, on the Tuileries site, the square in the centre of which the monument to Gambetta will rise, and which will complete the great promenade which extends from Courbevoie to the Louvre, across the Champs Élysées and the Tuileries.

Meanwhile, the administration is much occupied with the national fête of the 14th of July. But here, as everywhere this year, we are hampered by want of money. The State has docked its subvention by 100,000 francs; and as one cannot cut down the share of the poor, the illuminations will be reduced and the standards and trophies suppressed. The loss is not very great, however, and the public is a little weary of these official lightings-up. This time the glory of the fête will be reserved for the Bois de Vincennes; a concession made to the popular quarter at the expense of the "West End," whose inhabitants generally leave Paris at this broiling season. In the way in which things are going, in a few years the national fête may have survived its interest, for Parisians are capricious, and it is with them more than anywhere else, according to the old proverb, "Tout casse, tout passe, tout lasse."

This year there are four among the attractions of the programme the inauguration of the statue of Voltaire, which is being erected on the Quai Malaquais. After the *chef-d'œuvre* by Houdon, which every one can admire in the foyer of the Comédie Française, it was of little use to bestow on the public streets so vulgar a bronze, which can add nothing to the fame of the great writer any more than to that of the sculptor Caillé, who died some years ago, and who was the author of it. On the occasion of the 14th of July also, it is said that the two vast annexes which have been for eight years in course of construction in the Jardin des Plantes will be

opened, which will allow of the exhibition of zoological and anthropological collections hitherto inaccessible to the public.

Speaking of the Jardin des Plantes, we may give a glance at the enlargement of the Pont d'Austerlitz, which is being actively carried on. Thanks to this operation, which still requires two months' work to complete it, the Pont d'Austerlitz will be the most spacious bridge in Paris. It dates from 1807, but has been already rebuilt in 1854.

There is another project much talked of at present, and which, if it receives the sanction of the Municipality, will be very serviceable to the most popular quarters of Paris. We allude to the Butte Montmartre, the bare ridge of which overlooks Paris, and serves as the base to the Church of the Sacré Cœur, which M. Daumet hopes to complete in time for the exhibition year of 1889. According to the scheme prepared by M. Bartel, Engineer-in-Chief "des Promenades," the accidental features of the site are utilised to create, above Paris, a picturesque and shady square, where water will escape in cascades between the rocks, to glide over lawns between masses of foliage. The new park will be a kind of pendant to that of the Buttes Chaumont, and will offer a marvellous perspective of the great town with its innumerable buildings stretched out below.

Such works command unanimous approval. Why does the Municipal Council of Paris not set bounds to its ambition instead of believing itself obliged to now and then excite, by ill-judged innovations, the complaints of the public? Thus, with no other motive than to flatter certain politicians, it is about to enter on a fight *d'outrance* against the expiatory chapel, a work by Perdreau and Fontaine, raised on the site of the Cimetières de la Madeleine, where were laid the remains of Louis XVI. and Marie Antoinette. Merely in an artistic point of view the act is deplorable, and as little comprehensible as the hatred against certain names of public streets which are intimately connected with the history of the capital, its trials, its glories, and its successive transformations. These changes of names are generally disapproved, and excite something like a public outcry. The tradesmen especially, who are compelled to change their headings and their stationery, protest strongly against the expense thus imposed upon them. The inhabitants of the rich and aristocratic quarters protest also energetically when it is proposed to de-baptise the "Boulevard Haussmann" and call it the "Boulevard de la Convention," or (still worse) to give the name of Danton to the Rue St. Dominique St. Germain, where dwell so many of the families whose ancestors were victims under the Terror. We have not space to enumerate all the changes decreed by the Council; we can only observe that the "Rue Buonaparte" will become the "Rue Luxembourg," the "Boulevard des Capucines" will be called "Boulevard du 24 Février," and whilst the "Rues Deguerry" and "Darboy" which recall two illustrious victims of the Commune, will take the names "d'Holbach" and "d'Helvétius." Delescluze, who died in 1871, his arms in his hands in that fight against social order, will give his name to the Rue Richard Lenoir.

Here is once more the shabby business born of low political prejudice. We must notice, however, an honourable scruple in regard to the "Avenue Victoria," the name of which the Council refused to have changed, as such an act "would be an injury to a friendly nation and an impertinence in regard to a lady who, as sovereign, had always respected the liberty of the English people." One can only applaud these words of wisdom, and hope that the Government of the Republic will also respect the liberty of the Parisians by refusing to ratify the changes of names which hurt the convictions of a great many and are called for by no general necessity.

Last month we expressed some fear for the paintings in the Panthéon on account of the recent de-consecration of the building. We believe now that the Government has quite made up its mind to preserve the paintings and even to carry on the artistic work commenced ten years ago. On the other hand, it has been decided to remove the gilt cross which crowns the dome and rises 82 mètres above the level of the Place du Panthéon. This cross, which may be called a veritable monument in metal, measures 7 mètres and a half in height, without counting the ball which serves as its base, and weighs more than 1,500 kilogrammes (about

28 cwt.). It is expected that its removal will cost about 7,000 francs.

The death of the lamented Ballu has left vacant the post of Architect-in-Chief of the Hôtel de Ville; and though the building may be considered as completed in the main, there remains still the decoration of the *salons de réception* to be carried out, which is exceedingly important, and demands the direction of a thorough artist. Though the question is not finally settled, we may pretty safely predict that *nominalement* the late architect will not be officially replaced. His zealous collaborator, M. Deperthes, will continue the direction of the architectural work, while the purely artistic work will be confided to M. Formigé, who has preserved all the traditions of his master, and been the depository of his ideas and projects. In choosing him the Administration will ratify the last intentions of M. Ballu, who had shown entire confidence in the young architect.

Since we have mentioned the name of M. Formigé, we may say a word more about the crematory apparatus of which he is the inventor, and which was described in a recent article on the *Salon* in these pages. The Municipal Council have been taken with the idea of constructing, in a cemetery in Paris, three kilns or furnaces for burning the *débris* of hospitals as well as the bodies which have been used for anatomical study. This is only part of a general project of which we have already spoken, and which cannot be carried out as a whole except by the authorisation of Parliament. For the more restricted experiment here referred to, the place chosen will be the Père la Chaise Cemetery. All the monumental and architectural portion of the work will be for the present adjourned, and only a plaster imitation of the intended design, on a core of brick surrounding the kilns, will be erected.

We need not conclude without mentioning another project with which the Council are equally taken, and which will necessitate an expenditure of nearly six million francs. This idea is to construct, on a site comprised between the Rue du Cloître Notre Dame, the Rue Massillon, and the Quai aux Fleurs, headquarters for the Fire-extinction Service. All the plans have been studied and prepared, and there will be matter for very important works; and, as we have already said, at the time of a crisis in building trades and of general distress, one cannot have too many large building yards open for public works.

*Postscript.*—We learned that M. Perrin, the able administrator of the "Comédie Française," is seriously ill. For some time past M. Perrin had been obliged to practically retire, owing to ill-health, and the Government had entrusted the direction of the "Maison de Molière" to M. Kaempfen, Director des Beaux Arts, and Minister of Public Instruction.

#### PAISLEY BAPTIST CHURCH COMPETITION.

MR. JAMES COATS, of Paisley, having resolved to build a new Baptist church in his native town, at a cost of 20,000l., as a memorial of a member of his family, has invited six architects to send in plans, each of whom is to receive a premium of 100l., which, in the case of the successful competitor, is to merge in the commission. The architects invited to compete are Messrs. Billing and Seddon, of London; Blanc, of Edinburgh, and Burnet, Hutchison, and Watson, of Glasgow. Three Glasgow architects volunteered their services, and have also sent in plans, viz., Messrs. Chalmers, Bell, and Higgins.

The church is to accommodate a congregation of 800, without galleries, and to embrace a hall, a school, retiring-rooms, &c.

The competitors were each furnished with a photographed view of a Gothic church, which was "to be considered a model for the outside, but to be improved upon if possible," and they were desired to nominate a consulting architect to advise the donor. The choice ultimately fell upon Mr. Sellar, of Glasgow.

The site, which has been acquired at a cost of 10,000l., is a fine one, at the angle of High-street and Oakshaw-street, and the building, when completed, will form a prominent architectural feature in the town, the existing churches in which, with the exception of the ancient abbey, are not remarkable.

The plans were last week exhibited in the



Gymnasium, Knox-street, Paisley, a building erected by Mr. Coats upon the margin of the grounds surrounding his mansion, at the west end of the town. The drawings do not bear the names of the authors, nor are mottoes attached to them, but the names of the competitors were freely disclosed, and we shall refer to them in the order they presented themselves to those entering the hall of the Gymnasium, where they were disposed on screens level with the eye. No view of the church submitted as a model was to be seen in the Gymnasium, but, from the variety of treatment, it is apparent that the competitors have availed themselves of the invitation to "improve upon it."

Mr. Watson, in an explanatory statement which accompanies drawings, compares the site secured for this church to that occupied by St. Mary Redcliffe, Bristol, which, being placed upon an elevated platform, has a fine effect, and he has followed this example. The disposition of the parts and general aspects of the design are similar to those we find in many recently-erected Dissenting churches. The spire is placed at the end of the aisle to the right of the main gable, and the schools, &c., project from the rear at the other side. The proportions are harmonious and the detail correct, but there is a lack of emphasis throughout. The interior consists of nave, with aisles, terminated by an apse; in the front stands the pulpit platform, behind it the communion-table, and behind that the baptistery, flanked by seats for choir and elders. The organ occupies a chamber to the right. There appears to be no specified position for the pulpit, communion-table, and baptistery in a Baptist church; at least, the variety of treatment and mode of disposing of these requisites in the designs now in question are various. It may be remarked that in no case is a special feature made of the place of immersion save in one instance, where a carved canopy is placed over it somewhat after the manner of a baldachino over an altar.

Mr. Hutchison seems to have carefully considered the site before preparing his designs, and gives a bird's-eye view, showing the church he proposes to erect upon it, which appears to group effectively with the surroundings. The design itself possesses considerable merit. It is sufficiently rich as regards detail, without being florid, and the parts group compactly together. The body of the church consists of nave, with aisles, transepts, and chancel, the schools, &c. being placed in the rear. A well-proportioned, effective spire is placed at one side of the main gable, and its base is pierced at the side by the principal doorway, which has the pediment filled in by a bas-relief. A doorway in the centre of the main gable is, of purpose, kept subordinate, the effect here being directed to a large four-light traceried window, having a bas-relief under it. The clearstory is supported by clustered columns, and the ribs of an open-timbered wagon-roof rest upon attached shafts. In the chancel an effort has been made to produce an effective and pleasing arrangement. This has been obtained to a certain extent, but the *tout ensemble* is somewhat theatrical. The communion-table is placed in front, the pulpit to the left, and the baptistery behind. The organ is divided into two parts, placed in flanking aisles, and the baptistery is screened off by an open arcading, furnished with draped curtains.

Mr. Burnet's design is characterised by power and breadth of treatment. He is reticent as regards decoration, and relies upon largeness of the parts and depth of light and shade in order to produce a dignified effect. This he has attained, with seeming absence of effort, yet with simplicity of arrangement and picturesque, pleasing grouping. At the same time utility has been strictly kept in view, the plan showing a simple nave and transepts without aisles. The spire is placed at the centre on one side, and groups effectively with the adjuncts, which are joined to the church by an arched gatehouse with a turret attached to it. The buttresses are boldly projected, and the idea of massiveness is accentuated by the walls, at about a third of their height, being sloped back, an arrangement which is suggestive of shallow, stone-roofed aisles. The roof is open-timbered, and the principals are supported by clustered shafts rising from the floor. The pulpit is placed in front of the choir, and the baptistery occupies the entire end of the church.

Mr. Blanc exhibits alternative designs. In

the first of these he shows two spires (rather feeble in effect) flanking the principal gable, and the style adopted is Early French. The other design has a tower over the intersection of the nave and transepts, having an open crown, after the manner of St. Giles's, Edinburgh, a feature which would be very effective on the site. The detail of this design is distinctly Scottish in character, some of it having apparently been suggested by the neighbouring abbey. The schools, &c., are placed on the ground-floor, which necessitates a flight of steps to the doorway. The aisles are spanned by flying buttresses, thus repeating the salient feature of the tower, and imparting to the exterior an expression of strength. An octagonal vestry, after the manner of a chapter-house, groups pleasantly with the body of the building. The main gable is flanked by octagonal turrets, which contain staircases leading from the hall below to the church above; these add materially to the outward effect. The interior shows at the end of the nave the communion-table in front, the pulpit at one side, and the baptistery behind.

Mr. Billing has produced a very florid design, the plan showing nave with aisles, transepts, and semicircular chancel. There is a richly-decorated spire at one side, and a *flèche* over the intersection. The windows have elaborate tracery, and they are surmounted by crocketed gables, and the pinnacles, from which rise flying buttresses, are crocketed in like manner. In the transepts are large rose-windows, and blank arcading clothes great part of the wall surface. The clearstory rests on clustered shafts, and there is a triforium with open parapet, which is corbelled out over the capitals of the aisle columns. The communion-table occupies the front centre of the chancel, and on either side stands a stone reading-desk and a stone pulpit, with an open canopy over it. The baptistery in the rear is also surmounted by an open canopy.

There is no doubt as to the splendour of the conception, but there is as little doubt that it could not be produced by the expenditure of the stipulated amount.

The plan submitted by Mr. Higgins shows a cross church, with aisles to nave and chancel. The style is Italian Gothic, with the infusion of an English element. There are spires at each side of the main gable, which is surmounted by a sculptured figure of an angel. In this gable there is a rose-window under a containing arch, and beneath it is a bas-relief and statues under canopies.

The interior is vaulted; shafts springing from the floor, in face of the aisle columns, supporting the main ribs. The pulpit is placed in the centre front of the chancel, the baptistery behind it, and the communion-table against the back wall.

Mr. Seddon has aimed evidently at creating a work of art. A coloured drawing of the interior shows the whole wall surface decorated in gold and colour, a marble floor unencumbered by seats, and marble shafts of various kinds. The chief entrance is by a projecting octagonal porch, above which is a group of three windows, and to the right a massive tower and spire. The plan shows a nave with aisles, transepts with one aisle each, and octagonal apse. Square piers support the aisle arcade, and upon the inner face of these are attached marble shafts in two stages. Marble shafts run up the face of the clearstory and receive the principals of a hipped open timber roof. The aisles are separated from the nave by open screens. The roof at the intersection takes the form of a dome. The pulpit is a stone gallery or rostrum with perforated parapet, occupying the whole breadth of the chancel; the organ stands in the rear, and the baptistery is placed on the floor-level, beneath the rostrum, which is supported by slender stone columns.

Mr. Chalmers has sent in two designs, in one of which there is a boldly-treated front with a large window recessed to the depth of one bay of the nave. The plans show a nave without aisles, and the accessory buildings project beyond the church walls, giving the effect of side aisles.

The other design has aisles with a very poorly designed clearstory, having in each bay a circular cusped window flanked by very small sharply-pointed single lights.

#### Valuers for Re-Assessment, Blackburn.

Mr. W. S. Varby and Mr. A. W. R. Simpson have been appointed joint valuers to the Guardians of the Blackburn Union.

#### SOCIETY OF TELEGRAPH ENGINEERS.

On Tuesday last about 500 of the members of the Society of Telegraph Engineers and Electricians, at the invitation of their President, Mr. Spagnoletti, who is the chief electrical engineer of the Great Western Railway, visited the large engineering works of the Railway Company at Swindon. A special train, consisting of fifteen narrow-gauge saloon carriages, had been prepared, and this train steamed out of Paddington Station five minutes after the departure of the Flying Dutchman, and made the run of seventy-seven miles to Swindon in an hour and three-quarters. Here the passengers alighted, and proceeded to the large drill-hall belonging to the company, where an excellent luncheon was served, at which Mr. Spagnoletti presided, supported by Sir Robert Rawlinson, Professor Stokes, Mr. Crookes, and others. This drill-hall, the dimensions of which are about 120 ft. by 85 ft., is admirably adapted for its purpose; it is roofed in two bays, with light iron trusses of about 60 ft. span, resting on an iron girder, which is carried across the centre of the building, and is supported on one central iron column, with the exception of which the whole of the floor-space is perfectly clear, and thus ample room is secured for drill, gymnastic exercises, &c. At the conclusion of luncheon, the toasts of the "Queen," the "Great Western Railway Company," the "Visitors," and the "President," were given with commendable brevity, and the company dispersed over the works. These works cover an area of 130 acres, and are fitted with every kind of machinery required for the purposes of a great railway company. Locomotives were seen in all stages of preparation, from the forging of the axle to the painting and varnishing of the completed engine; railway carriages, from the sumptuous royal saloon to the modest third-class coaches, which are themselves saloons compared with the style of carriage which used to be considered sufficient for the third-class passenger; horse-boxes, cattle trucks, and parcel vans, valves and piston rods, bolts and nuts, and huge girders for bridges; in fact, everything required for the maintenance of a large railway is here manufactured except rails, and as the use of steel for rails is superseding that of iron, the rolling of the latter has been discontinued, and steel rails are purchased ready for laying. The foundry and locomotive department detained the visitors longest, as here is fixed the more elaborate machinery, which is so extensive that two completed engines can be turned out per week if required. The fact of the double gauge being in use on the Great Western Railway considerably complicates the manufacturing arrangements, as the old class of broad-gauge locomotive could not be adapted to the narrow-gauge. The company are now, however, building narrow-gauge engines, as far as the boiler and machinery are concerned, and fixing them on broad-gauge wheels, so that if required for the narrow-gauge they can be readily adjusted without much expense. One of the most interesting objects in the works, from a historical point of view, is the first engine which ran on the Great Western Railway, called the "North Star," which was made in 1837, and still appears in very fair condition. The driving-wheel of this engine, which is 7 ft. in diameter, is formed with iron spokes, somewhat in the style of an ordinary wagon-wheel, and the buffers are covered with leather. It would have formed an interesting exhibit at the Inventions Exhibition. The number of men employed at these works is on an average 6,000, and these with their families form almost a separate town which has sprung up in proximity to the railway, as distinct from the old town of Swindon, on the high ground about a mile from the station. It is pleasant to notice that the directors of the Company are fully alive to their responsibilities as employers of labour on this gigantic scale. In addition to the drill-hall previously mentioned, there is a mechanics' institute, with lecture-hall, library, &c., a free school, a fine church, designed by Sir Gilbert Scott in the Decorated Style, and built of random coursed Pennant stone from the neighbourhood of Bristol, and containing some good stained-glass windows; and a large number of neat and convenient cottages, which have all been erected by the Company; and there is also an extensive park where cricket and other games can be indulged in by the employees. There is also an excellently arranged accident



hospital. As the area of the works is so vast, the visitors were unable to inspect more than a portion of them in the time at their disposal, the return train being timed to leave Swindon at 6.50. Paddington was reached at 8.30, and the company separated after a most interesting and enjoyable visit.

### Illustrations.

#### THE PALAIS DE JUSTICE, BRUSSELS.

**RE** our impression of April 11th we gave some particulars of this remarkable building, and illustrated them by a view of the exterior. We are now enabled to add a view of the interior of the twin stairs vestibule and one flight of the entrance stairs which lead therefrom to the principal floor upon which the courts themselves are placed. The pedestals at the foot of the flights are occupied by marble statues, of heroic size, of eminent lawgivers, Greek and Roman, and, as will be seen, preparations have been made in the design for similar statues at intermediate points. It is also intended to place groups of statuary on the broad pedestals left for them in the interspaces of the colonnade on the principal floor.

The Belgians do not follow our example, and having provided niches, leave them empty. One by one the proposed figures are being put in their places, and there is no intention to leave the work until it shall have been completed in every respect in accordance with the architect's designs and instructions.

Notwithstanding the prodigious outlay which has been made on the fabric, and the odd million or so which is being spent in clearing the site, so that the building may be properly displayed, there is now on foot a scheme for the artistic decoration of the interior corridors, and the vast *salle des pas perdus*. Truly our Belgian friends do things thoroughly, and shame us by the noble sacrifices they make for art.

#### DESIGN ORIGINALLY SUBMITTED FOR THE BROMPTON ORATORY.

THE design we illustrate this week was one sent in competition for the Brompton Oratory, and besides being rather striking and original in design, contains some novel features.

Whilst adhering strictly to the style called for in the conditions of the competition, the author has so treated the façades as to admit of an extensive use of richly-coloured glass mosaic figure subjects in panels, &c., a decorative medium that, from its indestructible qualities and the ease with which it is cleaned and freshened up from time to time, should recommend itself to London street architecture.

Those who, like the architect of the design, have carefully studied the mosaics of Italy, must be struck with their depth of tone and richness of tint, far above any other kind of decoration; the local colour of any material used in London for external work is entirely lost and gone at the end of 160 years, whereas mosaics such as those in the Chapel of Galla Placidia at Ravenna retain their original beauty of colour after the lapse of 1,500 years.

Where judiciously used in conjunction with coloured marbles (in thin slabs in panels, &c.), and therefore comparatively inexpensive), a permanent effect of cheerful colour is obtained that would very much relieve and enliven the usual dull monotony of our dingy streets and public buildings.

#### MONUMENTS IN THE NORTH CHOIR AISLE, OLD ST. PAUL'S.

WHEN the importance and wealth of London, even during the Middle Ages, are taken into account, it is not surprising that its vast and venerable cathedral church should have been singularly rich in monuments of great men and distinguished citizens, and it is a very fortunate circumstance that so careful a historian as William Dugdale should have copied all the more important epitaphs and inscriptions just a very few years before the time when, owing, in the first place, to Puritanical Vandalism, and afterwards to the Great Fire of 1666, they ceased to exist. Dugdale's "History of Old St. Paul's" gives illustrations, engraved by Wenceslaus Hollar, not only of the vast and magnificent cathedral, but of no less than forty of the most remarkable monuments which adorned it previously to the year 1645, about which time the stalls

of the choir, organ, &c., were sawn up, and many of the most magnificent monuments mutilated or destroyed, in order to convert the choir and aisles into a convenient "preaching-place." \* Notwithstanding the peculiar way which Hollar and other draughtsmen of his day had of representing architectural works, especially if they happened to be Gothic in style, yet it is not difficult to arrive at some notion of the general appearance of the noble monuments which formerly existed in Old St. Paul's.

A group of tombs of more than ordinary splendour, even for a cathedral, stood in the north choir aisle, and these we have attempted to represent in our illustration. These monuments commemorated or marked the resting-places of the following eminent persons, and were arranged in the following order. Between the high altar and the north choir aisle stood, between the sixth and seventh pier of the choir, the stately chantry chapel and monument of John of Gaunt, Duke of Lancaster; to the east of this was the monument of Thomas Heneage, Chancellor of the Duchy of Lancaster under Queen Elizabeth, who died in the year 1594; kneeling upon a pedestal in front of this tomb was a female statue, presumably that of Elizabeth Finch, daughter and heiress of Thomas Heneage.

Immediately opposite to the tomb of John of Gaunt was the fine Perpendicular canopied tomb of Sir Simon Barley, Knight of the Order of the Garter and Keeper of the Cinque Ports, under Richard II. The monument was a fine example of a canopied Perpendicular "wall tomb," greatly resembling that of Sir Bernard Brocas in Westminster Abbey. Immediately to the west of the tomb of Sir Simon Barley was that of John Chishull, Bishop of London and Treasurer to Edward I. This monument was one of several similar constructions in the cathedral, and was of a form which was, unfortunately, very uncommon out of this cathedral. Instead of cutting away the beautiful wall arcade, as has been done at Westminster Abbey, the wall behind the wall arcade was hollowed out and the monument or tomb constructed there, allowing the wall arcade to stand in front of it as a kind of arched screen. To the west of Chishull's monument were two fairly good Elizabethan ones, commemorating Thomas Aubrey, 1595, and John Mason, 1566.

Under the sixth arch, dividing the north aisle from the choir, immediately to the west of John of Gaunt's Chantry, stood the noble tomb of William Herbert, Earl of Pembroke, who died in the year 1569. This sumptuous monument was constructed of marble, and consisted of a sarcophagus with recumbent effigies of the Earl and his Countess, supported upon a lofty podium and surmounted by a magnificent canopy supported by six Corinthian columns; at either end was a smaller canopy, each supported upon four columns. One surmounted the effigies of two sons of the Earl, and the other that of their daughter, all kneeling.

The fifth arch which divided the choir from its aisles on either side was double, being subdivided by a very slender column supporting two sharply-pointed arches. The space between these and the outer arch was filled in with a canopied niche and tracery.

Under the westernmost of these arches stood the beautiful shrine of "Saint Roger" or Roger Niger, Bishop of London, who was consecrated in 1228 and died in 1241. The episcopate of Roger Niger was a most important one for Old St. Paul's, because it was during it that the magnificent choir of the cathedral was rebuilt. It would appear from Hollar's drawings that the old Norman choir was not pulled down, but only cased with Decorated work. The Presbytery and Lady Chapel, however, from the double arch previously alluded to, were entirely new and had a crypt beneath them. Probably the Norman choir projected no farther east than the double arch. A great solid pier is shown distinctly in Hollar's drawings, which may possibly have marked the commencement of the curve of the old Norman apse. As was the common practice in the Middle Ages, Bishop Roger is buried in the midst of his work. In addition to being a generous benefactor to the cathedral, he was possessed of considerable bravery, for it is recorded that when he was one day saying mass at the high altar of the cathedral the building was struck by lightning, and every one but the bishop and one deacon rushed out of the building, but these two remained and finished the service unmoved!

\* Dugdale's "Old St. Paul's," p. 173.

The shrine consisted of a low canopy supported upon cusped arches, beneath which was a coffin-shaped tomb. Behind the shrine was a very rich pierced stone screen, composed of four two-light traceried compartments. In the bay west of his tomb was the organ, which appears to have been very handsome, and was furnished with great folding doors and shutters, like the ancient organs at Sion in Switzerland, Nordlingen and Augsburg in Germany, and Perpignan in France.

The engraving given in Dugdale's "History of Old St. Paul's," of the tomb of "John of Gaunt" (or Gand) is evidently very inaccurately drawn. It bears, however, a strong family likeness to that of his son, Cardinal Beaufort, at Winchester, and it is not impossible that the monument of Cardinal Beaufort may have been, to a certain extent, copied from that of his father.

Of all the monuments shown in our view one alone exists: it is that to Sir Simeon Baskerville, a small tablet, dated 1641, attached to the column near John of Gaunt's tomb. It is now to be seen in the crypt of the present church.

We may, upon a future occasion, return to this subject, and give some further "restorations" of the monuments in old St. Paul's.

H. W. B.

#### DESIGN FOR WINDOW, JESUS COLLEGE, CAMBRIDGE.

THIS design, by Mr. E. Burne-Jones, A.R.A., represents the subject of the "Adoration of the Lamb," perhaps in somewhat too matter-of-fact a manner, but in a style, in the draping and arrangement of the figures, very suitable for execution in stained glass. The illustration is not reproduced from the window, but from Mr. Hollier's photograph of Mr. Burne-Jones's cartoon.

#### CANDELABRA PRESENTED TO THE BISHOP OF SOUTHWELL.

ON Dr. Ridding being elevated to the new bishopric of Southwell the pupils of Winchester College decided on presenting him with a pair of candelabra, the working drawings for which are illustrated in our impression.

The combined candelabra bear eighteen candles, the number of years of Dr. Ridding's headmastership.

Round the bases, in the place of the usual jewels, &c., are twelve photographs of Winchester College, burned in on enamelled porcelain plaques. On the shields are the arms of the bishoprics of Winchester and Southwell, of William of Wykeham, Dr. Ridding, and the City of Winchester, the Wicameal motto, "Manners makyth men," running under same. The canopies contain the figures (drawn by Mr. Lonsdale) of St. Swithin, the patron saint of the cathedral, and William of Wykeham, founder of the college. The diapers and ornament are appropriated to St. Mary the Virgin, to whom the college is dedicated.

Blue and red translucent enamel is sparingly applied. An appropriate Latin inscription runs round the base of each candelabrum.

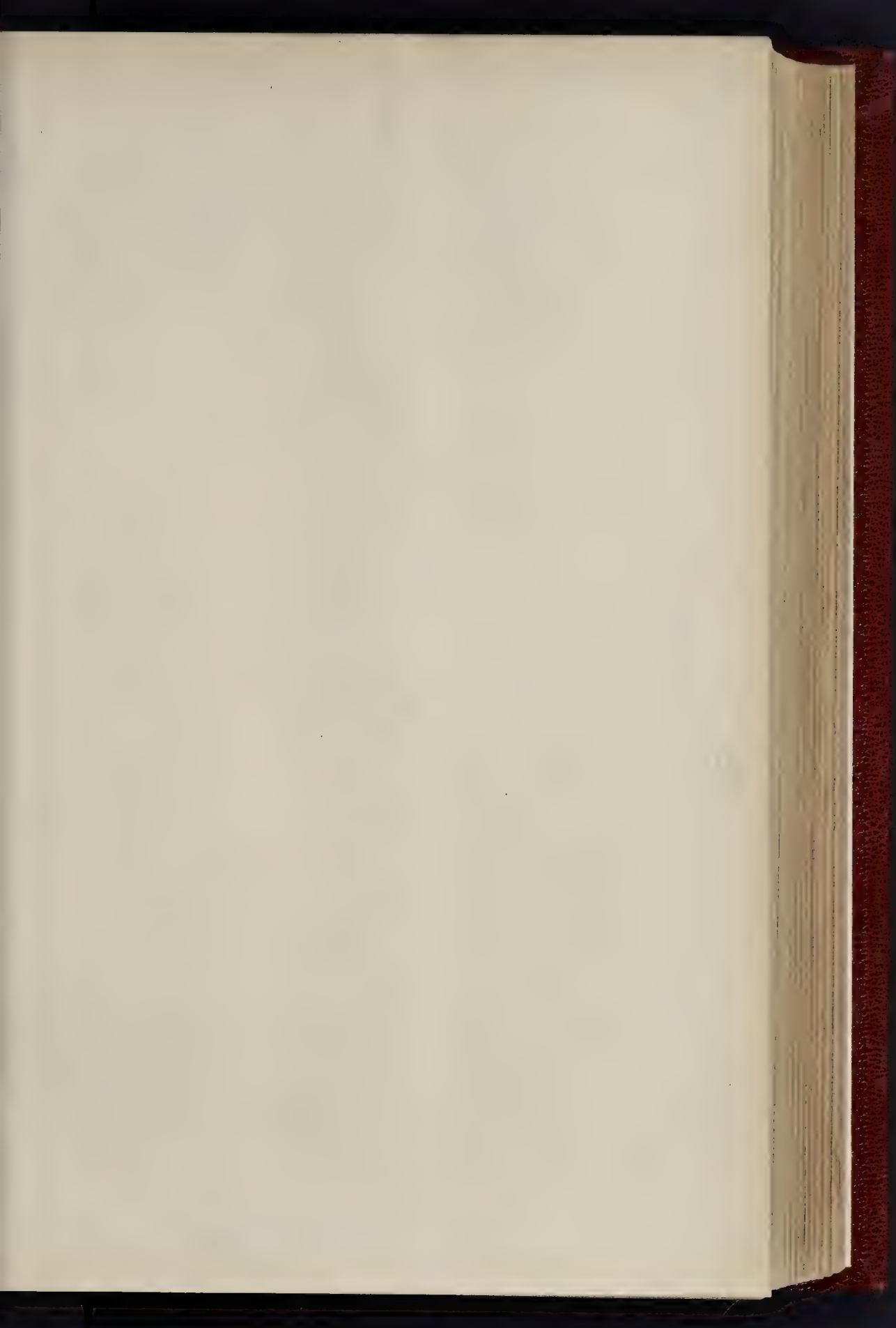
The silver work has been excellently carried out by Messrs. Barkentin and Kral, of Regent-street, from the drawings of Mr. Ernest C. Lee.

#### SCULPTURE AT THE ROYAL ACADEMY.

WE give this week two more examples from this year's sculpture at the Royal Academy, Mr. Onslow Ford's refined and pathetic bas-relief, entitled "In Memoriam," and Mr. Greenough's spirited figure of "Circé offering the Cup to Ulysses." The latter is a little too much of the finished and polished-up order of sculpture for our taste; with less of superficial finish the sculptor might have got more force and freedom; but he has succeeded well in giving what we might imagine to have been the look of Circé, half queenly and half mischievous and dangerous.

The plate of Mr. Ford's work is not reproduced from a photograph at first hand, but from another reproduction which the artist was kind enough to send to us. We told him it would not come out so clean as from a proper photograph, but Mr. Ford says he has no objection to a little softening off of detail in representing sculpture; and as there seemed no other means of obtaining a representation of it till after the Academy closed, we have employed the print which he was kind enough to send us.







THE BUILDER, JULY 4, 1888.





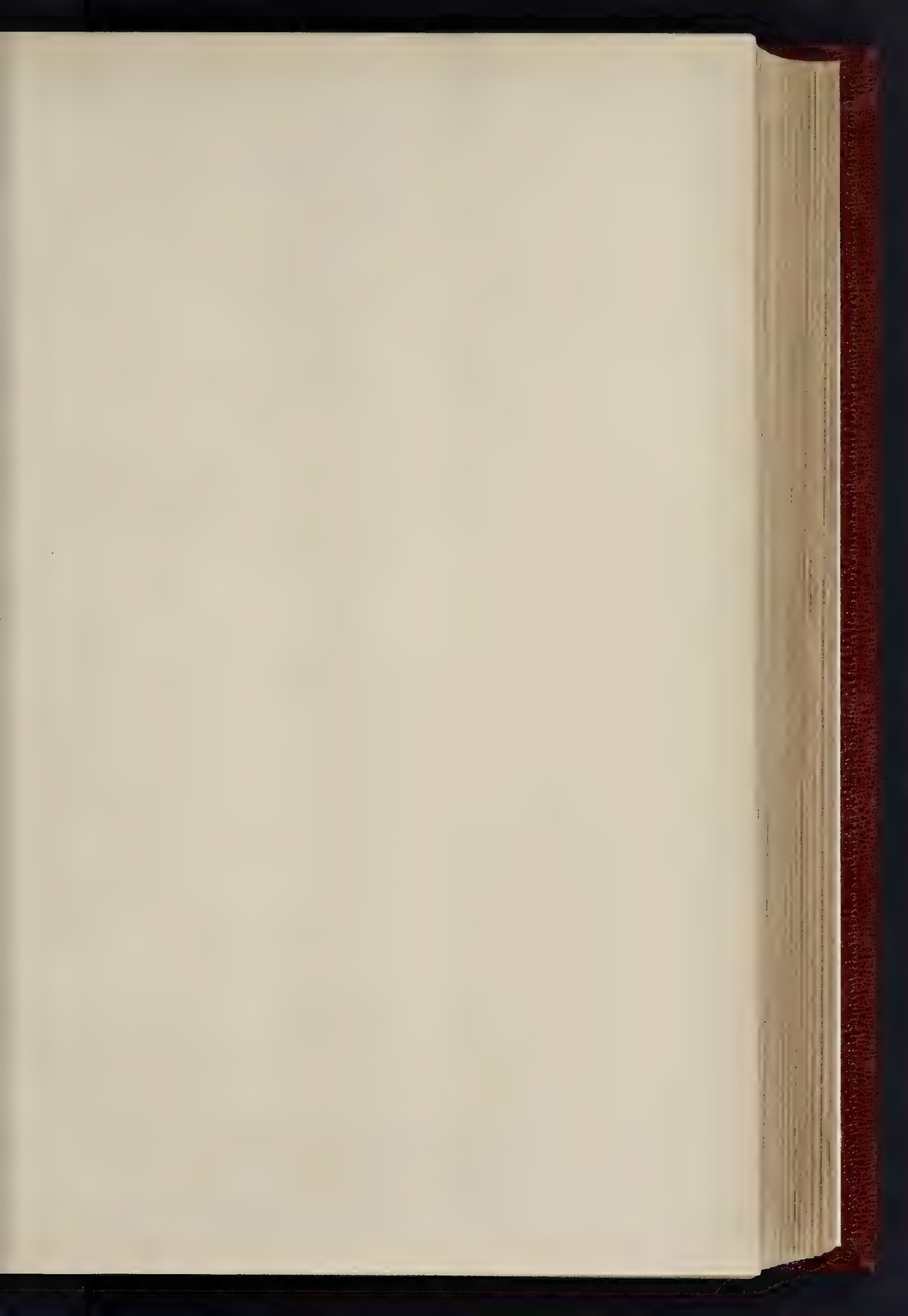


ENTRANCE VESTIBULE, PALAIS DE JUSTICE, BRUSSELS.



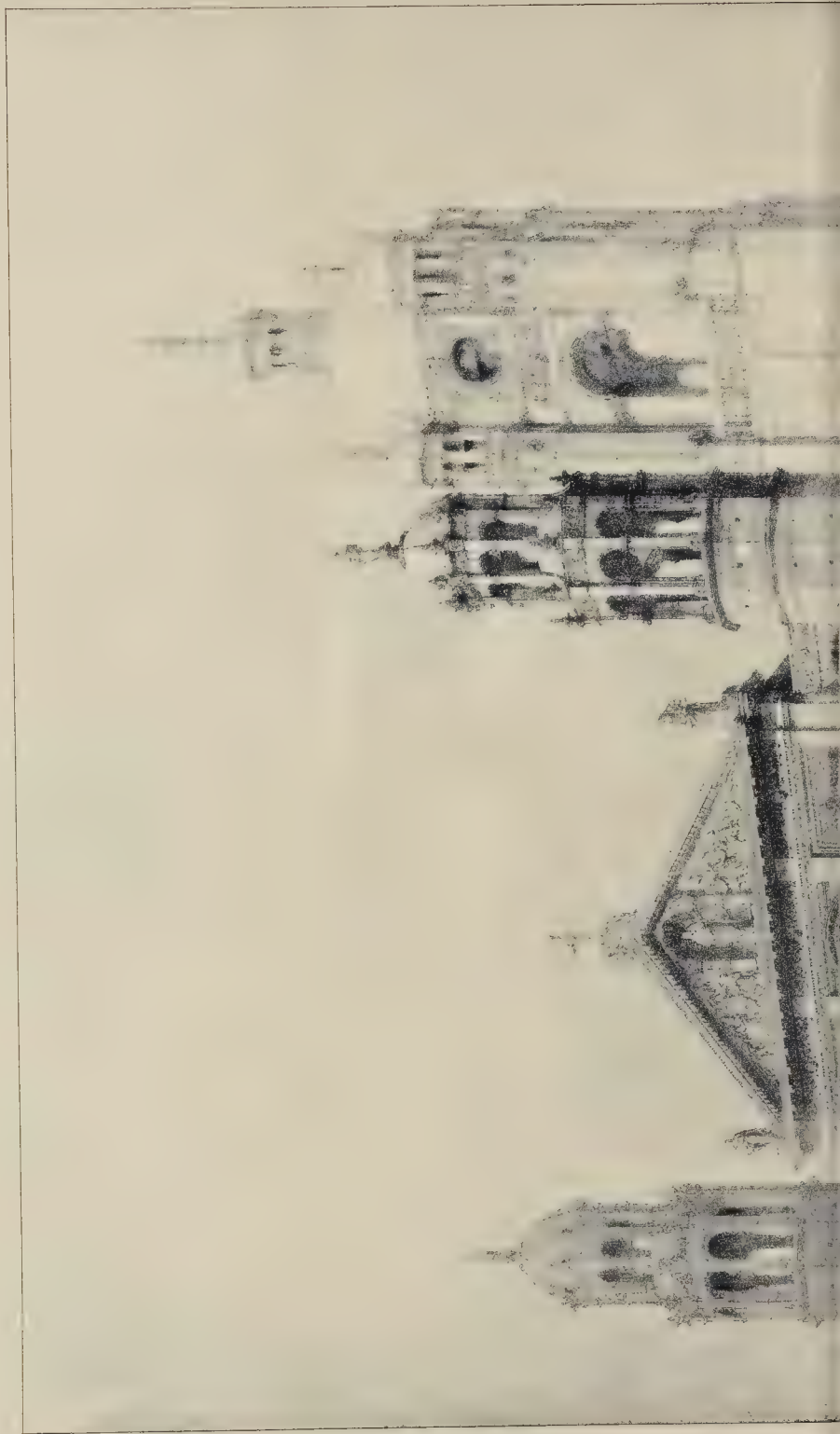








THE BUILDER, JULY 4, 1885.







THE PHOTO SPRAUE & CO LONDON

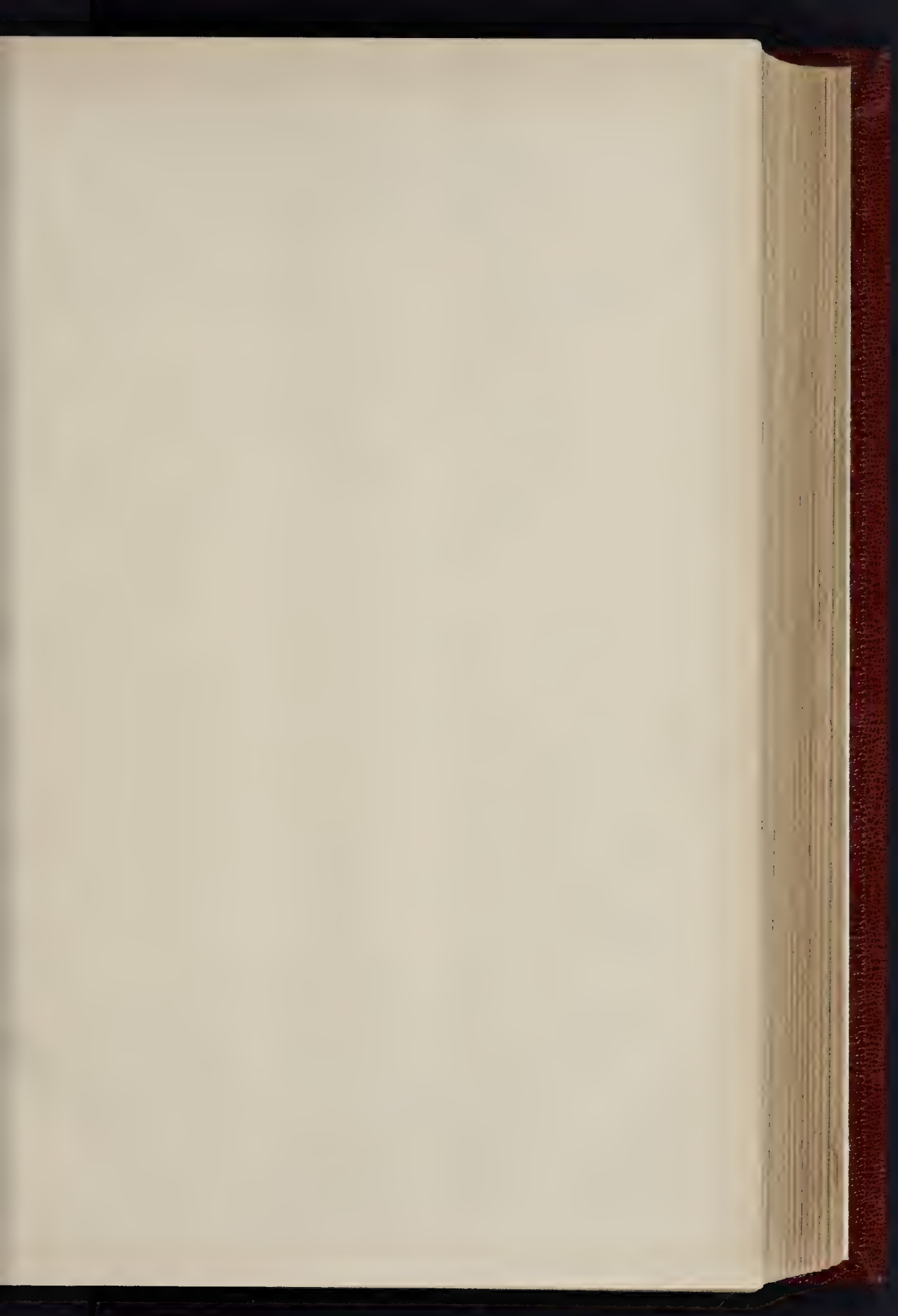
DESIGN ORIGINALLY SUBMITTED IN COMPETITION FOR THE BROMPTON ORATORY

MR GEORGE NATTRESS, ARCHITECT

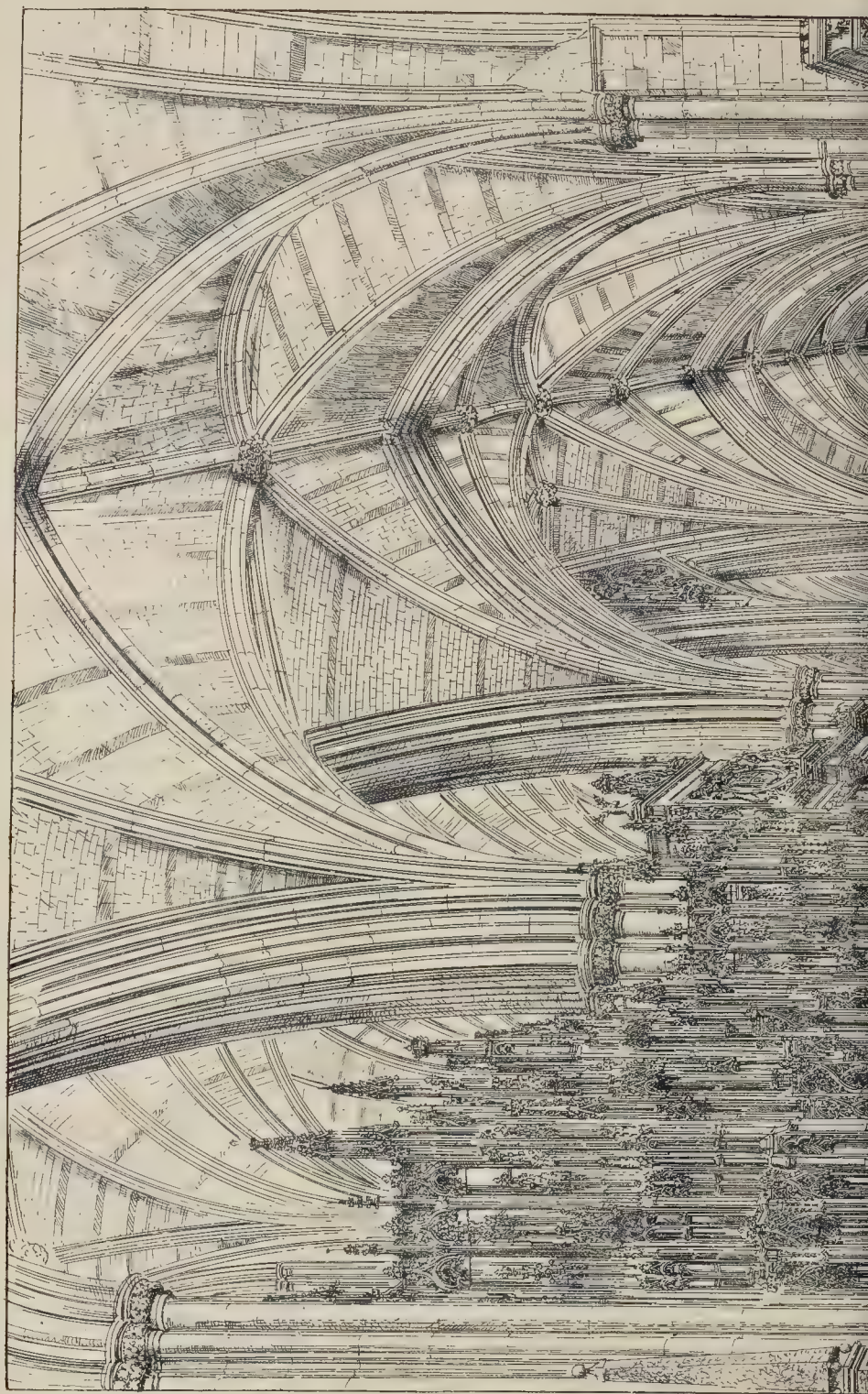




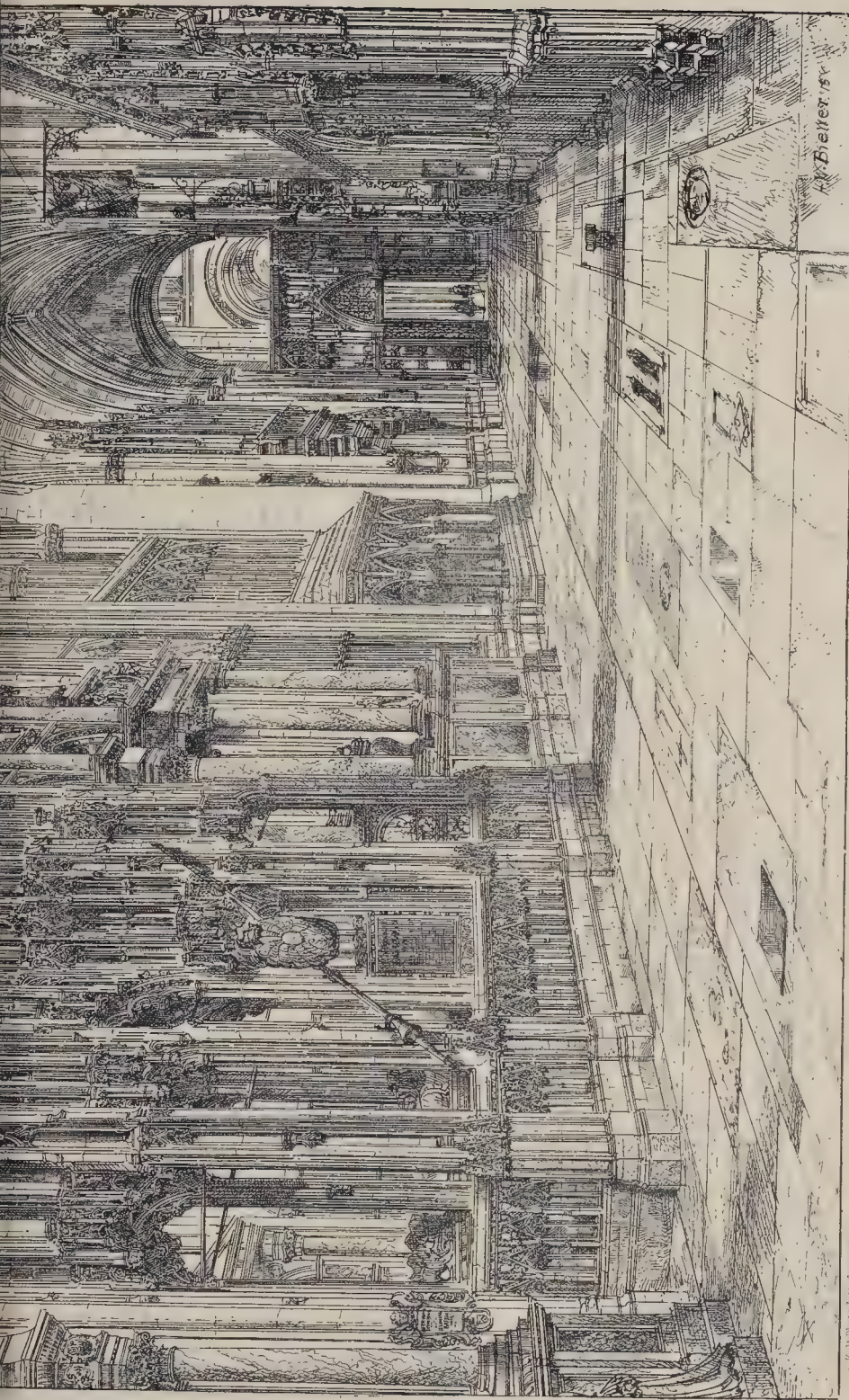




THE BUILDER, JULY 4, 1885.



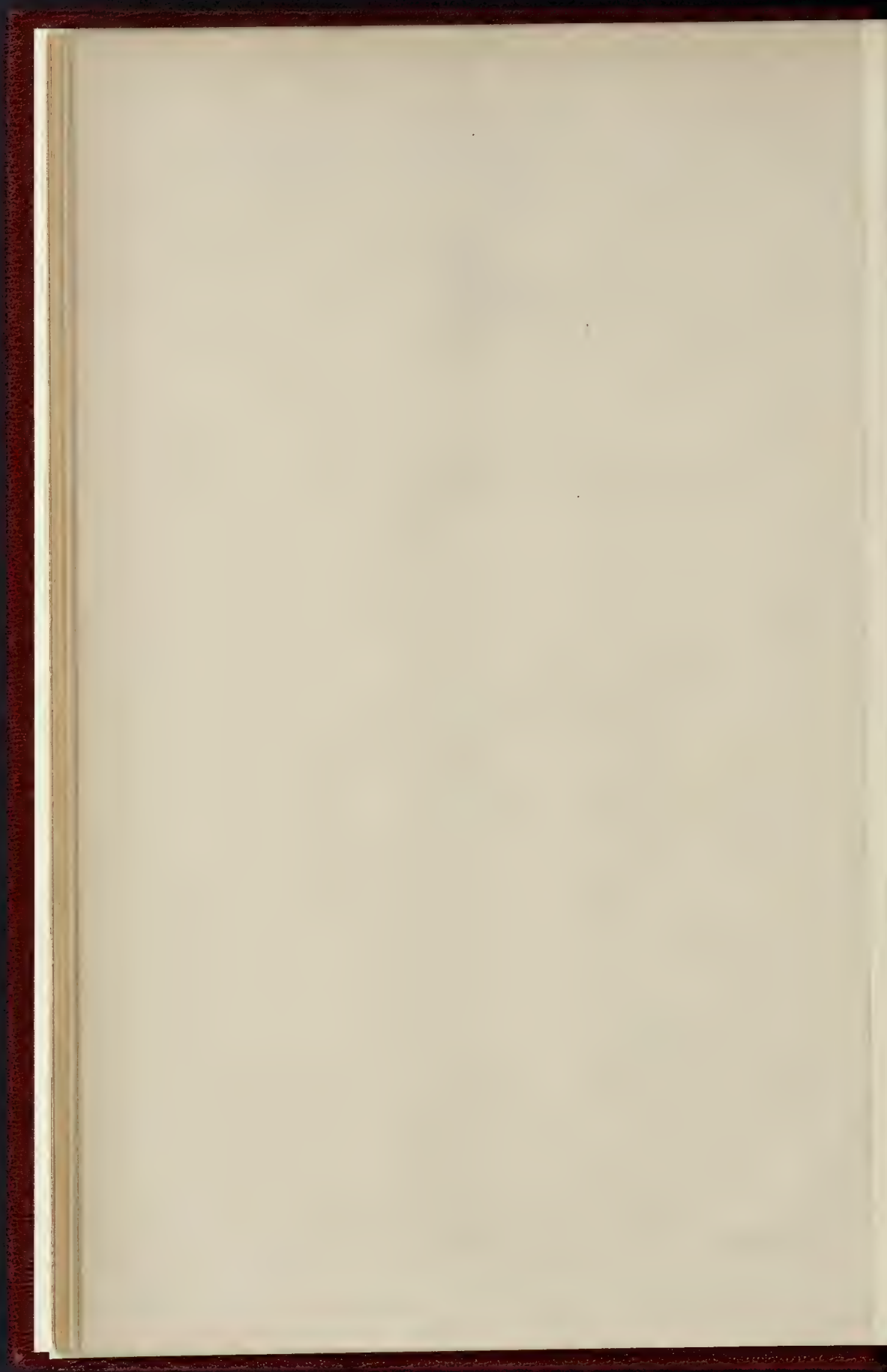




RESTORED VIEW OF MONUMENTS IN THE NORTH CHOIR AISLE,  
OLD ST. PAUL'S CATHEDRAL.

8 Castle St. Ho. Bora London E.

W. B. Dyer & Co. Engrs.





# ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS. ANNUAL MEETING IN LONDON.

The annual meeting of the Association of Municipal and Sanitary Engineers was held in the Council Chamber of the Institution of Civil Engineers, Westminster, on Thursday and Friday in last week. Mr. Laws, Borough Engineer of Newcastle-on-Tyne, President of the Association, occupied the chair until the election of his successor, Mr. R. Vawser, M.Inst.C.E., of Manchester, and there was an exceptionally numerous attendance of members of the Council and of the Association.

The annual report states that the steady progress of the Association, which had been the subject of congratulation by successive Councils, during the past year had not shown any signs of diminution. Forty new members had joined the Association, which now numbered 242. The memorial to the Local Government Board, embodying suggested amendments in the Public Health Act, had been completed, and its presentation only awaited the termination of the Ministerial crisis. With respect to applying for a Royal Charter, which would give additional prestige and status to the Association, the Council could not at present advise taking a step which would involve such a heavy expense, but they recommended that the Association should be registered under the Literary and Scientific Institutions, or the Companies' Acts. As to instituting voluntary examinations and granting certificates of competency to Surveyors of Corporations, Local Boards, and other Sanitary Authorities, the Council thought this would be desirable, and that the Association was the proper body to undertake such a duty. The rules had been revised with the assistance of the gentlemen appointed last year at Newcastle. The ballot had resulted in the election of Mr. Vawser, M.Inst.C.E., of Manchester, as President for the ensuing year, and the Committee recommended that the next annual meeting be held at Hanley, Staffordshire.

The annual report was adopted, and a long discussion then ensued respecting the new code of by-laws. Mr. Strachan (Chelsea) complained that surveyors in the metropolis were excluded from the full privileges of members of the Association. Because he had advanced in his profession and changed from Chiswick to Chelsea, he fell now under this prohibition. The President ruled this point could not be discussed without notice, but it was referred to the Council for consideration. Objection was also taken to the mode prescribed for electing the Council, on the ground that the Council were to nominate fifteen, and the total number of nominations was to be reduced by the same body to thirty; but, on an amendment being submitted for striking out this part of the rule, it was defeated by a substantial majority. A prohibition of canvassing for any office, on penalty of disqualification, was explained to mean canvassing by circular or personally. The new rules were then passed.

Mr. Gamble (Grantham) and Mr. Parry (Reading) were appointed auditors for the ensuing year, and the following were chosen district secretaries:—Home Counties, Mr. Robson, Willesden; Midlands, Mr. Pritchard, Birmingham; Yorkshire, Mr. Horsfield, Batley; Lancashire and Cheshire, Mr. S. Platt, Rochdale; Western, Mr. J. Hall, Torquay; Northern, Mr. Thompson, Willington Quay; and, Eastern, Mr. Buckham, Ipswich.

The President, Mr. Laws, then vacated the chair, and introduced his successor, Mr. Vawser (Manchester), when a vote of thanks was accorded to the former for his valuable and energetic services during the past year, on the proposition of Mr. Jones (Ealing), seconded by Mr. McKie (Carlisle).

After a brief adjournment the President elect, Mr. Vawser, delivered an inaugural address. He approved of the suggested voluntary examination of surveyors, and said that it was impossible any person could fill the position of surveyor to a local authority, with credit to himself and advantage to his employers, without careful preparation and training. He dwelt at length on the difficulties in the way of satisfactorily purifying sewage, either by chemical treatment or irrigation, and said that nothing had contributed so much to make sewage purification unsuccessful as the erroneous idea which once widely prevailed that sewage could be made to pay, whilst the purity of the effluent water was considered of secondary importance. Experience

had shown that a profit from sewage and a pure effluent were inconsistent with each other. He then dealt with ensilage as a means of utilising the green crops of sewage farms, where there was not a ready sale for them in a green state. As to Sir John Lawes's suggestion that sewage should be discharged into the sea, on the ground that it was of the greatest value as food for the fishes, the President said this could not be adopted until it was known that such a system would not give rise to greater evils than those which now exist. He advocated the better enforcement of the Rivers Pollution Bill, but remarked that the proposed amendment of that measure, had it been adopted, would have revolutionised many industries. Having alluded to the Prevention of Floods Bill, the President said the report of the Royal Commission on the Housing of the Working Classes contained much valuable information, and many practical suggestions of professional interest. He showed there would probably be increased gravitation of rural populations to the towns; urged the importance of this being ever kept in view; condemned the system of back-to-back cottages as certain some day to give rise to difficulties that would have to be faced; and held that no house should be allowed to be occupied or re-occupied until a thorough inspection had been made, which should also include the gas-fittings. The President concluded by urging the members of the Association to endeavour to influence public opinion on questions affecting public health and other sanitary matters with which they had to deal professionally.

A cordial vote of thanks was accorded to the President for his address by acclamation.

Mr. W. Santo Crisp, Surveyor to the Wimbledon Local Board, then read a paper on "Street Lighting," giving particulars of the oil-lamp lighting at Wimbledon and the experimental lighting of a portion of the district by electricity. His computation of the actual cost of electricity was 4s. 13s. per annum for glow lamps burning 4,000 hours of 20-candle power. For nearly three years, owing to the high rate charged for gas by the Gas Company, the local authority had lighted all the street lamps at Wimbledon with oil, the first two by contract and the last year under its own management. There were 361 lamps, the greater part had 1½ in. wicks, and the chimney is known as the "pine." About twenty of Rettich's mitrailleur burners were employed for the principal positions. The latter were far superior to ordinary gas-burners of 5 cubic feet per hour, and the cost was about 10s. per annum more than the flat wick lamp. The light of the ordinary oil lamp is steady, averages 12 candles, and each costs 2s. 11s. 5d. against 4s. 10s. for gas, at 3s. 6d. per 1,000 ft. Thus petroleum was enormously cheaper than gas, whilst the fact that oil lamps had been in existence at Wimbledon for nearly three years showed that the ratepayers are not anxious to revert to gas.

Professor J. A. Wanklyn next read a paper on Sanitary Gas-making, describing the Cooper coal-liming process, which, since 1882, had demonstrated the possibility of having pure gas and cleanly gas-works. Since December, 1883, this process had been in successful operation at Tunbridge Wells, which now had the advantage of pure gas and inoffensive gas-works. The feature of the process was the admixture of a small portion of slaked lime with the coal, and the result was the production of a purer gas, in the purification of which it was not necessary to make foul lime and foul oxide of iron. In many gas-works serious nuisance was caused by gas-liquor being allowed to leak and evaporate into the air. This and all other nuisances from gas-works are all avoidable, and gas-works really should be as cleanly as water-works, and should exert a distinctly sanitary influence.

In the discussion on these two papers, the general feeling appeared to be that petroleum lamps, of which a sample was shown lighted, might be adopted as a makeshift where, owing to the high price paid for gas, it was cheaper, and satisfactory terms could not be made with the local gas company. Several inconveniences, besides the trouble and annoyance of cleaning and filling the lamps, were mentioned, notably, the dark shadow round the base of the lamp, which was not completely remedied by having a transparent reservoir for the oil. In reply to a question why electricity was abandoned, Mr. Crisp caused considerable amusement by quaintly remarking that it was due to the

failure of the contractor as much as anything else.

Mr. Lemon (Southampton), Mr. Jerram (Walthamstow), and others spoke of the saving in the cost of street-lighting with gas by adopting the metered-lamp system; and Mr. Godfrey (King's Norton) mentioned, amid expressions of general astonishment, that the Birmingham Corporation had agreed to supply gas for public lighting at cost price,—1s. per 1,000 cubic feet,—a penny less than one half the price previously paid, and representing a saving to the district of 570l. a year.

The discussion on Professor Wanklyn's paper was brief, and Mr. Cooper, the manager of the Tunbridge Wells works, in reply to questions, gave corroborative evidence of the efficacy of the Cooper coal-liming process in the prevention of offensive smells from gas-making. Asked why the system was not more generally adopted if it was so efficacious, Professor Wanklyn said that any one acquainted with gas-making knew that, whilst small improvements were readily adopted, those who made any important discovery were persecuted. It would take years to get this improved process adopted, and one of the greatest difficulties in its way was that it is a monetary success. If it involved costly apparatus and a heavy outlay, there would be less difficulty in getting it adopted. He said this deliberately, and he believed it to be true.

Thanks were voted to Mr. Crump and Professor Wanklyn for their papers; and in the evening the members of the Association dined at the Criterion, Piccadilly. Mr. Vawser presided, and Sir Robert Rawlinson, K.C.B., was the principal guest. In proposing the toast of "Success to the Association of Municipal and Sanitary Engineers," Sir Robert dwelt on the importance of sanitary science, and pointed out how, since he was appointed the first engineer inspector under the Local Government Board, it had conduced to the extension of life and the improvement of the health of the community.

On Friday Mr. Midley, of Finsbury Circus, explained his firm's draw ventilator and sewer gas purifier; and Mr. Gordon (Leicester), on behalf of Dr. Paulson (Loughborough), explained his project for ventilating sewers by hollow gas columns, with a charcoal chamber over the lights, through which the gas from the sewer passed into the air. It was elicited in the course of the discussion that neither system had been subjected to any extensive practical test; and Mr. McKie (Carlisle) complained of the valuable time of the Association being taken up with crude projects.

Mr. De Courcy Meade, A. M.Inst.C.E., Surveyor to the Hornsey Local Board, contributed a paper on the Highgate Hill Steep-grade Tramway. He gave details of the construction of the tramway, cost, and mode of working. The cost of a line, three-quarters of a mile, of which 1,100 yards were double, had been 18,111l., including five cars and three dummies, but, exclusive of 6,000l. for the engine-house and the cost of the steel cable, would be about 180l. per mile per annum. Mr. Mead added that he had had daily opportunities of watching the working of this line, and, though at first somewhat sceptical, he admitted that, so far, the working of it had been a mechanical success.

The paper gave rise to considerable discussion, the salient points in which were that the excessive cost, nearly as many thousands as an ordinary tramway costs hundreds, precluded the adoption of the system except in very rare instances; and inquiries were made as to whether any difficulty was experienced in keeping the central slot free from dust and snow, and as to how the central rail could be laid in streets where sewer manholes or ventilators were fixed, as usual, in the middle of the roadway. Mr. Colam, the engineer of the company, in replying, argued that the cost of working was equally an element with the cost of construction, and that the advantages of the latter more than compensated for the additional outlay. As to dust getting into the central slot, no inconvenience was experienced, and in Chicago the cable tramway ran continuously during a seven feet snowfall when every other kind of vehicular traffic was suspended. Manholes or sewer ventilators in the centre of a roadway would have to be removed or diverted, of course, at the cost of the tramway company.

Mr. Sydney G. Gamble, Assoc.-M.Inst.C.E., read the concluding paper, which was on "Dangerous Structures." He divided the



subject into (1) natural decay, (2) defective foundations, (3) faulty construction of superstructure, and (4) such buildings as are erected for temporary purposes. Having quoted the law bearing on dangerous structures, as incorporated in the Public Health Act, he said that a very onerous and arduous duty was thus placed on the surveyor, where great care and tact must be exercised. Then he briefly dealt with the subject under the four heads into which he had divided it, laying particular stress on the various causes of insecure foundations and defective buildings, both in workmanship and material, run up by jerry builders.

In the discussion to which the paper gave rise, Mr. Bayres (West Bromwich) spoke of the frequency with which surveyors had to deal with dangerous buildings, in mining districts, where all the ground was honeycombed. He urged that the whole of the clauses in the Act relating to dangerous structures required revising, and that it should not be imperative that the initial step, necessary to make all subsequent Acts legal, should be to immediately erect a hoarding round the alleged dangerous building. In a case from his district, which led to an appeal in the Queen's Bench, it was ruled that the opinion of the surveyor was not final as to a building being dangerous, but that the magistrates called upon to make an order must hear professional witnesses called by the defendant on this point.

Mr. Lobley (Hanley) said there were in his district at least one hundred dangerous buildings which he might reasonably order to be taken down, and the responsibility of ordering this to be done or of not taking action was in either case very serious. He agreed that a hoarding should only be required to be erected where there was immediate danger to the public, and that the owners should first have the opportunity of doing the necessary repairs. The hoarding sometimes cost more than it did to make the building perfectly safe. He held, however, that after notice to the owner and the decision of the justices, the subsequent notices, and confirmation of what had been done by the local authority, were needless and troublesome provisions.

Mr. Jones (Chester) pointed out the absurdity of erecting a hoarding to protect foot passengers in the case of a dangerous chimney, 60 ft. or 80 ft. high, or where it was evident the walls of a building must fall inward.

Mr. de Courcy Meade (Hornsey) also spoke of the absence of any power on the part of the local authority to turn out tenants of premises which were only dangerous to the occupiers. He had had to deal with two such cases.

The discussion was continued by otherspeakers, and there was a general consensus of opinion that the Act of Parliament needed amending with respect to the difficulties named.

A vote of thanks was then accorded to the readers of the papers, and to the Institution of Civil Engineers for the use of their council-chamber.

The members afterwards proceeded to the Mansion House, where they were entertained at luncheon by the Lord Mayor (Alderman Fowler, M.P.), who, in proposing "Success to the Association of Municipal and Sanitary Engineers," said that the matters with which its members had to deal were of the utmost importance, because so closely connected with the health and prosperity of the people. Mr. Vawser, the president, responded, and the health of the Lord Mayor was heartily received, on the proposition of Mr. Laws (Newcastle-on-Tyne). A visit was subsequently paid to Farringdon Bridge, where the Holborn subways were inspected, and the London Central Markets were also visited.

On Saturday, some of the members, with the President and Secretary, visited the Blackfriars Bridge works, and afterwards the Putney Bridge works, where they were met by Sir Jos. Bazalgette, C.B. Subsequently a visit was paid to the Inventions Exhibition, where several exhibits of professional interest were examined and explained.

**A New Temperance Hall** in connexion with the Good Duke Humphrey Coffee Tavern, at the corner of Trafalgar-road and Park-row, Greenwich, was opened on Thursday last, by Admiral Lord, C.B., President of the Royal Naval College. The hall will accommodate about 400 persons, and was designed by Mr. W. Rickwood, of Plumstead.

#### THE BADMINTON CLUB.

The West End wayfarer must by this time be pretty familiar with the exterior of Mr. Edie's new Badminton Club, which occupies a favourable site in Piccadilly, on which the old club until recently stood, and shows its roofs and gables over the noble trees which skirt the Green Park.

The building has a frontage towards Piccadilly of 40 ft., but widens in the rear to more than twice that dimension. The figure of the site is singularly irregular, and has called for much ingenuity in planning. A front block of several stories in height is separated from a similar rear block by an intervening glazed court or hall. That portion of the Piccadilly frontage which is not used for entrances is adapted for a shop. On the principal floor a handsome library overlooks the park, and extends upward through a mezzanine. The upper floors are allotted to sitting and bed rooms, arranged for letting as "residential chambers." These have a separate street entrance, staircase, and their own kitchen and offices.

The ground-floor of the rear block is occupied by the club kitchen and offices. On the main floor is a coffee-room, 48 ft. by 26 ft. 6 in., which in height also runs through the mezzanine. On the upper floors are billiard-rooms and sleeping apartments.

On the left of the central court are lavatories and dressing-rooms, card and committee rooms. On the right, stores, smoking-room, &c.

The difficulty of lighting properly so large an assemblage of rooms has been on the whole effectually surmounted, mainly by the aid of borrowed light from the central hall, the upper portion of which is octagonal in plan, domed and glazed with a semi-opaque glass, and is the prettiest feature of the interior. The floor is of mosaic designed to suit the irregularities of the area; the walls for a certain height are lined with Rouge Royale and other marbles, and, with its marble alcoves and Burmantofte surfaces, forms a most agreeable and artistic lounging-place, which will probably prove to the club members the most attractive apartment of all.

The ceilings generally are of Jackson's fibrous plaster, of ornamental design in low relief; others are divided into geometrical figures by small plaster ribs. The walls of entrances and corridors have high marble dados; and marble is freely used in steps, balustrades, and such like accessories.

The whole building has been warmed on Bacon's high-pressure system, and ventilated by Mr. Blackman by means of exhaust-engines in the roofs. The sanitary fittings are by Conolly. The kitchens have been fitted by Longden & Co.; and special care appears to have been taken in the arrangement of the drain-wastes, &c., in order to bring the building in this respect up to the latest standard of scientific sanitation.

The interior is bright and pretty, and although there is nothing of a very exceptional character about its architecture and decoration, it will no doubt prove a light, sweet, pleasant, and convenient club.

Mr. Boyce was the general contractor, and if any other persons connected with the building ought to have been named they must assign their omission from this record to the turmoil incident to the preparations for opening the club, and the difficulty of obtaining information where there is no one whose special business it is to afford it.

#### THE MÉKARSKI AIR ENGINE TRAMWAY.

ONE of the most interesting, and certainly one of the most extensive, exhibits at the Inventions Exhibition is the Mékarski tram car, which runs over a short length of line laid on the south side of the buildings, carrying those visitors who may be tempted by curiosity or scientific interest to take a short experimental ride.

The car is four-wheeled,—one pair of wheels alone being used for driving. There are a pair of high and low pressure cylinders of 5½ in. and 8 in. diameter respectively, the stroke being 8 in. The motive power is obtained from compressed air, which is supplied by a stationary plant situated in the grounds. By means of the stationary engines atmospheric air is compressed

to 450 lb. to the square inch and stored in reservoirs placed in the engine-house. On the car are six smaller reservoirs, five of which are used in ordinary working, one being held in reserve. Means are provided by which the full pressure can be admitted to the low-pressure cylinder to facilitate starting. To prepare a car for work its reservoirs are charged by being connected with the stationary reservoir. There are on the car two vessels, called "hot-pots," which are filled with water from the stationary boilers, and, therefore, having a temperature due to the boiler pressure, in this case 60 lb. The car would then be ready for a ten or twelve mile journey. The regulating valve is a very ingenious contrivance, and forms one of the chief features in the design. When it is required to start the car this valve is opened and the compressed air passes from the reservoirs under the car into one of the hot-pots, and takes up heat and moisture. It then passes to the high-pressure cylinder and, after there doing the necessary work, is exhausted through a coil of pipe immersed in the water contained in the hot-pot. From thence it passes to the low-pressure cylinder, and, after there performing the work, exhausts noiselessly into the atmosphere. The initial pressure in the engine varies from 150 lb. to 30 lb., according to the load and the gradient. There is a powerful brake, worked by the air-pressure, by which the car can be stopped in its own length. There is also a foot brake, under the control of the conductor. An automatic arrangement is fitted by which the air is shut off from the engine and the brake applied if the speed exceeds ten miles an hour.

There is, perhaps, no more promising field for the introduction of mechanical motive-power than in the propulsion of road cars, and, if the apparatus in question continues to work in the same satisfactory manner that it already has in the Exhibition (and we see no reason why it should not), there would seem to be every prospect of a successful career before it.

The car has been constructed by the Lancaster Railway Carriage and Wagon Company, and is a fine piece of workmanship.

#### THE PLUMBERS' COMPANY AND THE WORK OF PLUMBERS.

ON Monday last the members of the court of this company dined with their friends at the Royal Forest Hotel, Chingford, Mr. George Shaw, the Master of the Company, in the chair. Among the gentlemen present were Earl Fortescue, Dr. Cameron, M.P., Mr. P. Magnus, Mr. Penrose, Mr. Robins, Mr. Deputy Edmonstone, Mr. C. J. Shoppee, Mr. Emplage, Mr. Norris, Mr. Ewan Christian, Mr. A. Cates, and Mr. J. Smeaton.

The Master, in the course of the proceedings, stated that the company are bound by their charter to meet on the 29th of June to carry out certain duties. As regards those branches of town sanitation which chiefly depend upon public drainage and other works, and public regulations, vast improvements have been effected within the past few years, and we might not reasonably look to such bodies as the Corporation and the Metropolitan Board of Works to carry out any further public improvements which are now or may become requisite. But (Mr. Shaw continued) when we come to that particular branch of sanitation which is dependent upon house fittings or private sanitary works, as they may be called, we find, perhaps, a generally less satisfactory state of affairs, and a matter more difficult to deal with. It is, perhaps, not surprising when we remember the enormous increase of housebuilding in London and all the chief provincial towns, to find that serious evils have arisen and various necessities have been disclosed. I shall not be accused of exaggeration if I say that plumbers' work undoubtedly stands among the first, if it is not actually the first, of the crafts affecting health; and that I believe that the statement which it is my duty to make on behalf of the court will, therefore, have a somewhat peculiar interest, especially as I am afraid we have all of us had more or less sad experience of the evils of bad plumbing. It has been the anxious effort of the Plumbers' Company to endeavour to ascertain the precise cause of the existing evils, and to place themselves in a position which would justify them in publicly proposing remedial measures. To make such



investigations necessarily takes a good deal of time, and to consider the value and bearing of the information elicited has occupied, as it often does, even more time. In these days of wonderful panaceas we are all accustomed to receive invitations to join certain sanitary associations, which only charge a guinea or two a year for protecting, as we are led to expect, their clients against defective plumbing; and we hear too of various kinds of apparatus, which has only to be bought and fitted up to secure sanitary immunity. No doubt such associations and apparatus may have a certain measure of usefulness. But I am not able to prophesy such smooth things, nor to recommend any one to expect to obtain relief by such simple means. On the other hand, I am far from joining in the cry of those who denounce plumbers and their work as almost altogether bad. As a fact, I believe there is no doubt that more good plumbing work is being done now than in any former age, but I am sorry to say that from certain causes the average of the work done in some branches has distinctly deteriorated. To sum up very briefly the result of the investigation of the Plumbers' Company, and the conclusions of the congress,—held under their auspices,—of plumbers and sanitarians, drawn together, not only from all the districts of London, but from all parts of the kingdom, I may say that the evils now experienced from bad plumbing are substantially traceable to four causes:—1st. The identity of the plumber's craft being to a great extent lost or obscured, through the merging or the amalgamation of the various branches of the building trade, houses are now built in large numbers without any sufficient definition of the plumbers' work, and the natural consequence is that it is done "anyhow," and by persons who are not really plumbers. Though it may, perhaps, not only be necessary, but desirable, that plumbers' work should be done by builders, it is still essential that the identity of the plumbers' craft should be preserved as a distinct craft. 2nd. The system of apprenticing lads for a term of years to learn the trade has fallen off to a great extent, and, in consequence, there is an excessive influx of men who are not properly qualified plumbers. 3rd. That, while there have been considerable changes in the character of some of the materials used in plumbing work, the standard qualities of such materials have not been determined by custom or the general assent of the trade, and the result is that there is much uncertainty as to the selection of material, and much that is unsuitable is used. In former years, when lead and solder were chiefly used in plumbing work, they were assayed and stamped by the Plumbers' Company, to define the value, not only as a safeguard against fraud, but as a convenience and advantage to traders tendering to do plumbing work, and to persons ordering it. 4th. The public regulations which deal with certain details of the construction of new houses, and their connexion with the public sewers, do not sufficiently recognise the importance of securing the efficiency of the plumbers' work done in those houses. To meet, as far as may be, these several evils, it is obvious that public knowledge and public interest in the subject must be enlarged, and it is equally obvious that it would be quite impracticable for any mere organisation of plumbers to carry out single-handed the necessary reform. By what I have said it will be clear that we want not only the trade of plumbers to unite in a common effort for their common good, but we want the co-operation of other trades and professions immediately connected with house-building; and, moreover, we want the help of those persons whose special province it is to extend the benefit of technical instruction to the rising generation of plumbers, and to diffuse sanitary knowledge among all classes of the people. Further than this, it is essential that we should have with us the countenance and support of legislative and municipal authority. I hope and believe we have got these several interests and influences fairly represented in the council which has been recently formed to deal with the subject, and I can promise you that when that council meets the Court of the Plumbers' Company, supported by some of the representatives of the late Plumbers' Congress and other qualified persons, will be prepared to submit definite recommendations to the judgment and decision of the council. The investigations of the Plumbers' Company have made it clear that among both

the masters and journeymen of the trade there is generally a distinct recognition of the fact that defective or scamped work, as it is called, is a serious evil to the trade as well as to the public, and the Court of the Plumbers' Company now feel that they are sufficiently supported by the opinion and authority of the plumbers of the kingdom to initiate and accept on behalf of the trade such regulations as may tend to secure more efficient plumbers' work in general. This is not an occasion for entering into detail, but I may say that a definite scheme for the registration of plumbers, both masters and journeymen, the technical instruction of plumbers, and the inspection of plumbers' work in new houses, will form an important branch of the recommendations which will be submitted to the council, and though it would be too sanguine to anticipate absolutely universal approval of our recommendations, I am quite sure, as they will be framed on the lines of the honest and straightforward resolutions of the late Plumbers' Congress, they will receive the loyal and cordial support of the great majority of the best masters and journeymen engaged in the trade, who, I am convinced, are fully disposed to rise above the consideration of mere personal questions and trade technicalities in order to secure such broad and equitable regulations of the trade as may elevate its general status and enhance its public usefulness.

The Master added that amongst those who had consented to serve on the council were Earl Fortescue, the Lord Mayor, the Lord Mayor of York, the Mayor of Newcastle, Mr. Ewan Christian and Mr. G. Godwin (president and past vice-president respectively of the Royal Institute of British Architects), Mr. Ernest Hart, Mr. Philip Magnus, Dr. Cameron, M.P., Dr. Bond, and Mr. Hardcastle, M.P.

#### ARCHITECTURE AT UNIVERSITY COLLEGE.

The following prizes have been awarded to the students in Professor Roger Smith's classes, viz.:—

**FINE ART.**—Donaldson Silver Medal, H. W. Wills, of London; 2nd Prize, W. R. Low, of London; Certificate, 3<sup>rd</sup>, L. Withrington, of London. **Second Class.** W. H. Ferguson, of Calcutta; G. S. Jones, of Sydney; F. W. Quick, of London; H. S. Saunders, of London. **Third Class.** A. G. Chalmers, of Perth; H. Porter, of London; F. T. Verity, of London.

**CONSTRUCTION.**—Donaldson Silver Medal, L. A. Legros, of London; 2nd Prize, W. R. A. G. Tucker, of London; Certificates, 3<sup>rd</sup>, John May, of Reading; 4<sup>th</sup>, eq., H. W. Wills, of London, L. W. Withrington, of London. **Second Class.** J. W. Hall, of London; G. Lyon,† of Valparaiso; H. Martineau, of Clapham; F. W. Perry, of London; A. Shea, of Reading. **Third Class.** T. E. Browne,† of Wood-green; H. D. Lloyd, of London; H. Porter, of London; J. Simpson, of London.

**MODERN PRACTICE.**—Prize, E. W. Knight, of Greenwich. Certificates, 2<sup>nd</sup>, N. C. H. Nisbett, of Gravesend; 3<sup>rd</sup>, F. M. Day, of London. **Second Class.** T. E. Browne,† of Wood-green; Frank Swift, of Peckham; Frank Taylor, of London; T. C. Yates, of Shrewsbury.

#### "GORDON DWELLINGS," CAMBERWELL.

On Saturday last a large number of invited persons assembled to inspect a new block of artisans' dwellings to be henceforth known as "Gordon Dwellings," situate in Pound-row, Church-street, Camberwell. These buildings have been erected by Messrs. Colls & Sons, builders, from plans by Mr. Ellis Marshall, architect, and they owe their origin to the great local improvements recently effected in this neighbourhood by the Metropolitan Board of Works. As our readers are aware, Church-street has been considerably widened at this point, and a row of new houses and shops has been erected along the north side. Immediately at the back of these shops a vacant piece of land was left near the junction of Church-street and Pound-row, and this was afterwards taken by Messrs. Colls, who have erected thereon the block of dwellings of which the top-stone was laid on Saturday last by Sir James McGarel Hogg, Chairman of the Metropolitan

Board of Works, at the top of a detached tower, 70 ft. high, which stands in front of the new dwellings. Mr. Colls said that the site was purchased from the Metropolitan Board of Works under the Artisans' Dwellings Act, and the buildings erected thereon were under the provisions of that Act, and would always have to continue so. He then introduced Sir James McGarel Hogg, bart., M.P., Chairman of the Metropolitan Board of Works, who, after laying the "top stone," made a few remarks in defence of the Board's action under the Act. The visitors then proceeded to inspect the various rooms and arrangements. The site has a frontage of 100 ft. to Pound-row, by a depth of 124 ft., and on this, four blocks of buildings are erected, with two detached towers, containing stone staircases. The buildings are five stories in height, and are reached by galleries from the staircase towers, supported by rolled-iron joists, which, with the iron stanchions, were supplied by Messrs. Lindsay & Co. The front tower is surmounted by a large water-tank containing 5,800 gallons to supply all the blocks. The staircase well-holes are bricked round as dust-shoots and ventilating-shafts, and on each landing the dust-shoot opening is of cast-iron, marked "Dust and ashes only: all other refuse to be burned," a salutary piece of cremation that should be enforced in every household. The whole of the buildings, galleries, and roofs are of fireproof construction, and there is a communication between the two staircases in case of egress being cut off from one or the other. The four blocks contain 125 rooms in all, and these are arranged in suites, each suite containing a living-room, 13 ft. by 12 ft., with a kitchen, sink, and pantry, and one or two bedrooms, 12 ft. square, with a separate entrance, coal-cellar, and water-closet. All rooms are 8 ft. 6 in. high. The floors are fire and sound proof, being filled in to a portion of their depth between the flooring and ceiling with a fire-resisting composition of coke breeze and Portland cement. The kitcheners, iron railings, entrance-gates, and cast-iron work generally are supplied by the Coalbrookdale Company. The roofs are all flat and covered with asphalt. The water-closets are provided with wash-out basins and water-waste preventers, and discharge their contents into a soil-pipe, having a Stiff's interceptor trap at the bottom and a ventilating-cowl at the top. The sinks discharge into open rainwater heads, which in their turn empty into Bellman's gully-traps. All the sanitary fittings are supplied by Messrs. Stiff. The washing and lavatory accommodation are all on the top floors. The rents are 6s. per week for two rooms, and from 8s. to 9s. for three rooms. The areas are covered with tar paving. A main air-shaft is carried up in the centre block with a large extracting cowl on the top. All the windows have double-hung sashes in three heights, the lower part being fixed, as a precaution against children falling out.

The elevations are faced with stock bricks relieved by string-courses and quoins, and a cornice at the top of moulded pressed Leicester bricks. The window-heads are in coloured concrete, deeply moulded. Mr. H. W. Knight has acted as Messrs. Colls's general foreman of works throughout.

The estimated cost of the blocks is about 10,000l.

#### NEW POOR-LAW INFIRMARY AT CHAMPION-HILL, DULWICH.

On the 22nd ult. the foundation-stone of the new infirmary which is being erected at Champion-hill, Dulwich, for the Guardians of St. Saviour's Union, Southwark, was laid by the Chairman of the Board, Mr. Flood.

The site selected for the building is on the north side of East Dulwich Grove, close to the Champion-hill Station, and is about seven acres in extent, having a frontage towards the south of 700 ft. The subsoil is loam and sand.

The building will consist of a large block in the centre for administrative purposes, with projecting wings in front. One will contain the medical superintendent's house, the other will consist of the committee-room, waiting-room, matron's office, &c. On each side of the entrance doorway will be sitting-rooms for the chief officers. At the rear, in a central position, will be the kitchen and sculleries, with large store-rooms on the west side, and the dispensary, drug-store, and

\* Obtained the number of marks qualifying for a prize.  
† Names printed in italics are those of former Pupils of University College School.



mess-rooms on the east. In the basement will be extensive coal-cellars, stores, larders, &c., and on the upper floors will be sleeping accommodation for about seventy nurses and servants. There will be two double blocks of wards for the inmates on both sides of the administrative block, and connected with it by a corridor 500 ft. long, which will be two stories high. The lower story is to be enclosed, and the upper one left open, to allow a free circulation of the air round the outside of all the buildings. The ward blocks will be three stories high, and each block will contain six wards. There will be twelve wards for 363 men and twelve wards for 400 women. At one end of each ward will be an open balcony, where the inmates will be able to take the air. The wards will vary in length from 78 ft. to 102 ft. The width will be 2½ ft., and height 13 ft., allowing 1,000 cubic feet, 72 superficial feet of floor space, and 6 ft. linear surface of wall to each inmate. Arrangements will be provided for the proper ventilation of the wards, and for warming them with open fireplaces and hot-water pipes. There will be also a small separation ward, duty room, day and bath rooms, lavatories, &c., attached to each ward. Large washhouses and laundry will be built at the rear of the blocks, with boiler and engine house adjoining. The porter's lodge and the receiving-wards will be in front, facing East Dulwich Grove. Having regard to the stipulation of the freeholder in selling the ground, the exterior of the buildings is designed with a view of producing a pleasing effect. They will be faced with red bricks, with stone dressings, and the architects have adopted a domesticated style of simple character, relying for effect upon the arrangement of masses rather than of detail. The contract for the building has been taken by Messrs. Kirk & Randall, of Woolwich, at 74,571l. The architects are Messrs. Henry Jarvis & Son.

#### ARCHITECTS' COMMISSION.

TAYLOR AND LOCKE V. GREENE AND SON.

In this case, which was decided last week in the Queen's Bench Division (before Mr. Justice A. L. Smith and a special jury), Mr. Philbrick, Q.C., and Mr. Buck were counsel for the plaintiffs; Mr. Pyke and Mr. W. O. Hodges for the defendants.

The action, which occupied the time of the Court for seven days, was brought by the plaintiffs to recover 451l. 7s. 1d., balance of an account, from the defendants for work done by plaintiffs for Messrs. Greene & Son in preparing plans and drawings in connexion with the re-erection of their premises in Cannon-street and Nicholas-lane. According to the report in the *Times*, the defendants set up a counter-claim for 3,680l. against the plaintiffs, on the ground, among other things, that the plaintiffs had not properly carried out their work, inasmuch as defendants alleged that they had not sufficiently considered nor warned the defendants as to the claims of surrounding owners on defendants regarding obstructions to their light and air if the plans were carried out; and the defendants further said that during the building operations they were put to heavy expenses in settling disputes with their neighbours, and these expenses they now claimed to recover from the plaintiffs. Messrs. Taylor & Locke, on the other hand, contended that they were in no way liable for the claims of the surrounding owners, because they had been specially retained to make the plans and do the rest of the work according to the express instructions of the defendants, and that they had so acted.

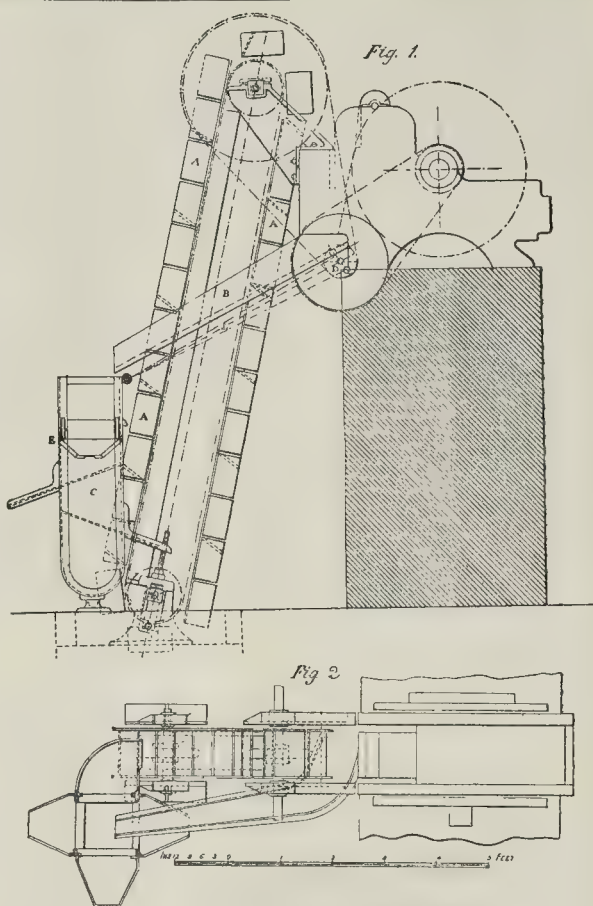
On Saturday last his Lordship summed up the case and evidence, which was of a very long and conflicting nature, and the jury found a verdict for the plaintiffs for a balance of 389l. 17s. 1d. due for work, and also on the other points, and judgment was given with costs.

Upon the application of the defendants' counsel, execution was stayed for a week in order to move for a new trial.

#### A QUESTION OF COSTS.

A POINT of interest to builders and their workmen arose at the Bournemouth County Court, on Wednesday, before Mr. Sergeant Tindal Atkinson. An action was brought by a joiner, named Coleman, against Mr. Crook, contractor, of Southampton, to recover the small sum of 6d. in lieu of notice.

Mr. Trevanion, the plaintiff's solicitor, stated that the plaintiff was employed by the defendants at 6d. per hour, and was discharged without any notice whatever. He contended that, according to the universal custom of the trade, he was entitled as an hourly servant to two hours' notice of dismissal, which custom he was prepared to prove by five witnesses he had present. At the last moment, however, the defendant had paid the



Stafford's Automatic Sieve for Stone-Breaking Machinery.

amount claimed into Court, but the Registrar had declined to allow costs, on the ground that it was not usual to give costs in cases where the claims were so small. He (Mr. Trevanion) had been instructed to press the case by the Trade Union to which the plaintiff belonged, and under the circumstances he asked his Honour to allow the costs of witnesses.

The Judge said he thought three witnesses would have been sufficient to prove the custom, and he allowed costs for the plaintiff and that number of witnesses.

#### STAFFORD'S "AUTOMATIC SIEVE," IN CONNEXION WITH STONE-BREAKING MACHINERY, &c.

THIS novel and highly-important invention has found many friends since it first made its appearance some few months ago. It not only entirely obviates the necessity of having a large gang of men to work the plant, but also reduces very considerably the wear and tear, which is such an enormous item under the old arrangement, e.g., when fed by hand.

The intermittent feeding and consequent racing and slowing of the machinery is dispensed with, and much less strain and wear and tear necessarily follow.

As a comparison of the cost of working stone-breaking machinery, it may be stated that to break macadam and chippings, by the old process, cost 10d. and 1s. 3d. per ton respectively; the chippings having still to be riddled by hand entails a further cost of 10d., making a total of 2s. 1d. per ton for breaking and riddling chippings; whereas, by Mr. Stafford's arrangement, macadam and chippings are made and loaded into carts by the machine, ready for use, at 4d.

per ton and 10d. per ton respectively, and, by being equally fed, the machine is able to get through considerably more work.

The amount of saving effected at Burnley by Mr. Stafford's machine during the past twelve months is over 2500l.

Independently of the adaptability of this apparatus to stone-breaking machinery, it is also of great value to Corporations and contractors, as it can be erected on wheels to work either by hand or steam power.

The following is a short description of the drawings:—The materials to be broken or riddled are filled into the foot of the elevator and are conveyed into the jaws of the machine, from there they pass into the shoot B, and are carried into the sieve C, which is driven by the eccentric and rod D.

Four different descriptions or sorts of material may be made and discharged into carts ready for use at the same time, or, if a certain size of chippings alone is required, the screen at B is reversed by simply drawing a pin, when all the larger particles are returned to the elevator, and thence to the jaws again until every stone is broken to the size required.

It will be particularly noticed that after the stone has once entered the elevator it requires no further attention or labour to be bestowed upon it.

**Sir Henry Peek's New Building, East-champ.**—In reference to this building, which we described and illustrated in our last number, it should have been mentioned that the whole of the granite, stone, and wood carving was executed by Messrs. J. W. Seale & Son, of Apollo Works, Thurlow-street, Walworth.



## THE ALBERT EXHIBITION PALACE.

SIR,—Our attention has only now been drawn to articles in your valuable journal of May 2nd, p. 634, and May 9th, p. 672, and we in justice to ourselves hope that you will be good enough to allow the insertion of this letter, as we were the engineers who planned the removal of the Palace from Dublin and reconstructed it at Battersea, and by some inadvertence our names do not appear at all. Perhaps the fairest and simplest way would be to give a short history of the Albert Palace.

The building was originally erected in Dublin in the year 1856 from designs by Mr. A. G. Jones, architect, associated with Messrs. Ordish & Le Fevre, and was purchased by the original Albert Exhibition Palace Company, whose prospectus appeared in the public prints, with H.S.H. the Duke of Teck as president, and our firm as the engineers, on the 5th day of August, 1852.

We had to alter the form of the building to suit the requirements of the new site, and we prepared plans for the additional side buildings containing picture gallery, banquetting-hall, dining and refreshment rooms, smoking and billiard rooms, and offices.

The taking-down of the building at Dublin was commenced in the autumn of 1852, and its removal to Battersea, along with the construction of the side buildings, were all carried out under our direction as the engineers to the company, and were practically completed in the summer of 1854, when the whole was disposed of to a new company, who launched their prospectus on the 11th of July, 1854, with Sir Robert Carden, M.P., as chairman, and Messrs. F. & H. Fawcett as their architects, who have made further additions at the east end of the Palace since their appointment.

The contractors who carried out the works under our direction were as follow:—

Taking down and re-erecting main iron building, Messrs. Braby & Co.

Constructing new side buildings in Bath and Portland stone, Messrs. Bywaters.

Lighting arrangements by gas, Messrs. Strode & Co.

Hot-water heating arrangements by Messrs. Rosser & Russell.

BELL, MILLER, & BELL, MM. Inst. C.E.  
Westminster and Glasgow.

## A CLERK OF WORKS' DUTIES.

SIR,—Will the editor of the *Builder* kindly answer the following inquiry, which I humbly think is a somewhat important one?

A clerk of works is employed by and paid by a sanitary committee of a town corporation, and works as usual under an architect employed and paid by this same committee.

Is it, or is it not, the known and recognised duty of such clerk of works, who has not, let it be well borne in mind, had any, not a *single* one, instruction of any kind or form whatever from this committee or any one, to inform this committee from time to time, or at any time, that the architect is deviating from the specification or the contract drawings, by giving written or verbal orders to the clerk of works to have portions of the work executed in material or design or in workmanship other than specified, and which orders are carried out by the clerk of works?

By the specification the architect is empowered, as usual, to alter, add to, or omit, what work he pleases.

CLERK OF WORKS.  
\* Most certainly it is not the duty of the clerk of works to make any such report. The clerk of works is under the orders of the architect, and is responsible to him directly.

## THE NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC.

SIR,—The editor of the *Builder* in 1881 very generously accorded me a little space in your widely-spread journal to say a few words respecting the National Hospital for the Paralyzed and Epileptic, Queen's-square, Bloomsbury; and it must be a great satisfaction to all interested in it that the report of Mr. Burford Rawlings, the secretary and general director, whose energy has never slept.

Twenty-five years ago it was a little hospital, for whose habitation no more than a single house could be provided, and now the new and magnificent building, rising like a Phoenix on the ashes of the old one, has become a world-known institution, and tens of thousands of sufferers have shared its advantages, and alike by the reputation it has achieved and by the ever-widening scope of its good work among the most neglected of the sick poor, and by its abundant promise of a future fraught with benefit to every rank of the community, the hospital claims a large sympathy and support of all who acknowledge the relief of suffering to be a great and sacred duty.

Out of the large sum of 60,000l. needed to complete the building and equipment fund, there only remain a few thousands more to be contributed to enable the committee to inform the Prince of Wales (who opens the new building on Saturday) that the institution can pursue its useful career free from the burden of debt.

\*CARLEON.

## FAN-LIGHTS.

SIR,—I have read with some interest the notes in your current number on "Fan-lights" [p. 896]. I hope it may have some effect in preserving them, but I have for some time noticed, with regret, that when old houses are repaired or altered, these lovely and graceful objects are the first things to disappear.

I was particularly struck with this the other day in Gower-street. It may be a rule in the great London properties that certain changes should be made on the granting of new leases: can it be that a single sheet of plate-glass is considered an improvement on the fan-lights of our grandfathers?

WILLIAM WICKHAM.  
\* \* We entirely concur with our correspondent as to the want of taste displayed in the alterations in Gower-street. The entrances have been effectually vulgarised.

## PROVINCIAL NEWS.

**Heavitree (Exeter).—**A Congregational Hall has been erected here. In 1884 the site of "Homestead House" and yard was obtained at Heavitree, at a total cost of 726l. Messrs. Best and Commis supplied drawings for a church and schools to cover the entire site; but the school buildings only are erected on the yard adjoining the house, and will be used as a Mission hall and Sunday School. Messrs. Scadding & Son were entrusted with the work, the contract price being 999l. The Hall has been built in the Gothic style. The walls are of local red brick, with Bath stone dressings. At the north end is a platform, and the lectern standing on it was supplied by Messrs. Wippell & Co., of Exeter. Ventilation is ensured by means of Leggett's patent fan-light openers.

The glazing has been carried out by Mr. Kingwell, and the plumbing by Messrs. Bowden & Toby. The work has been carried out under the direction of Mr. Scadding's foreman (Mr. J. B. Cole). The total cost of the building will be about 1,200l., and accommodation is provided for 288 persons.

**Ashington.**—New Co-operative Store buildings, including a Temperance hotel, have just been opened at Ashington Colliery. The buildings are of pressed red bricks with stone facings. The architects were Messrs. Oliver & Leeson, of Newcastle; the clerk of the works was Mr. Charlton; and the contractor was Mr. Lilburn.

**Teignmouth (Devon).—**A fountain is to be presented to Teignmouth by Mr. J. Wills, of Oak Lodge. It is to be erected on ground adjoining the west end of No. 2, The Esplanade, near the Den promenade. The design is in the Italian style, circular at the base, and having four drinking fountains for persons, a large trough for cattle, and four basins for dogs. The structure will be 15 ft. in diameter, and 16 ft. high. There will be one central jet of water at the top, and four smaller jets from the main basin. The fountain will be of grey granite, fine-axed, having four polished Aberdeen granite columns supporting each of the two upper basins, which will be pierced by numerous holes through which the water will fall on to a large octagonal water-shed at the base, and thence into the cattle-trough, forming graceful cascades in its descent. The work will cost about 300l., and is being carried out by Mr. J. J. Hayman, of Teignmouth, from a design prepared by Mr. T. Mullins, architect, of Exeter.

**Beaconsfield (Bucks).—**A very large clock and chimera have been erected on the church here. The dial is 9 ft. diameter. The clock plays the Cambridge chimes, strikes the hours upon a 21 cwt. bell, and is fitted with all the latest improvements. It has a pendulum of 2 cwt. The entire work has been carried out by John Smith & Sons, Midland Clock Works, Derby, who have also put up a four-dial clock at the new workhouse at Burton-on-Trent.

**Newbury.**—The scene of the great fire noticed by us in our issue of February 29th last, at the Albert Moulding Mills and Joinery Works, Newbury, the property of Mr. Samuel Elliott, has assumed a different aspect since that date. The premises have now been entirely rebuilt. The moulding-mill is one of the most extensive in the West of England. The loss in the late fire on machinery alone was little less than 8,000l.

**Preston.**—A two-light Munich stained-glass window has just been erected in the baptistery of St. Peter's Church, Preston, in which two frescos have lately been painted. The subject of the window is the "Draught of Fishes." The artists are Messrs. Mayer & Co.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

2,871, Letter-box, with Indicating Bell. J. D. Duckett.

The letter-box is provided with automatic means for signalling when anything is inserted therein, and with a groove in the front plate for the attachment of a name-plate. On opening the hinged flap of the letter-box a pivoted projection actuates an arm and causes a spindle to rotate until a spur enters a slot in the arm, when the spindle falls back and the bell rings. The letter-box bell may be used as a house or door bell, the seating for the bell-pull being formed on the front plate of the box.

4,570, Door-sill Brasses. S. Slater.

A door-sill brass is sprung into sockets on the door-posts by its own elasticity, being bent in a bow-like form. It may be readily taken out for cleaning, and when in position is fastened by slots engaging on pins, by which it is fastened to the door-sills.

3,792, Non-conducting Covering for Heat. W. L. Thompson and J. C. W. Stanley.

Sheets of porous material such as hair, felt, silicate-cotton, asbestos, and the like, are corrugated and placed one over another to the thickness required, with the corrugations at right angles. On the inner side strips of asbestos are secured by riveting, and covered with adhesive material, and the lagging so attached to the objects to be covered. The outer sheet may have a plate of tinned iron or a sheet of tinfoil paper. The metal coating is perforated at various points to detect leakage.

## APPLICATIONS FOR LETTERS PATENT.

June 19.—7,469, H. Buchan, Improvements in Water-closets.—7,475, E. Dutton, Improved Bench Vice.—7,483, J. Hammond, Improvements in Mortising Machines.—7,485, A. McLean, Manufacture of Pigments.—7,508, G. Redfern, Automatic Intermitting Syphon or Flushing Cisterns.

June 20.—7,523, J. Dougherty, Fastening and Securing Door Knobs on Spindles.—7,542, J. Overing and A. Tulip, Construction of Buildings or Structures.—7,552, J. Sharp, Window Sash Fastenings.

June 22.—7,587, W. Farrow, Water Waste Preventer Cisterns for Water-closets.—7,592, R. Robson, Foundation and Fastener for Tiles.

June 23.—7,604, W. Baird, Flushing Water-closets Automatically.—7,618, J. Clegg, Wood Floorings, Match Linings, and other Wood Coverings.—7,620, H. Byles and T. Hanson, Improvements in Water-closets.—7,637, A. Boulle, Bit Braces.

7,655, G. Winkle, Knobs for Lock Spindles, &c.  
June 24.—7,670, W. Kilby, Improvements in Sinks or Gutter Drains.—7,699, H. Haddan, Improvements in Windows.

June 25.—7,716, D. Appleton and J. Fussell, Improvements in Screw Drivers.—7,724, J. Macmelcan, Ventilators.—7,729, F. Garon, Fastening Knobs to Door Spindles and Handles.—7,732, D. Webb, Pavement Lights.—7,735, T. Collis, Portable Dust Bin.—7,738, G. Pfeifer and Max Schutz, Apparatus for Heating Soldering Tools.—7,741, O. Elphick, Apparatus for Drawing off Water for Flushing, &c.—7,743, G. Wright, Improvements in Store Grates.—7,752, E. Robbins, Improvements in the Manufacture of Plain, Ornamental, Decorative, and Constructive Works from Slag.—7,743, T. Worthington, Producing Imitations of Wood and Marble on Painted and other Surfaces.

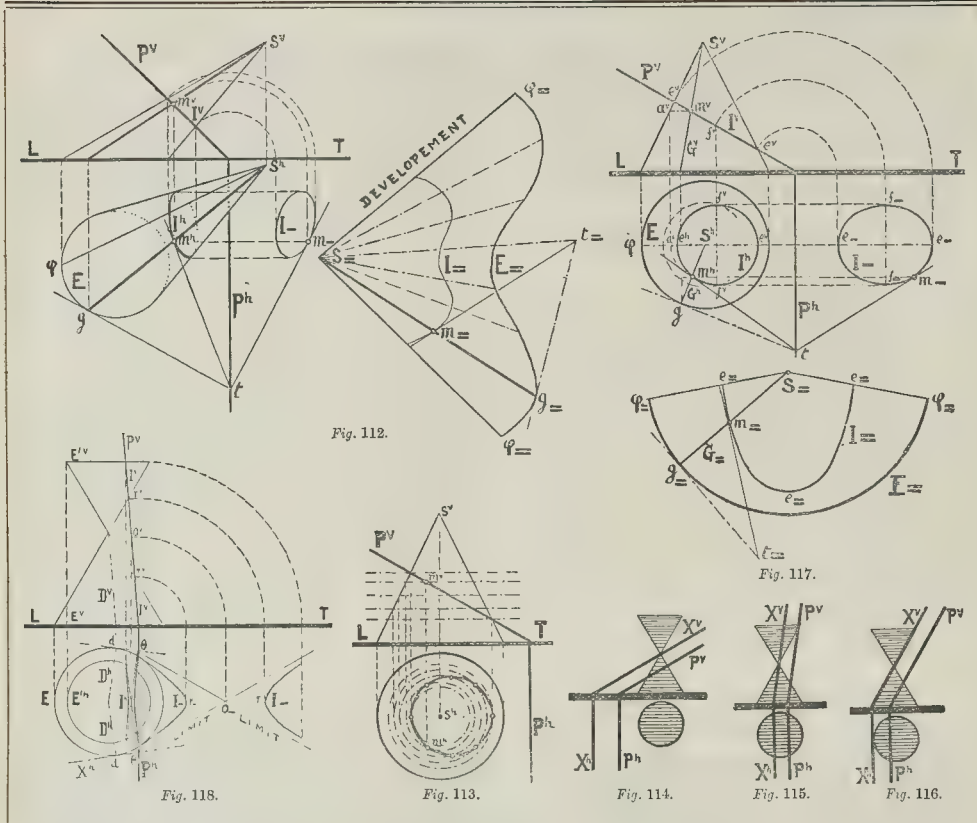
## PROVISIONAL SPECIFICATIONS ACCEPTED.

3,255, W. Mead and S. Jenner, Chimney-top or Ventilating Shaft.—5,537, G. Halbach, Improvements in Bow Saws.—5,601, J. Horne, Apparatus for Warming and Ventilating.—5,705, A. Biew, Fire Escape, Applicable also for Ventilating Buildings. 5,728, G. Crowther, Receptacle for Paints, Stains, and Brushes.—6,121, J. Weston, Door Springs.—6,133, E. Cammis, Manufacture of Bricks.—6,318, T. Birbeck, Spindle for Door Knobs and Means of Attaching same.—6,643, R. Hunter and J. Turnbull, Kitchen Ranges.—5,529, W. Riches, Combination Cabinets.—5,577, J. Bennett, Manufacturing Welded Hinges.—6,157, C. Schlickeysen, Apparatus for Cutting Bricks and Tiles.—6,244, G. Smart, Improvements in Tiles.—6,249, G. Redfern, Improvements in Tiles.—6,712, J. Budd, Ornamental Glass for Decorating Walls and Ceilings.

## COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

9,793, T. Wright, a Plumb Rule.—10,717, W. Holmes, Syphon Water-waste Preventer for Flushing Purposes.—11,590, W. Page, Construction of Horticultural and other Buildings.—11,969, H. Crowe, Improved System of Glazing Roofs.—12,067, E. Bailey, Attaching Knobs to the Spindles of Locks and Latches.—12,290, W. Hindle, Improvements in Water-closets.—13,039, R. Hodges and J. Archer, Sash-fastenings.—14,989, R. Lowe, Cement or Composition for Laying Floors or Pavements.—3,452, T. Hawkins, Glazing with or without Putty.—6,326, B. Saunders, Fasteners for Windows, to prevent their being opened beyond a given point.—12,332, H. Booble, Improvements in Reflectors.—14,323, C. Thompson, Improved Form of Bricks for Constructing Furnaces, Stoves, Kilns, &c.



### The Student's Column.

#### DESCRIPTIVE GEOMETRY.—PART II.

VI.

To find the section of any cone by a plane, draw the real shape of the section and develop the surface of the cone.

**F**IND  $E$  be the base of the cone, and let the plane  $P$  be perpendicular to the elevation, then  $P^v$  the elevation of the section, falls on  $P^v$ , and we get  $I^v$  by finding the intersections of a series of generators. We find the real section and the tangent to any point of the section by the same method used above for the cylinder.

To develop the cone after splitting its surface along one of its generators, the foot of which is  $\phi$ , we carry from this point on the base a series of distances,  $\phi g, g g^1, g^1 g^2$ , &c., corresponding to as many generators. Replacing the arcs of the curve by their cords, the cone becomes a pyramid, and can be developed in a series of triangles,  $s = \phi = g = g^1 = g^2 = g^3$ , &c., which we can draw by finding their three sides. The cords on the base we know; as for the sides which start from the apex, such as  $s = \phi = g = g^1 = g^2 = g^3$ , &c., we find their length by the same means we used to find the real length of the hip of a roof. The developed cone is completed by connecting all the points,  $\phi = g = g^1 = g^2 = g^3$ , &c., by a curve. (See fig. 112.)

Find the section of a right cone by a plane  $P$ .

A right cone has a circle for its base, and the plan of its apex is on the centre of its base.

We might find the section by the same method as before; but we have a more rapid way in cutting the cone by a series of horizontal planes, for their sections are then circles, and we can at once find thereby the plan of any point of the section of the cone by the plane  $P$ . (See fig. 113.)

Definition of the conic sections found.

The plane which cuts the right cone may

have three positions, which we will define as follows:—

A plane  $X$  passing through the apex of the cone meeting the plane of the base is called a directing plane.

If a cone be cut by a plane  $P$  parallel to a directing plane  $X$ , the section is an ellipse when the directing plane passes outside the base of the cone (fig. 114); it is a hyperbola when the directing plane falls within the bases (fig. 115), and a parabola when the directing plane is tangent to the surface of the cone (fig. 116).

In the development of a right cone the base becomes an arc of a circle with the length of the generator  $G$  as radius, and to get the developed surface of the cone we have only to carry on such a circle the distances of the feet of the generators  $\phi g, g g^1, g^1 g^2$ , &c. If we are developing a complete cone, that is a cone the generators of which are prolonged above the apex  $S$ , we shall find two segments instead of one. To distinguish them we will make the radius of the one smaller than that of the other. Whenever the diameter of the base of a right cone is larger than its height the developed circle will measure more than  $180^\circ$ , or half a circle, and the two parts of the developed surface will overlap one another.

To find the shape of the elliptical section of a cone it will suffice to have its major and minor axes. In fig. 117 the major axis is parallel to the elevation plane, and is projected in real length in  $e^v e^h$ ; the other is parallel to the plane of the plan, and is projected in real length in  $f^h f^v$ ; this allows to draw the ellipse by any of the methods commonly used or with elliptical compasses.

In the development of the cone,  $S = m =$  will be equal to the real length  $S m$ , which is easy to find; for a horizontal line from  $m^v$  will give you a point  $a$  which  $m$  would reach if the cone were made to rotate round its axis.  $S^v a^v$  is, therefore, equal to real length of  $S m$  which

we carry on the generator  $G =$  in the developed surface.

For the tangent in  $m =$  to the developed section, we make  $g = t =$  equal to  $g t$  and tangent to the developed base in  $g =$ , then  $t = m =$  is the tangent; for the angle it will make with  $G =$  will be the same as the one the tangent itself,  $t m$ , made with the generator,  $G$ . We shall draw this curve more easily by getting a few points and their tangents than by getting a great number of points. (See fig. 117.)

Find the section of the cone when it is a hyperbola.

As in the case of the ellipse, we can find the principal points of this curve, such as the extremities  $r =$ ,  $o =$  of the axis, then the centre  $o =$ , and the limits which pass through  $o =$ .

To find these limits, we draw the generators  $D$  parallel to the cutting plane  $P$ . We do so by making  $D^v$  parallel to  $P^v$ , and deducing therefrom  $D^h$ . By the feet  $d$  of the generators  $D$ , we draw lines tangent to the base; they are the horizontal traces  $X^h$  of the planes  $X$  tangent to the cone along the generators  $D$ , and therefore the points  $\phi$  where they meet  $P^h$  belong to the limits of the tangents to the hyperbola, the lines  $\theta o =$  are, therefore, those limits. (See fig. 115.)

The above gives us all the elements for drawing the hyperbola, either by hand or with the aid of special compasses. Students who are unacquainted with conic sections may rest contented with drawing the curves by a series of points which they get, as in fig. 113, by cutting the cone by horizontal planes.

In developing the surface of the cone with a hyperbolic section, we must be careful to remember on which side of  $S =$  we must carry the points  $m =$  of the section  $I =$  according as they belong to the sections of the lower or the upper cone. Generally one of the sections is cut in two, and the developed cone presents the appearance of fig. 119; tangents to the developed section are found by the same method



described in fig. 117 for the development of the ellipses. The developed generators  $D_1, D_2$  will be the limits of the developed curve of the hyperbola, for we know that they meet the curve in points infinitely distant. (See fig. 119).

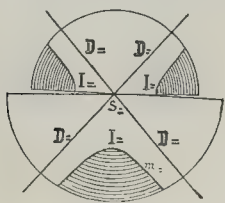


Fig. 119.

## CHURCH-BUILDING NEWS.

**Claines (Worcestershire).**—The new church of St. Barnabas, Rainbow-hill, Claines, has just been consecrated. The church consists of a nave, north and south aisles, transept, chancel (which is apsidal), vestry and organ-chamber, north and south porches, with narthex at west end, having swing doors communicating with porches. Entrances are also provided at the east end of the south transept and vestry. The extreme internal length of the church is 108 ft. 3 in. by 55 ft. 5 in. wide. Extreme heights are as follow:—Chancel, 40 ft.; nave, 48 ft.; narthex and porch, 15 ft. 3 in.; aisles and vestry, 21 ft.; transepts, 26 ft. The walls are substantially built with brick, vary from about 2 ft. to 3 ft. in thickness, and are faced with pressed bricks set in dark mortar finished with a neat cut joint, Bath stone being employed for windows, bell gable, and outside dressings; also white brick for string and plinth courses. The nave walls are supported on either side with three Early English shafts with chamfered stone arches and moulded labels of grey Bromsgrove stone. In the spandrels of the nave arches are introduced six carved Bromsgrove stone circular medallions representing St. Barnabas, St. Paul, St. Matthew, St. Mark, St. Luke, and St. John. The floors of the entrances, aisles, and chancel are laid with encaustic tiles supplied by Webb's Worcester Tiles Company (Limited). The ventilation has been arranged by the Worcester Sanitary Ventilating Company, of which Mr. E. Day is engineer, the system adopted being a combination of Ellison and Lloyd's patents. The general design of the church partakes of the character of work existing about the early part and middle portion of the thirteenth century. Accommodation is provided for about 600 persons. The carving and font were executed by Mr. Forsyth. The heating and gas work was carried out by Messrs. Goodman & Ward. Mr. William Birch has acted as clerk of the works. The whole of the work, including fittings, heating apparatus, gas, fences, &c., complete, has been carried out by Messrs. Brazier & Weaver, contractors, Bromsgrove, at a cost of about 3,600*l.*, from the designs and under the supervision of Mr. Ernest Day, architect, Worcester.

**Sheffield.**—The new rectory in Sheffield parish church has just been unveiled. It is of oak, and is stated to be part and parcel of the original design for the general restoration of the church. When that took place some few years ago, Messrs. Flockton & Gibbs, architects, acting with the late Sir Gilbert Scott as consulting architect, prepared designs for this rectory. These designs have since received some alterations, and it has long been the wish of the Venerable Archdeacon Blakeney, D.D., and his indefatigable churchwardens, to see the ideal on paper become a reality. Opportunities for doing this at last offered themselves, and last year Mr. Harry Hems, of Exeter, was commissioned to carry out the work. The new rectory is composed wholly of English oak, left from the tool, and without oil or varnish of any description. Like the immediate surroundings, it is in the fourteenth-century style of Decorated Gothic work. Its entire length is 21 ft., and its greatest altitude 9 ft. The lowness of the fine east window, and the undesirability of cutting into any of its light, rendered the general treatment somewhat difficult to manage successfully. Immediately above the altarpiece are three recessed panels divided by niches; all these are surmounted by groined

and ogee-headed canopies, which rise from carved capitals, and are crowned by a wealth of crocketed work, each being separated by bold buttresses, which, after being carried well up, terminate in graceful pinnacles a little above the main cornice line. A continuous cornice, rich in a wealth of running ornament and brattice work, runs through the entire length, whilst the recessed ground-work (above the ogee-heads and below the cornice) is diapered by rich pattern in geometrical patterns. The recessed panels have gilded grounds. The niches between are decorated with the Tudor rose. From the Holy Table to the walls, on each side, there is an arcading of six bays, all exhibiting rich and delicate carved work. This arcading rests upon a deeply-moulded base, between which and the moulded transom are traceried panelling. Above all this spring the shafts, quatrefoil on plan, which carry the groined head niches above the main panels. These heads mostly assume an ogee outline, and are crocketed. They spring from daintily-carved cherubim heads, and above and behind them the ground is diapered.

**East Hammingfield, near Chelmsford.**—All Saints' Church in this parish has just been consecrated by the Bishop of St. Alban's. The old church was totally destroyed by fire at the close of 1883, and the building committee decided to erect the new church on a site nearer the centre of the village. It consists of nave, chancel, north and south transepts, organ-chamber, vestry, and bell-turret to hold five bells. Accommodation is provided for 140 adults and sixty children. The walls are of brick, faced with Kentish rag and Car stone, and Bath stone dressings. The reredos, font, and pulpit are richly carved with subjects chosen by the rector, the Rev. James Fowler, and the total cost of the building is about 3,000*l.* The architect was Mr. Henry Stone, of London, and the builder, Mr. W. Wood, of Chelmsford, whilst Mr. G. Hamlin acted as clerk of works, and the carving was executed by Mr. J. Frampton.

**Battersea.**—The new church of St. Andrew, Battersea, was consecrated on the 14th ult. The church has been erected by Messrs. Macey & Sons, of Battersea, from the designs of Mr. Henry Stone, architect, Bedford-row. It is built of stock bricks, relieved with red dressings and Ham Hill stone to doors and windows. The roof is covered with Broseley tiles. The nave columns are of Ham stone, and the arches are formed in red bricks. The floor is laid with solid wood blocks. The mosaic tile pavement of the chancel was laid by Messrs. Minton. The gas-fittings were by Mr. Dodson, the carving by Mr. George Crampton, the hot-water pipes, &c., by Messrs. Jones & Co. The seats for the congregation are of deal, varnished, those in the chancel being of pitch-pine. The pulpit is carved and of Caen stone. The roof is open and boarded throughout. The church furniture was supplied by Messrs. Atkinson & Co., of Lambeth. The cost of the church has been only some 5,000*l.* Mr. Humphreys acted as foreman of the works. St. Andrew's stands in the midst of a network of railways, and the congregation is largely composed of railway men. Mr. John Deacon, of Putney, gave the site.

## DISSENTING CHURCH-BUILDING NEWS.

**Belfast.**—Sandy Row Methodist Church, Belfast, was opened for service on the 28th ult. The church, which in design exhibits a simple treatment of the Early English style, is built in Belfast red perforated brickwork, with dressings of red freestone to the doors and windows. It faces the end of McDiam-street, the principal gable being so arranged as to show in Sandy-row. This façade has a bold triplet window in the centre, with single windows in the recesses between the buttresses. The entrance door-way opens into the vestibule, and have played stone jambs with moulded arches, having label and hood mouldings, with foliated terminals. The interior of the new church is 68 ft. long by 42 ft. wide, with galleries at sides and one end. The arched recess at the back of the pulpit is arcaded in pitch pine. The seats and pulpit, gallery front, and other joiners' work, are of pitch-pine, with panels of Quebec pine, and mouldings of deep-coloured wood. The heating is effected by Musgrave's small-bore tube apparatus. The church affords sitting accommodation for 650 adults. The cost of church, schools, and ground is 3,500*l.* The contract has been executed by Mr. Hucheson Keith from the

designs and under the superintendence of Mr. James J. Phillips, architect, Arthur-street, Belfast.

**South Elmsall, near Doncaster.**—The new Wesleyan Chapel at South Elmsall was opened on the 25th ult. The buildings comprise a chapel, 55 ft. by 33 ft., with vestries in the rear, and are of Elland flag stone. The tracery to the windows and other dressings are of Horsforth sandstone. The tower, with spire, rises to 90 ft. in height. The interior is finished in pitch pine and English oak. The communion table and chairs are of carved wainscot oak. The gasfittings are of hammered iron and polished brass by Messrs. Dutton & Powers, of Manchester. Accommodation is provided for 400 persons; and the cost, exclusive of site, has been 1,600*l.* Mr. James Wilson, of Leeds, has been the architect, but the works have been carried out under the personal superintendence of Mr. T. Butler-Wilson, who has recently succeeded to his father's practice.

## RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JUNE 22.

|                                                                                                                          |        |
|--------------------------------------------------------------------------------------------------------------------------|--------|
| By DEBENHAM, TEWSON, & CO.                                                                                               |        |
| Whitechapel, High-street.—Freehold ground-rents of 74 <i>l.</i> , reversion in 25 years .....                            | 23,100 |
| Eastcheap.—Freehold ground-rent of 1,230 <i>l.</i> , reversion in 78 years .....                                         | 31,700 |
| Great Tower-street.—Freehold ground-rent of 300 <i>l.</i> , reversion in 40 years .....                                  | 9,300  |
| Whitechapel, High-street.—A plot of freehold land, 1,860 ft. ....                                                        | 1,380  |
| 74 <i>l.</i> and 14 <i>l.</i> , High-street, freehold .....                                                              | 11,350 |
| Alidgate—27, High-street, freehold .....                                                                                 | 1,420  |
| Cheapside—46, Queen-street, freehold .....                                                                               | 12,075 |
| Eastcheap—40, Fish-street-hill, freehold .....                                                                           | 6,000  |
| By T. CHAMBERS.                                                                                                          |        |
| Romford, White Hart-lane.—Four freehold cottages Hornchurch — Four freehold cottages, and 2 <i>l.</i> 14 <i>l.</i> ..... | 460    |
| Barking, Ripple-lane—An enclosure of land, 21 <i>l.</i> 3 <i>l.</i> 3 <i>l.</i> , freehold .....                         | 400    |
| 21 <i>l.</i> 3 <i>l.</i> 3 <i>l.</i> , freehold .....                                                                    | 1,050  |
| An enclosure of land, 60 <i>l.</i> 2 <i>l.</i> 20 <i>l.</i> , freehold .....                                             | 3,100  |
| Shoe-lane—10 to 14, Robin Hood-court, Freehold ..                                                                        | 3,000  |

|                                                                                              |     |
|----------------------------------------------------------------------------------------------|-----|
| By J. DAWSON & SON.                                                                          |     |
| Fimlico—37, 38, and 39, Palford-street, 33 years, ground-rent 27 <i>l.</i> 7 <i>l.</i> ..... | 500 |
| Clapham—9 and 11, Turret-grove, 65 years, ground-rent 11 <i>l.</i> 10 <i>l.</i> .....        | 570 |
| Battersea—68, St. Philip-street, 72 years, ground-rent 6 <i>l.</i> .....                     | 270 |
| 13, Stanley-street, 71 years, ground-rent 1 <i>l.</i> 13 <i>l.</i> 4 <i>l.</i> ..            | 250 |
| Lambeth—34, Renfrew-road, 40 years, ground-rent 4 <i>l.</i> .....                            | 350 |
| 11, Loughborough-street, 10 years, ground-rent 3 <i>l.</i> ..                                | 210 |
| By J. McLELLAN & SON.                                                                        |     |
| Balham—80 and 84, Sistora-road, 92 years, ground-rent 14 <i>l.</i> 14 <i>l.</i> .....        | 830 |
| 94, Endlesham-road, 94 years, ground-rent 7 <i>l.</i> .....                                  | 330 |

|                                                                                            |     |
|--------------------------------------------------------------------------------------------|-----|
| H. J. E. B. B.                                                                             |     |
| Liphook, Hants.—An enclosure of freehold land, 16 <i>l.</i> 0 <i>l.</i> 4 <i>l.</i> .....  | 480 |
| By A. RICHARDS.                                                                            |     |
| Tottenham—4 and 8, Tottenham-terrace, 6 years, ground-rent 10 <i>l.</i> 10 <i>l.</i> ..... | 115 |
| 11 and 12, Percy Villas, 66 years, ground-rent 4 <i>l.</i> 10 <i>l.</i> .....              | 385 |

|                                                                       |       |
|-----------------------------------------------------------------------|-------|
| By THURGOOD & MARTIN.                                                 |       |
| Islington—14, Hanover-street, freehold .....                          | 750   |
| 23, Gerrard-street, 48 years, ground-rent 6 <i>l.</i> .....           | 550   |
| By E. F. GWYNNE.                                                      |       |
| Forest Gate, Earham-grove.—The freehold house, "Lynncroft" .....      | 2,300 |
| Camden-road—133, King's-road, 38 years, ground-rent 7 <i>l.</i> ..... | 545   |

|                                                                                        |       |
|----------------------------------------------------------------------------------------|-------|
| By H. J. KIRK.                                                                         |       |
| Camden Town—69, Arlington-road, freehold .....                                         | 1,100 |
| By T. B. WESTCOTT.                                                                     |       |
| Kentish Town—33, Malden-crescent, 81 years, ground-rent 8 <i>l.</i> 10 <i>l.</i> ..... | 845   |
| 75, Castle-road, 78 years, ground-rent 4 <i>l.</i> 10 <i>l.</i> .....                  | 805   |

|                                                                                   |     |
|-----------------------------------------------------------------------------------|-----|
| By M. LITTLE.                                                                     |     |
| Mill End—17, Lichtfield-road, 56 years, ground-rent 3 <i>l.</i> 8 <i>l.</i> ..... | 385 |
| North Bow—155, Armagh-road, freehold .....                                        | 265 |

|                                                                                      |       |
|--------------------------------------------------------------------------------------|-------|
| By W. H. MOORE.                                                                      |       |
| Fitzroy-square—14, Charlotte-street, freehold .....                                  | 1,650 |
| Kentish Town—125, Leighton-road, 55 years, ground-rent 6 <i>l.</i> 5 <i>l.</i> ..... | 400   |

|                                                                                                                 |       |
|-----------------------------------------------------------------------------------------------------------------|-------|
| By DEBENHAM, TEWSON, & CO.                                                                                      |       |
| Berley, Kent.—Three houses, ten cottages, and an orchard, 2 <i>l.</i> 1 <i>l.</i> 15 <i>l.</i> , freehold ..... | 2,000 |
| Tottenham Court-road.—Ground-rent of 14 <i>l.</i> a year, reversion in 24 years .....                           | 880   |
| Ground-rent of 41 <i>l.</i> a year, reversion in 24 years ..                                                    | 2,650 |
| Ground-rent of 30 <i>l.</i> a year, reversion in 35 years ..                                                    | 1,230 |
| Ground-rent of 58 <i>l.</i> a year, reversion in 32 years ..                                                    | 2,510 |
| Ground-rent of 55 <i>l.</i> a year for 41 years, and 60 <i>l.</i> for 45 years .....                            | 1,550 |
| Ground-rent of 246 <i>l.</i> a year, reversion in 37 years ..                                                   | 8,185 |

|                                                                                         |       |
|-----------------------------------------------------------------------------------------|-------|
| By HARRIS, VIGOR, & JENKINSON.                                                          |       |
| Pentonville-road—No. 20, freehold .....                                                 | 1,700 |
| Eltham.—The freehold residence called "The Woodlands" .....                             | 1,010 |
| "Woodland Cottage" freehold .....                                                       | 280   |
| Farnborough, Look's Bottom.—Freehold orchard, 1 <i>l.</i> 2 <i>l.</i> 0 <i>l.</i> ..... | 325   |

|                                                                             |       |
|-----------------------------------------------------------------------------|-------|
| By A. SAYLE & SON.                                                          |       |
| Stratford—2 to 10 even, Angel-lane, and 1 to 7, Wilton-road, freehold ..... | 1,565 |
| 12 to 40 even, Angel-lane, freehold .....                                   | 3,030 |
| By FULLER, HOSNER, SONS, & CASSELL.                                         |       |
| Lewis, Sussex.—"The Viper" Store, with wharf and yard, freehold .....       | 1,200 |



WATERS & RAWLINSON.  
Hants, Weyhill—"Penton Lodge," and  
84s. Or. 20p. £12,800

By MADDOX & SON.  
Pimlico—129, Lupus-street, 23 years, ground-rent  
12s. 1,430  
Baker-street—84, Crawford-street, 23 years, ground-  
rent 21s. 490  
Edgeware-road—A profit-rent of 355s. a year, term  
10 years 1,410

JUNE 25.

By HUSSEY, WALCOTT, & BLACKFORD.  
Harrow-on-the-Hill—Ground-rents of 65s. 10s., rever-  
sion in 91 years 1,275

By NORTON, THIST, WATNEY, & CO.  
Richmond Hill—6, Downe Terrace, freehold 1,500

By FARRERBROTHERS, ELIS, CLARK, & CO.  
East Ham—Freehold land, 4s. 3r. 5p. 1,800  
Dorset-square—Ground-rent of 31s. 10s. a year,  
term 24 years 410

By NEWSON & HARDING.  
Camden-road—61, Hilldrop-crescent, ground-rent  
10s., 63 years 850

Kingland—104, 106, and 108, Southgate-road, 34  
years, ground-rent 10s. 370

Islington—5, Rheidol-road, 31 years, ground-rent 5s.  
Stoke Newington—19 and 21, Chisholm-road, 89  
years, ground-rent 12s. 675

Dalston—115 and 117, Forest-road, 66 years, ground-  
rent 17s. 880

Islington—65 and 66, Colebrook-row, freehold 2,665

St. Margybone—Ground-rents of 42s. a year, term  
35 years 660

Ground-rents of 77s. a year, term 35 years 1,130

By O. C. & T. MOORE.  
Mile End—1, St. Thomas-road, 65 years, ground-  
rent, 3s. 15s. 6d. 300

Dunk-street, the lease and goodwill of the "Old  
Cheshire Cheese" 140

By E. SIMON.  
Brixton—193 to 199 odd, Shakespeare-road, 60 years,  
ground-rent 25s. 1,225

Borough—81, Long-lane, freehold 780

Bernouday—148 to 154 even, Bolls-road, 57 years,  
ground-rent 18s. 960

Kotherbith—29 to 35, Corbett-lane, 96 years,  
ground-rents 27s. 10s. 1,200

JUNE 26.

By BAKER & SON.  
Sunbury, near—An enclosure of freehold land,  
32s. 3r. 15p. 3,900

New Burlington-street, No. 1—Profit-rent, 480s.,  
term 18 years 1,400

By R. REID.  
Notting Hill—1 and 2, Pamber-street, 79 years,  
ground-rent 13s. 455

Camden Town—85, York-road, 75 years, ground-  
rent, 6s. 19s. 380

Mile End—34 and 35, Harford-street, 81 years,  
ground-rent 5s. 375

Kornsey-road—17, Wray-crescent, 93 years, ground-  
rent 8s. 435

#### MEETINGS.

SATURDAY, JULY 4.

St. Paul's Ecclesiastical Society.—Visit to Chichester  
Cathedral, under the guidance of Mr. Somers Clarke, F.S.A.  
Train from Victoria at 10.30 a.m.

MONDAY, JULY 6.

Clerks of Works' Association.—Mr. J. H. Heathman,  
on "Measures for Protection against Fire." 7.30 p.m.

THURSDAY, JULY 9.

Sanitary Institute of Great Britain.—Anniversary  
Meeting at Royal Institution, Albemarle-street.—Address  
by Professor Corfield on "The Water Supply of Ancient  
Roman Cities." 3 p.m.

#### Miscellaneous.

A new Hall and Sunday School-rooms have been decided upon in connexion with the North Leith parish church. An eligible site has been secured, stretching between Great Wellington-street and Allan-street, off the Ferry-road; and, as the result of a limited competition, designs by Mr. Hippolyte J. Blanc, architect, Edinburgh, have been unanimously selected by the committee. The scheme comprises a large hall, in which eighty classes are accommodated, and so arranged that when required the hall can be seated for an audience of 900 persons comfortably, in addition to platform accommodation. There are also infants' class-room, accommodating 150; committee-room, kitchen, furnace-room, three separate rooms for advanced classes, capable of being opened out to form one apartment; teachers' room, and caretaker's dwelling. The works are to be proceeded with as soon as tenders are obtained, the limit of expenditure proposed by the committee for the whole works being under 3,000.

Sanitary Institute of Great Britain.—The ninth anniversary meeting of this Institute will be held in the lecture theatre of the Royal Institution, Albemarle-street, on Thursday next, July 9th, at three p.m. The chair will be taken by Sir John Lubbock. An address will be delivered by Professor W. H. Corfield, M.A., M.D., entitled "The Water Supply of Ancient Roman Cities," and three medals and certificates awarded to the successful exhibitors at the Exhibition held at Dublin in 1884 will be presented.

#### New Fountain, Henley-on-Thames.

The visitors to the Regatta, who have been accustomed to look with some degree of familiarity upon the obelisk and pump which, for want of something more graceful, have for many a long year been the principal objects of attraction in the Market-place, will be agreeably surprised at the change which has taken place since their last visit. The obelisk has been relegated to a suburb of the town, and the pump removed. A handsome fountain has been erected in their place. The circumstances which led to this transformation may be gleaned from the following inscription engraved on a granite panel:—"In memory of Groveville Phillimore, M.A., for sixteen years rector of Henley-on-Thames: this Fountain was presented to the town, June, 1885, by his family and friends." The deceased rector was a brother of the late Sir Robert Phillimore, and to him Henley is indebted for its schools, its school of art, nursing-home, invalid's kitchen, parochial hall, and other useful institutions. The design of the fountain is Gothic. The materials are granite and Ketton stone. At each of the four angles is a globular lamp, by Hodge, of Hutton-garden. The steps, foundation, and plumb are by Mr. Clements, of Henley; the fountain itself being the work of Mr. James Forsyth, of Finchley New-road, Hampstead.

**Patent Postage-stamp Affixer.**—We have had submitted to our notice a machine for affixing postage-stamps, which has been invented and patented by Mdlle. Victoria de Bunsen. By its use the injurious habit of wetting with the tongue the stamps and flap of the envelope is obviated, and as it is stated that 100 stamps can be affixed in five minutes by an experienced person with this machine, it is apparent that by its use a vast waste of time will be avoided by those who are in the habit of using stamps in any considerable number. Not the least merit of the apparatus is its simplicity, and the absence of complicated movements in its employment. It is exhibited in the International Inventions Exhibition, where it may be inspected by those interested in such an appliance.—*Lancet*.

**A Recreation-ground for Oldbury.**—On Saturday last a public recreation-ground was formally opened for the use of the people of Oldbury by Mr. A. M. Chance. The ground is about two acres in extent, situated in the Low Town district, between the new railway embankment and Lodge-street. It has been fenced in and planted with a number of shrubs and flowers, while the centre is laid with grass. The whole of the expense has been borne by Messrs. Chance Bros., of the alkali works, and the planting and laying out of the ground has been carried out under the supervision of Mr. A. M. Chance. The firm proposes retaining control of the ground for the present, but it will no doubt ultimately be made over to the Local Board for the use of the inhabitants in perpetuity.

**The Duke of Albany's Sarcophagus.**—A handsomely-sculptured sarcophagus has just been erected in the Albert Chapel, Windsor, in which are re-entombed the remains of the late Duke of Albany. It is placed on the marble mosaic floor, midway between the west entrance doorway and the tomb of the late Prince Consort. The work is executed in statuary marble. The recumbent figure in plaster is temporarily placed on top awaiting the figure in marble, which is far advanced towards completion. Mr. J. E. Boehm, R.A., is the sculptor. Mr. L. Pearson, R.A., is the architect; and the work has been executed by Mr. Henry Terry.

**Liverpool Architectural Society.**—The third meeting of the Junior Debating Club was held at the Rooms, 9, Cook-street, on the 29th June, Mr. J. H. Dawson in the chair. There was a large attendance. The paper for the evening was read by Mr. James B. Hinks, the subject being "Terra-cotta." A well-sustained discussion ensued, in which the Chairman, Messrs. R. Holt, C. J. Anderson, E. Rathbone, J. W. Blakey, and others joined. It was announced that the next meeting would be held on July 13th, when Mr. Joseph H. McGovern (visitor) would read a paper on "Valuations."

**Newport (Mon.)**—St. Woolo's Church has, through the liberality of a member of the congregation, been presented with a handsomely-carved oak pulpit, with prayer-desk and seat to correspond, the whole having been executed by Messrs. Jones & Willis, of Birmingham and London.

#### The New London Pavilion Music

Hall, Coventry-street, is making rapid progress. The architect of the building is Mr. R. J. Worley, of Cannon-street, the interior arrangements being in the hands of Mr. Saunders. The contractors are Messrs. Peto Bros., of Pimlico. Portland stone is being used up to first-floor level; for all above that, Bath stone, from the Westwood Ground Quarries, is adopted. Since the foundation-stone was laid six weeks ago, about 30,000 feet cube of stone have been got from the quarries, sent in, prepared, and delivered to the building, and fired at the rate of 7 ft. per week taken all round the building, i.e., the building has grown over 42 ft. high in six weeks. The contractors to do this have kept a large staff of men employed day and night. Their steam-saws have been going constantly, in addition to about twenty hand sawyers, in order to get the stone sawn ready for the men to work. The cost of converting has been considerably lessened, and the rate of fixing greatly assisted by the extraordinary size of the Westwood stone, each block of which ran throughout from 3 ft. to 6 ft. deep in bed, and averaged over 30 ft. per block. The electric light is being used with great success at night.

**Proposed Memorial to the Late Bishop of Lincoln.**—On the 26th ult. a meeting of the Bishop Wordsworth Memorial Committee was held in the Cathedral Vestry, Lincoln, the Bishop of Nottingham in the chair. It was unanimously resolved that the general design and arrangement of the memorial, which is to consist of a recumbent effigy of the deceased bishop beneath a lofty and elaborate canopy, should be placed in the hands of Messrs. Bodley & Garner. The selection of the sculptor of the effigy will rest with the general body of subscribers. Certain names were suggested for consideration. A sub-committee was formed to carry out the design.

**Burlington Fine Arts Club.**—The Committee of the Burlington Fine Arts Club announce that in consequence of the great interest excited by the Exhibition of Persian and Arab Art, they have arranged that the collection shall remain on view until Saturday, 11th of July, after which date it will be closed.

#### PRICES CURRENT OF MATERIALS.

|                                       |              | £. s. d. | £. s. d. |
|---------------------------------------|--------------|----------|----------|
| TIMBER.                               |              |          |          |
| Greenheart, B.G.                      | ton          | 6 10 0   | 7 10 0   |
| Teak, E.I.                            | do           | 11 10 0  | 15 10 0  |
| Sequoia, U.S.                         | ft. cube     | 0 2 6    | 0 2 9    |
| Ash, Canada                           | load         | 3 0 0    | 6 0 0    |
| Birch                                 | do           | 3 0 0    | 4 10 0   |
| Elm                                   | do           | 3 10 0   | 5 0 0    |
| Fir, Daintie, &c.                     | do           | 1 10 0   | 4 10 0   |
| Oak                                   | do           | 3 5 0    | 5 0 0    |
| " Canada "                            | do           | 6 0 0    | 7 0 0    |
| " Pine " red "                        | do           | 3 0 0    | 4 0 0    |
| " yellow "                            | do           | 3 15 0   | 5 5 0    |
| Lath, Daintie                         | do           | 4 10 0   | 5 0 0    |
| St. Petersburg                        | do           | 5 0 0    | 7 0 0    |
| Wainscot, Kipin                       | log          | 3 0 0    | 4 10 0   |
| Deals, Finland, 2nd and 1st, std. 100 | ft. and 3rd  | 8 10 0   | 7 10 0   |
| " Rig "                               | do           | 7 0 0    | 8 10 0   |
| St. Petersburg, 1st yel.              | do           | 10 0 0   | 16 10 0  |
| " 2nd "                               | do           | 7 10 0   | 9 15 0   |
| " white "                             | do           | 7 10 0   | 11 10 0  |
| Swedish                               | do           | 7 0 0    | 17 0 0   |
| White Sea                             | do           | 15 0 0   | 32 10 0  |
| Canada, 2nd                           | do           | 12 0 0   | 18 10 0  |
| " 3rd, &c.                            | do           | 7 0 0    | 10 0 0   |
| " Spruce 1st                          | do           | 9 0 0    | 12 0 0   |
| " 2nd                                 | do           | 6 10 0   | 8 0 0    |
| New Brunswick, &c.                    | do           | 5 0 0    | 7 10 0   |
| Battens, all kinds                    | do           | 4 0 0    | 13 0 0   |
| Flooring Boards, sq. 1 in.—Pre-       | pared, first | 0 9 0    | 0 13 0   |
| " Second                              | do           | 0 7 6    | 0 8 8    |
| " Other qualities                     | do           | 0 5 0    | 0 7 0    |
| Cedar, Cuba                           | foot         | 0 0 32   | 0 0 4    |
| Honduras, &c.                         | do           | 0 0 3    | 0 0 4    |
| Australian                            | do           | 0 0 4    | 0 0 5    |
| Malagasy, Cuba                        | do           | 0 0 4    | 0 0 5    |
| St. Domingo cargo av.                 | do           | 0 0 5    | 0 0 6    |
| Mexican                               | do           | 0 0 4    | 0 0 5    |
| Tobacco                               | do           | 0 0 4    | 0 0 5    |
| Honduras                              | do           | 0 0 4    | 0 0 5    |
| Rosa, Rio                             | ton          | 7 0 0    | 17 0 0   |
| Bahia                                 | do           | 7 0 0    | 16 0 0   |
| Saio, St. Domingo                     | do           | 0 0 8    | 0 1 0    |
| Porto Rico                            | do           | 0 0 8    | 1 3 0    |
| Walnut, Italian                       | do           | 0 0 4    | 0 0 5    |

#### METALS.

|                           |     |         |         |
|---------------------------|-----|---------|---------|
| COPPER—                   |     |         |         |
| British, cke. and ingt.   | ton | 47 10 0 | 48 10 0 |
| Best selected             | do  | 45 10 0 | 49 0 0  |
| Sheets, strong            | do  | 55 10 0 | 58 0 0  |
| " India "                 | do  | 52 10 0 | 55 0 0  |
| Australian, fine cast.    | do  | 54 10 0 | 56 0 0  |
| Chili, bars               | do  | 44 7 6  | 44 15 0 |
| Iron—Pig in Scotland      | ton | 2 0 0   | 0 0 0   |
| Bar, Welsh, in London     | do  | 5 0 0   | 5 7 6   |
| " in Wales                | do  | 4 12 6  | 4 17 6  |
| " Staffordshire, London   | do  | 6 0 0   | 7 0 0   |
| Sheets, single, in London | do  | 7 10 0  | 8 0 0   |
| Heaps                     | do  | 7 0 0   | 8 0 0   |
| Nail rods                 | do  | 6 0 0   | 7 0 0   |



| METALS (continued).         |    |    |    | OILS.                         |    |    |    |
|-----------------------------|----|----|----|-------------------------------|----|----|----|
|                             | £. | s. | d. |                               | £. | s. | d. |
| YELLOW METAL.....lb.        | 6  | 0  | 4½ | Cocunut, Cochín.....ton       | 32 | 10 | 33 |
| LEAD—Pig, Spanish.....11    | 10 | 0  | 0  | Ceylon.....27                 | 10 | 0  | 27 |
| English, com. brands.....11 | 17 | 6  | 0  | Copra.....26                  | 0  | 26 | 10 |
| SPELTER.....                |    |    |    | Palm, Lagos.....33            | 0  | 0  | 0  |
| Silesian, special.....ton   | 13 | 10 | 0  | Palm-nut Kernel.....28        | 10 | 0  | 0  |
| Ordinary brands.....13      | 5  | 0  | 13 | Linned.....21                 | 10 | 21 | 17 |
| TRIPLES.....                |    |    |    | Rapeseed, English pale.....26 | 0  | 0  | 0  |
| Straits.....94              | 10 | 0  | 95 | do. brown.....24              | 0  | 24 | 5  |
| Australian.....94           | 10 | 0  | 95 | Cotton-seed.....21            | 10 | 0  | 0  |
| English ingots.....96       | 0  | 0  | 0  | Tallow and Oleine.....25      | 0  | 45 | 0  |
| TRIPLES.....                |    |    |    | Lubricating, U.S.....7        | 0  | 10 | 0  |
| IC coke.....box             | 13 | 6  | 0  | do. Refined.....8             | 0  | 15 | 0  |
| IX ditto.....21             | 0  | 26 | 0  | TURPENTINE.....               |    |    |    |
| IC charcoal.....17          | 0  | 20 | 0  | American, in cks.....cwt.     | 23 | 3  | 28 |
| IX ditto.....26             | 0  | 27 | 0  | Tan—Stockholm.....brl.        | 23 | 0  | 23 |
|                             |    |    |    | Archangel.....14              | 0  | 14 | 6  |

## CONTRACTS.

Epitome of Advertisements in this Number.

| Nature of Work, or Materials.                         | By whom required.         | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|-------------------------------------------------------|---------------------------|-----------------------------------|--------------------------|-------|
| Outside Repairs, Painting, &c., Bow Paving Works..... | City of London Union      | Official.....                     | July 4th                 | ii.   |
| Erection of Timber Framing, Rotherville.....          | St. Luke's Vestry.....    | do.....                           | July 8th                 | ii.   |
| Alterations, &c., Walcott County Court.....           | St. Saviour's Union.....  | W. Blackburn.....                 | do                       | ii.   |
| Iron Cylinders, &c., and Repairs to Pipes.....        | do.....                   | Jarvis & Son.....                 | July 9th                 | ii.   |
| Painting Barracks, &c.....                            | War Department.....       | Official.....                     | do                       | ii.   |
| Wrought-iron Post Bridges.....                        | Kingston-on-Thames Cor.   | do.....                           | July 10th                | ii.   |
| Alterations, &c., Walsall County Court.....           | Com. of H.M. Works        | do.....                           | do                       | ii.   |
| Erection of a Skittle Alley.....                      | Clapton Park Club.....    | do.....                           | do                       | xvi.  |
| Officer's House, Cottages, &c.....                    | Admiralty.....            | do.....                           | do                       | ii.   |
| Painting Barracks (Oxtong and Reading).....           | War Department.....       | do.....                           | July 11th                | ii.   |
| Paving Works.....                                     | Vestry of St. Giles       | do.....                           | do                       | ii.   |
| Sewerage Works, Henley-on-Thames.....                 | Henley-on-Thames U.S.A.   | I. Shone.....                     | July 13th                | ii.   |
| Keating, &c., Works.....                              | Lebanon Bld. of Wks.      | Official.....                     | July 14th                | ii.   |
| Painting Buildings.....                               | War Department.....       | do.....                           | July 15th                | ii.   |
| Water Tower.....                                      | Brook's Lunatic Asylum    | Sir F. Bramwell.....              | July 16th                | xvi.  |
| Wrought-iron Water Tanks, Fire Mains, &c.....         | do.....                   | do.....                           | do                       | xvi.  |
| Roads, Sewers, &c., Upper Norwood.....                | Boulton Park Estate.....  | W. N. Dunn.....                   | July 18th                | xvi.  |
| Water and Sewerage Works.....                         | Erpingham R. S. A.....    | E. Easton & Co.....               | do                       | xvi.  |
| Brick, &c., Sewers, Pumping Station, &c.....          | Wimbledon Local Bld       | Official.....                     | July 21st                | ii.   |
| Painting and Repairs.....                             | Gumdisden Mills End       | do.....                           | do                       | ii.   |
| Repairs, &c., Footpaths, Southwark Park.....          | Old Town.....             | J. M. Knight.....                 | July 23rd                | xvi.  |
| Erection of Villa, Clays, Surrey.....                 | Met. Board of Works       | Official.....                     | July 28th                | ii.   |
| Enlargement and Alterations.....                      | Fee Farm Estate.....      | W. J. N. Tomlinson.....           | Not stated               | ii.   |
|                                                       | St. Mary National         | C. J. Dawson.....                 | do                       | xvi.  |
|                                                       | Schools, St. Hilford..... |                                   |                          |       |

## TENDERS.

|                                                                                                    |             |                                                                                                                                                                               |             |
|----------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| For new schools, High-street, Shadwell, for the London School Board. Mr. T. J. Bailey, architect:— |             | For constructing 18-in. pipe sewer, building manholes, gullies, ventilating-shafts, &c., at Lordship-lane, Dulwich, for the Camberwell Vestry. Mr. J. C. Reynolds, surveyor:— |             |
| M. Palmer & Co.....                                                                                | £21,531 0 0 | Neave.....                                                                                                                                                                    | £1,447 0 0  |
| F. & F. J. Wood.....                                                                               | 20,947 0 0  | Mears.....                                                                                                                                                                    | 1,300 0 0   |
| Perry & Co.....                                                                                    | 19,433 0 0  | Harris.....                                                                                                                                                                   | 1,225 0 0   |
| Kirk & Randall.....                                                                                | 18,648 0 0  | Cooke & Co.....                                                                                                                                                               | 1,200 0 0   |
| H. L. Holloway.....                                                                                | 18,743 0 0  | Woodham & Fry.....                                                                                                                                                            | 1,149 0 0   |
| W. Shurmer.....                                                                                    | 18,630 0 0  | Hare.....                                                                                                                                                                     | 1,083 0 0   |
| J. R. Hunt.....                                                                                    | 18,169 0 0  | Saunders.....                                                                                                                                                                 | 1,060 0 0   |
| J. Grover & Son.....                                                                               | 18,031 0 0  | Catley.....                                                                                                                                                                   | 1,050 0 0   |
| Patman & Fotheringham.....                                                                         | 17,837 0 0  |                                                                                                                                                                               |             |
| J. Shepherd.....                                                                                   | 17,812 0 0  | For the erection of two houses at South-street, Greenwich, for Mr. J. Needham. Mr. W. T. Hunt, jun., architect:—                                                              |             |
| E. C. Howell & Son.....                                                                            | 17,748 0 0  | Redman.....                                                                                                                                                                   | £387 0 0    |
| T. Boyce.....                                                                                      | 17,634 0 0  | Hubble & Trott.....                                                                                                                                                           | 370 0 0     |
| B. J. Jerrard.....                                                                                 | 17,490 0 0  | Robson.....                                                                                                                                                                   | 360 0 0     |
| C. Wall.....                                                                                       | 17,449 0 0  | H. L. Holloway.....                                                                                                                                                           | 307 0 0     |
| W. Downs.....                                                                                      | 17,444 0 0  | Wire.....                                                                                                                                                                     | 790 0 0     |
| C. Cox.....                                                                                        | 17,336 0 0  | Leng (accepted).....                                                                                                                                                          | 775 0 0     |
| J. Holloway.....                                                                                   | 17,364 0 0  |                                                                                                                                                                               |             |
| Stimpson & Co.....                                                                                 | 17,033 0 0  | For alterations to the Mission Rooms, Rendlesham-road, Stoke Newington. Mr. W. Bradbear, architect:—                                                                          |             |
| T. Oldrey.....                                                                                     | 17,000 0 0  | Dove Bros.....                                                                                                                                                                | £750 0 0    |
| J. J. Croaker.....                                                                                 | 16,463 0 0  | W. Shurmer.....                                                                                                                                                               | 540 0 0     |
| M. Gentry.....                                                                                     | 16,373 0 0  | Riordanson.....                                                                                                                                                               | 445 0 0     |
| J. R. Hunt.....                                                                                    | 16,063 0 0  | Steel Bros.....                                                                                                                                                               | 425 0 0     |
| Lathey Bros.....                                                                                   | 15,710 0 0  |                                                                                                                                                                               |             |
| W. Brass & Son.....                                                                                | 15,654 0 0  | For warehouse, Short-street, Hoxton, for Mr. J. Armo. Mr. R. A. Lewcock, architect:—                                                                                          |             |
| Wall Bros.....                                                                                     | 15,518 0 0  | Mr. R. A. Lewcock.....                                                                                                                                                        | £793 0 0    |
| Atherton & Latta.....                                                                              | 15,100 0 0  | Jackson & Todd.....                                                                                                                                                           | 743 0 0     |
|                                                                                                    |             | Rooms.....                                                                                                                                                                    | 717 0 0     |
|                                                                                                    |             | W. Shurmer.....                                                                                                                                                               | 707 0 0     |
|                                                                                                    |             | Steel Bros.....                                                                                                                                                               | 705 0 0     |
|                                                                                                    |             | W. Pringle.....                                                                                                                                                               | 674 0 0     |
|                                                                                                    |             | Goodall.....                                                                                                                                                                  | 628 0 0     |
|                                                                                                    |             |                                                                                                                                                                               | 610 0 0     |
|                                                                                                    |             | For repairs, &c., to houses, Ashke-street and Fanshawe-street, Hoxton. Mr. R. A. Lewcock, architect:—                                                                         |             |
|                                                                                                    |             | J. Anley.....                                                                                                                                                                 | £430 0 0    |
|                                                                                                    |             | R. Mart.....                                                                                                                                                                  | 316 0 0     |
|                                                                                                    |             | Jackson & Todd.....                                                                                                                                                           | 295 0 0     |
|                                                                                                    |             | W. Pringle.....                                                                                                                                                               | 285 0 0     |
|                                                                                                    |             | W. Shurmer.....                                                                                                                                                               | 285 0 0     |
|                                                                                                    |             | Steel Bros.....                                                                                                                                                               | 172 0 0     |
|                                                                                                    |             |                                                                                                                                                                               | 165 0 0     |
|                                                                                                    |             | For new offices, &c., in Ship Tavern-passage, Leaden-hall-market, E.C. Mr. R. B. F. Anson, architect:—                                                                        |             |
|                                                                                                    |             | W. Shurmer.....                                                                                                                                                               | £11,870 0 0 |
|                                                                                                    |             | G. Shaw.....                                                                                                                                                                  | 11,769 0 0  |
|                                                                                                    |             | R. E. Nightingale.....                                                                                                                                                        | 11,254 0 0  |
|                                                                                                    |             | Adams & Son.....                                                                                                                                                              | 11,031 0 0  |
|                                                                                                    |             | W. Brass & Son.....                                                                                                                                                           | 11,003 0 0  |
|                                                                                                    |             | J. Morter.....                                                                                                                                                                | 10,998 0 0  |
|                                                                                                    |             | J. Woodward.....                                                                                                                                                              | 10,908 0 0  |
|                                                                                                    |             | Colls & Son.....                                                                                                                                                              | 10,993 0 0  |
|                                                                                                    |             | J. Grover & Son.....                                                                                                                                                          | 10,746 0 0  |
|                                                                                                    |             | Rider & Son.....                                                                                                                                                              | 10,416 0 0  |

For enlargement of schools, Burrage-grove, Plumstead, for the London School Board. Mr. T. J. Bailey, architect:—

|                         |            |
|-------------------------|------------|
| Atherton & Latta.....   | £6,716 0 0 |
| Kirk & Randall.....     | 5,141 0 0  |
| J. Johnson.....         | 4,936 0 0  |
| F. & F. J. Wood.....    | 4,808 0 0  |
| E. C. Howell & Son..... | 4,874 0 0  |
| W. Shurmer.....         | 4,860 0 0  |
| W. Hartener.....        | 4,848 0 0  |
| Lathey Bros.....        | 4,810 0 0  |
| Stimpson & Co.....      | 4,810 0 0  |
| Wall Bros.....          | 4,800 0 0  |
| B. J. Jerrard.....      | 4,793 0 0  |
| H. L. Holloway.....     | 4,769 0 0  |
| W. Loneragan.....       | 4,692 0 0  |
| W. Tongue.....          | 4,650 0 0  |

For proposed alterations and additions to All Saints' Church, Ennismore-gardens, Knightsbridge, for the committee. Messrs. T. L. Banks &amp; Townsend, architects, Finsbury-circus. Quantities by Mr. J. Sargeant, 4, Holden-terrace:—

|                            |             |
|----------------------------|-------------|
| Lancelotti & Co.....       | £10,127 0 0 |
| Lucas & Sons.....          | 9,910 0 0   |
| Greenwood.....             | 9,890 0 0   |
| J. Morter.....             | 9,858 0 0   |
| Dove Bros.....             | 9,886 0 0   |
| Higgs & Hill.....          | 9,692 0 0   |
| Bywaters.....              | 9,614 0 0   |
| C. Reading.....            | 9,587 0 0   |
| Colls & Son.....           | 9,475 0 0   |
| Patman & Fotheringham..... | 9,460 0 0   |
| J. T. Chappell.....        | 9,321 0 0   |

\* Accepted for portion of the works.

For alterations at Collins's Music Hall, Islington, for Mr. Herbert Sprake. Mr. Edward Clark, architect, 432, Strand. Quantities supplied:—

|                                |            |
|--------------------------------|------------|
| Anley.....                     | £5,867 0 0 |
| Green.....                     | 5,767 0 0  |
| Shurmer.....                   | 5,760 0 0  |
| Kirk & Randall.....            | 5,750 0 0  |
| Morter.....                    | 5,280 0 0  |
| Jackson & Todd (accepted)..... | 5,170 0 0  |

For the rebuilding of business premises, Westminster. Mr. S. C. Aubrey, architect. Quantities by Mr. Henry Lovegrove:—

|                           |            |
|---------------------------|------------|
| Lovegrove.....            | £2,510 0 0 |
| Whitlock.....             | 2,478 12 0 |
| Macey & Sons.....         | 2,379 0 0  |
| Scott.....                | 2,367 0 0  |
| Faulkner.....             | 2,345 0 0  |
| Shurmer.....              | 2,330 0 0  |
| Holliday & Greenwood..... | 2,138 0 0  |
| Mayle & Son.....          | 2,125 0 0  |
| Downs.....                | 2,068 0 0  |
| Smith & Son.....          | 2,059 0 0  |
| Prestige & Co.....        | 1,987 0 0  |
| T. L. Green.....          | 1,929 0 0  |

For the erection of ten villa residences at Wood-green. Quantities by Mr. Henry Lovegrove, 28, Budge-row.

|                    |             |
|--------------------|-------------|
| Downs.....         | £12,100 0 0 |
| Goad.....          | 11,285 0 0  |
| Shurmer.....       | 10,735 0 0  |
| Tarrant.....       | 10,750 0 0  |
| Gibbons.....       | 9,687 0 0   |
| Voller.....        | 9,495 0 0   |
| Adams.....         | 9,463 0 0   |
| Hickinbotham.....  | 9,050 0 0   |
| Smith & Son.....   | 8,787 0 0   |
| G. & J. Green..... | 8,695 0 0   |

For the erection of business premises at Peckham. Quantities by Mr. Henry Lovegrove:—

|                        |            |
|------------------------|------------|
| C. Goad.....           | £2,298 0 0 |
| G. Barker.....         | 2,149 0 0  |
| J. & J. Greenwood..... | 2,121 0 0  |
| Stilling.....          | 2,103 0 0  |
| Balsam Bros.....       | 2,100 0 0  |
| G. & J. Green.....     | 2,095 0 0  |
| S. Scott.....          | 2,080 35   |
| Tarrant & Son.....     | 1,995 0 0  |

For the erection of residences at Great Grimby, for Mr. Alderman Smethurst, J.P. Mr. Charles Bell, architect. Quantities by Mr. Henry Lovegrove:—

|                        |            |
|------------------------|------------|
| Thompson & Son.....    | £2,488 0 0 |
| Snurden.....           | 2,438 0 0  |
| Willows & Roobuck..... | 2,418 0 0  |
| Guy.....               | 2,330 0 0  |
| Chapman.....           | 2,323 0 0  |
| Smith (accepted).....  | 2,240 0 0  |

For alterations and additions to the Prince of Wales Public House, Dalling-road, Hammersmith. Mr. R. Cruwys, architect:—

|                          |          |
|--------------------------|----------|
| Chamberlain Bros.....    | £745 0 0 |
| Roberts (too late).....  | 635 0 0  |
| Johnson.....             | 600 0 0  |
| Ried & Taylor.....       | 547 0 0  |
| Stilling (accepted)..... | 498 0 0  |

For alterations and additions to 129, Upper-street, Islington, for Mr. C. E. Meads. Messrs. Carritt &amp; Monte-Williams, architects, Great St. Helen's, Bishopsgate:—

|                             |           |
|-----------------------------|-----------|
| Baylis.....                 | £451 15 0 |
| Bradford.....               | 350 0 0   |
| Riley Bros. (accepted)..... | 338 0 0   |

Accepted for the erection of five shops at the corner of Malpas and Brockley roads, Brockley. Mr. James Webster, architect, 27, Doughty-street, Mecklenburg-square:—

|                               |            |
|-------------------------------|------------|
| A. C. Hoile, Forest Hill..... | £2,275 0 0 |
|-------------------------------|------------|

For alterations and additions to No. 121, Maids Vale. Mr. George Edwards, architect. No quantities:—

|                          |            |
|--------------------------|------------|
| Martin, Wells, & Co..... | £1,129 0 0 |
| Scriveners & Co.....     | 1,080 0 0  |
| Stimpson & Co.....       | 1,060 0 0  |
| Robertson.....           | 1,070 0 0  |
| Mark.....                | 1,068 0 0  |
| Green.....               | 994 0 0    |
| Barnett, Kilburn.....    | 987 0 0    |
| J. Freeman.....          | 825 0 0    |

\* Delivered after other tenders opened.

For rebuilding stabling, Red Lion Yard, Edgware-road.  
Messrs. C. Eales & Son, architects:—  
Mowlem & Son ..... £3,955 0 0  
Mark ..... 3,618 0 0  
Scott ..... 3,667 0 0  
Simpson & Son ..... 3,539 0 0  
Fattman & Co. .... 3,405 0 0  
Scrivener ..... 5,528 0 0

For works, 45, Hill-street, Berkeley-square. Messrs.  
C. Eales & Son, architects:—  
Homann & Son ..... 2,858 0 0  
Shaw ..... 782 0 0  
Mark ..... 793 0 0  
Woodford ..... 635 0 0  
Wilkins & Kent ..... 683 0 0

For the erection of warehouse, &c., Clerkenwell-close.  
E.C. for Mr. Pys. Mr. B. Fabian Russell, architect.  
Quantities supplied:—

|                       | No. 1. | No. 2. |
|-----------------------|--------|--------|
| Kilby & Gayford ..... | £4,972 | £1,735 |
| Brass & Son .....     | 5,193  | 1,773  |
| Grover & Son .....    | 5,226  | 1,763  |
| W. Smith .....        | 5,284  | 1,711  |
| Woodward .....        | 5,400  | 1,720  |
| F. & P. J. Wood ..... | 5,470  | 1,837  |

For erecting new almshouses at Feltham, near Leatherhead.  
Messrs. Mr. Creese Harrison, architect:—  
G. & W. Brown ..... £913 0 0  
Colls & Son ..... 788 0 0  
Hards ..... 788 0 0  
W. H. Batchelor ..... 789 0 0

For repairs and additions to 17, York-place, Baker-street, for Mr. Shaw. Mr. King, architect:—

|                   |          |
|-------------------|----------|
| Pope .....        | £280 0 0 |
| Lamb .....        | 631 0 0  |
| Leithy Bros. .... | 497 0 0  |
| Petchey .....     | 470 0 0  |
| Woodford .....    | 440 0 0  |
| Schaller .....    | 412 0 0  |

For additions to vinery works, Stratford, for Mr. C. W. Schmidt. Messrs. J. E. Goodchild & Son, architects, 81, Finsbury Pavement. Quantities supplied:—

|                                 | General Building. | Paving, Additional. |
|---------------------------------|-------------------|---------------------|
| Cheesum .....                   | £1,267            | £246                |
| J. A. Reed .....                | 1,198             | 187                 |
| W. Sherrin .....                | 1,197             | 163                 |
| J. Woodward .....               | 1,195             | 183                 |
| W. Greger .....                 | 1,187             | 129                 |
| G. S. Pritchard .....           | 1,180             | 170                 |
| Conder .....                    | 1,160             | 133                 |
| J. Grover & Son .....           | 1,118             | 130                 |
| Thos. Wootner Smith & Son ..... | 1,079             | 120                 |

For first section of model dwellings, Bermondsey.  
Messrs. Waring & Nicholson, architects. Quantities supplied:—

|                              |            |
|------------------------------|------------|
| Maraland .....               | £2,855 0 0 |
| Rider & Son .....            | 2,773 0 0  |
| Laphorne & Co. ....          | 2,588 0 0  |
| W. & F. Croaker .....        | 2,530 0 0  |
| Ford & Sons (accepted) ..... | 2,498 0 0  |

For enlarging the Boys' School, Hercules Buildings, Lambeth. Messrs. Waring & Nicholson, architects. Quantities supplied:—

|                                  |            |
|----------------------------------|------------|
| T. Rider & Son .....             | £1,690 0 0 |
| Laphorne & Co. ....              | 1,637 0 0  |
| Ford & Sons .....                | 1,634 0 0  |
| W. & F. Croaker (accepted) ..... | 1,634 0 0  |

For new malting and cellars at West Brighton, for Messrs. Chapman & Co., Black Lion Brewery. Mr. Arthur Kinder, architect, Suffolk House, Lawrence Pountney Hill. Quantities by Mr. Alfred Howard, Martin's-lane:—

|                                |            |
|--------------------------------|------------|
| Punnett & Son, Tunbridge ..... | £4,285 0 0 |
| Patchin & Son, Brighton .....  | 4,740 0 0  |
| Garratt, Brighton .....        | 4,720 0 0  |
| Cheeseman, Brighton .....      | 4,687 0 0  |
| Barnes, Brighton .....         | 4,644 0 0  |
| Waterman, Watford .....        | 4,587 0 0  |
| Stiff, Dover .....             | 4,226 0 0  |

\* Accepted, after reduction, at 3,720.

For the erection of station at South Lynn, on the Eastern and Midlands Railway Loop Line:—

|                                    |            |
|------------------------------------|------------|
| Bardell Bros., Lynn .....          | £1,679 0 0 |
| Davis, Lynn .....                  | 1,631 0 0  |
| White & Broadhurst, March .....    | 1,495 0 0  |
| J. Leach & Son, Lynn (accepted) .. | 1,425 0 0  |
| E. Wanford, Lynn .....             | 1,408 4 10 |

Accepted tenders for alterations and additions to Congregational Church Schools, Holywell Green, near Halifax. Mr. F. Bartram Payton, architect, Laisteridge-road, Bradford:—

|                                       |           |
|---------------------------------------|-----------|
| B. Edwards, Holywell-green .....      | £248 5 0  |
| Mason, &c. Joiner, &c. ....           | 124 0 0   |
| J. Briggs, Bradford .....             | 41 13 6   |
| Haigh & Slater, Bradford .....        | 34 0 0    |
| T. Nelson, Bradford .....             | 48 0 0    |
| Seth Collins, Sowood, Huddersfield .. | 48 0 0    |
| Total .....                           | £483 16 6 |

For house and shop, corner of South-street, Greenwich, for Mr. J. Needham. Mr. Hunt, architect, 469, New Cross-road:—

|                      |          |
|----------------------|----------|
| Redmond .....        | £897 0 0 |
| Hubble & Trott ..... | 970 0 0  |
| Robson .....         | 960 0 0  |
| Holloway .....       | 909 0 0  |
| Wise .....           | 775 0 0  |
| Laing .....          | 675 0 0  |
| A. & T. Smith .....  | 775 0 0  |

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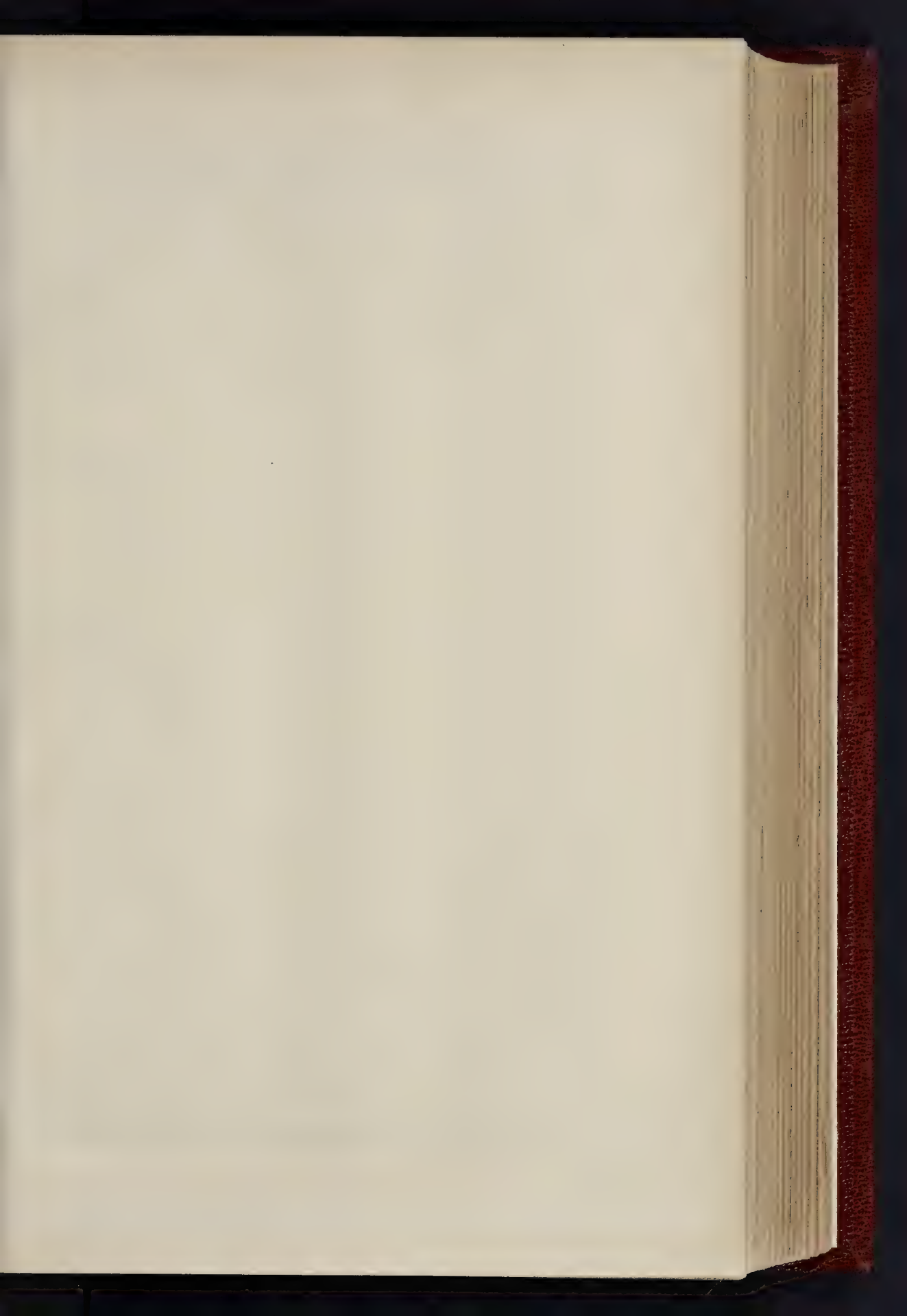
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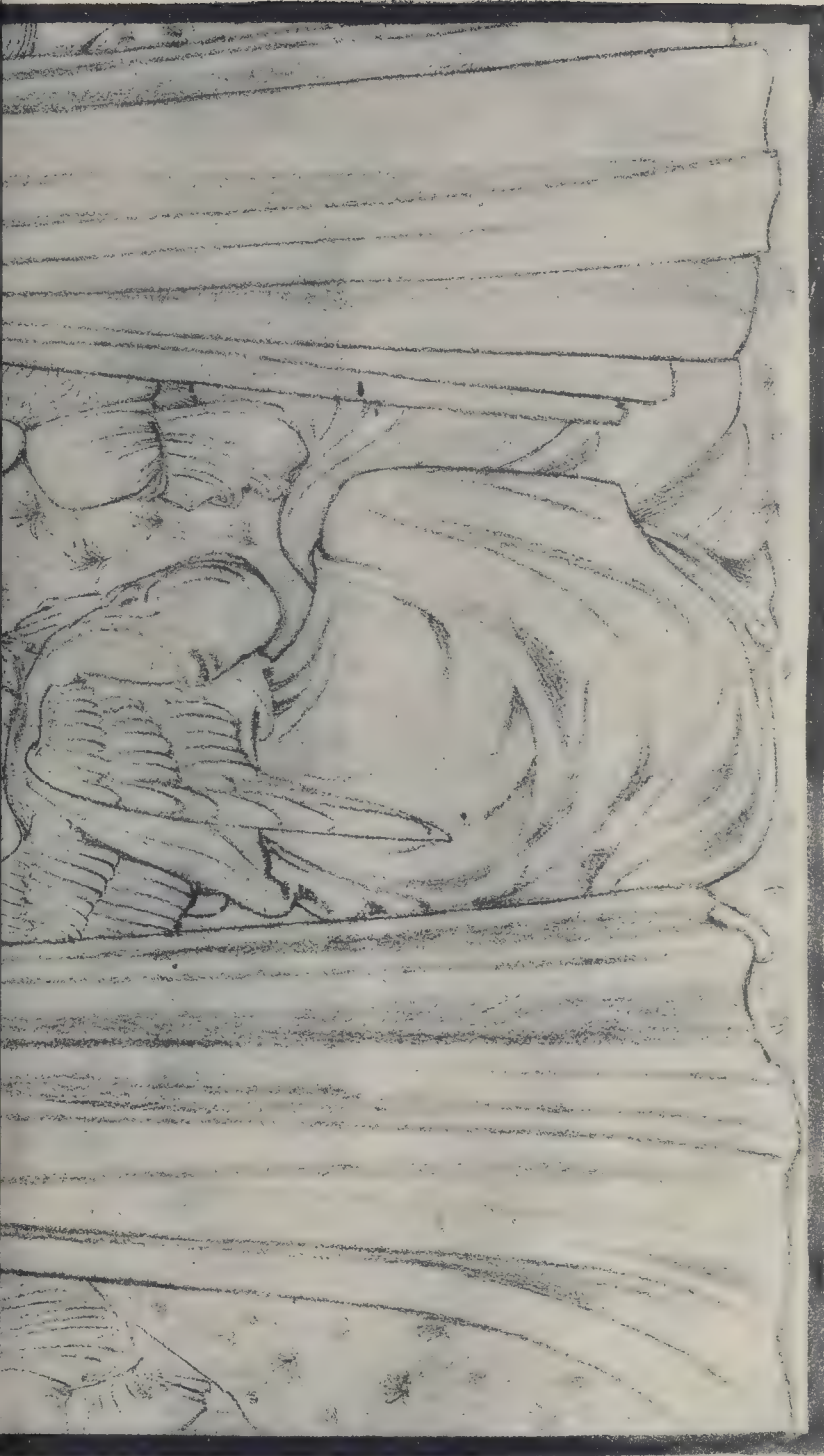




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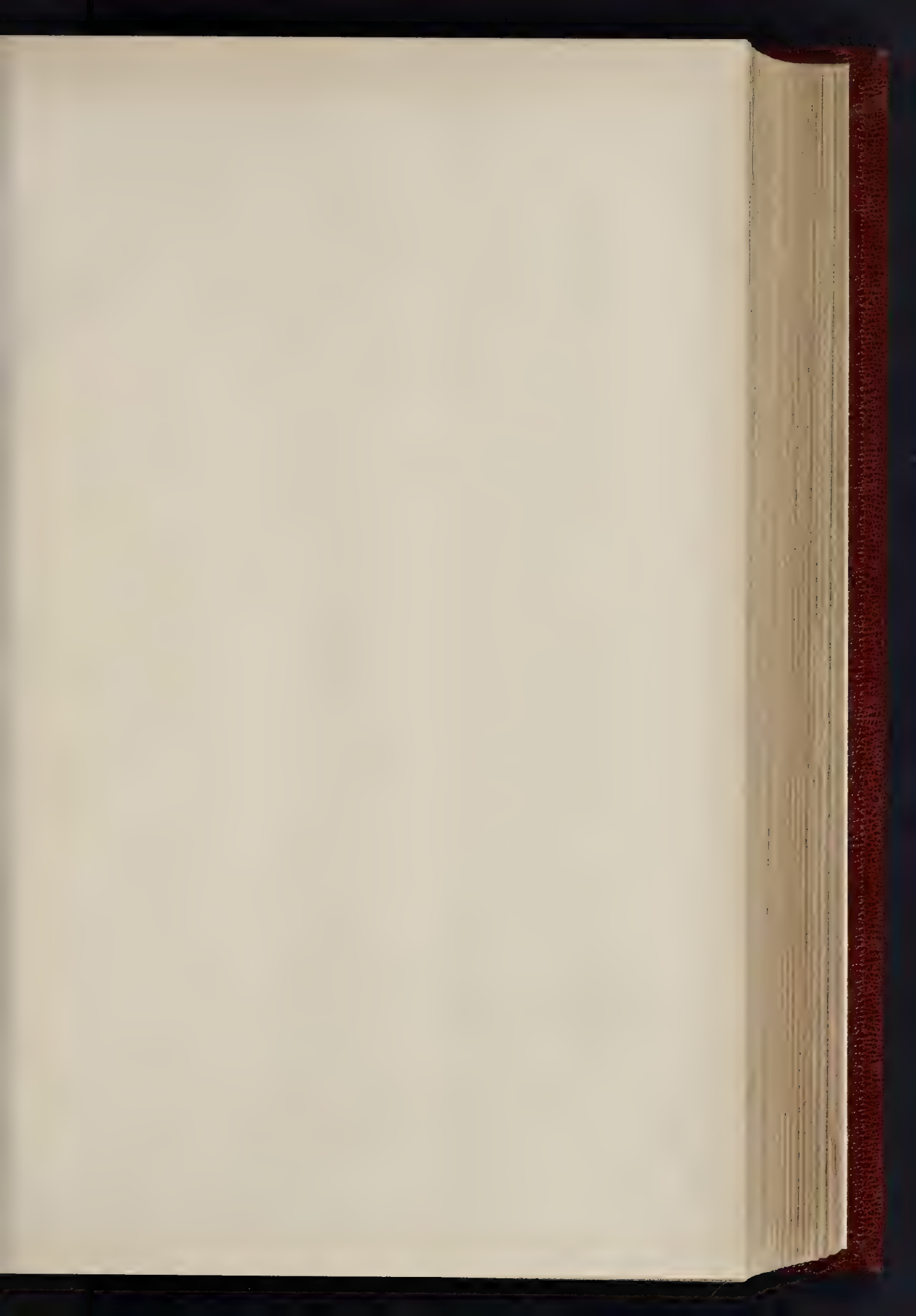


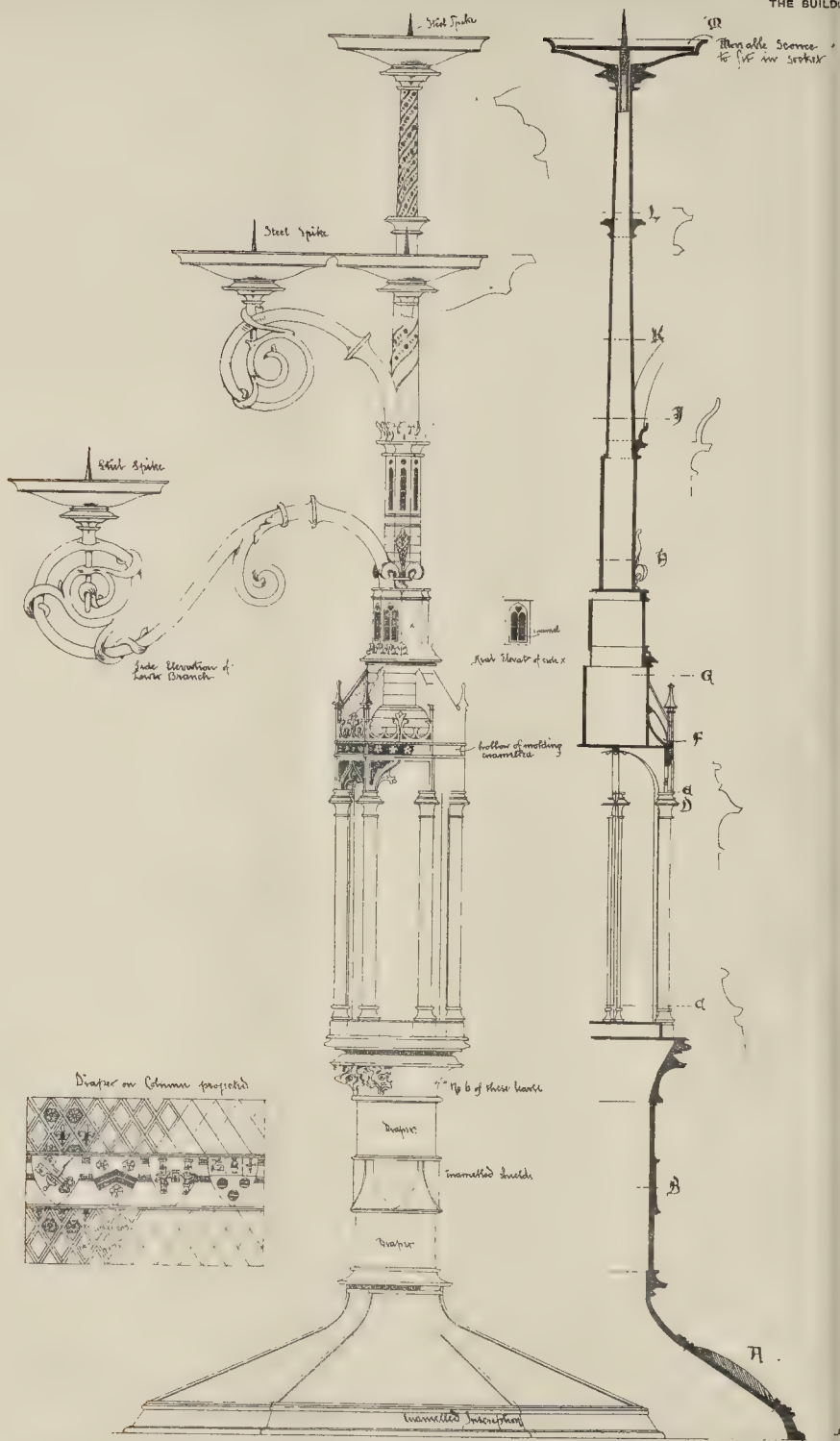
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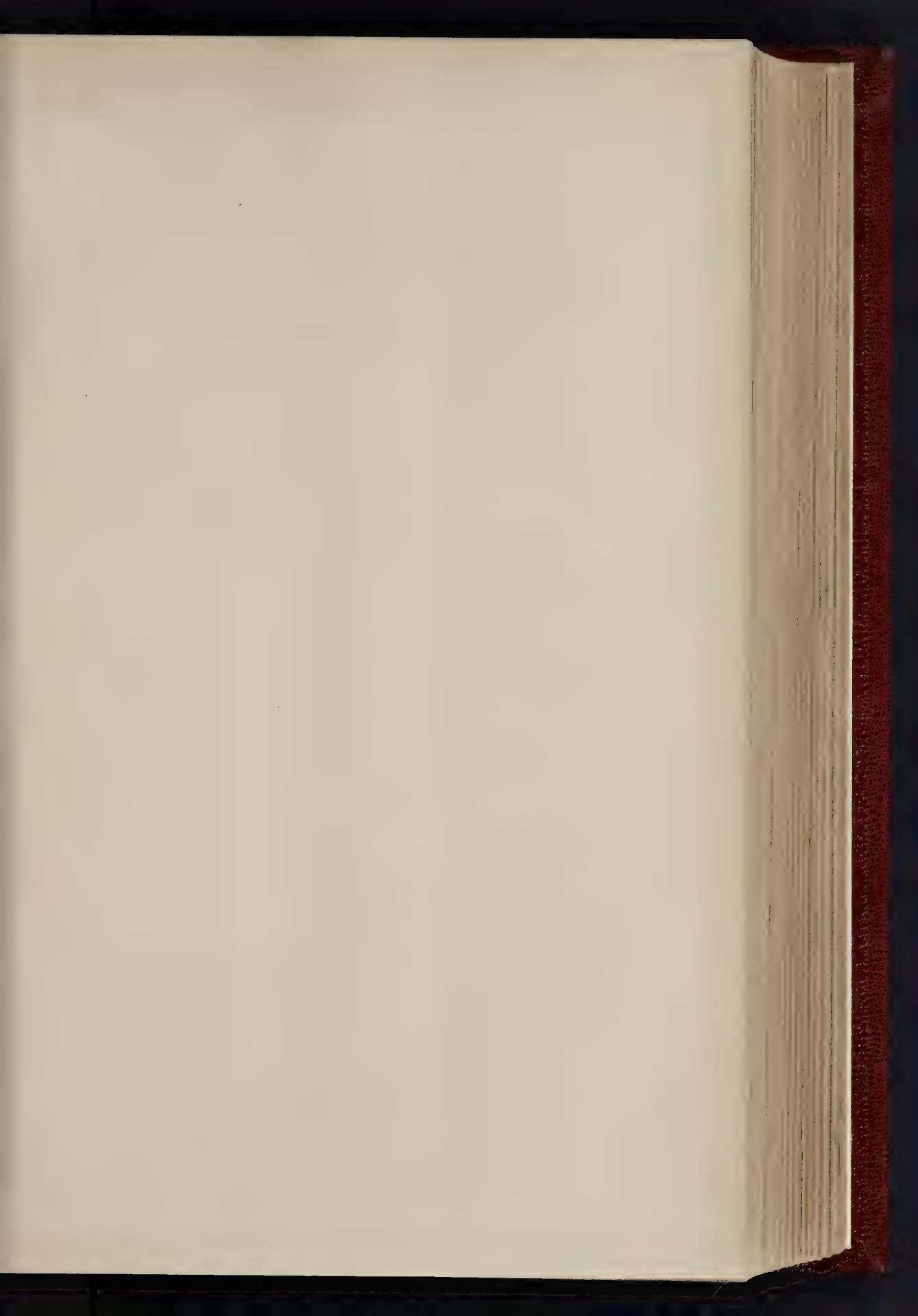
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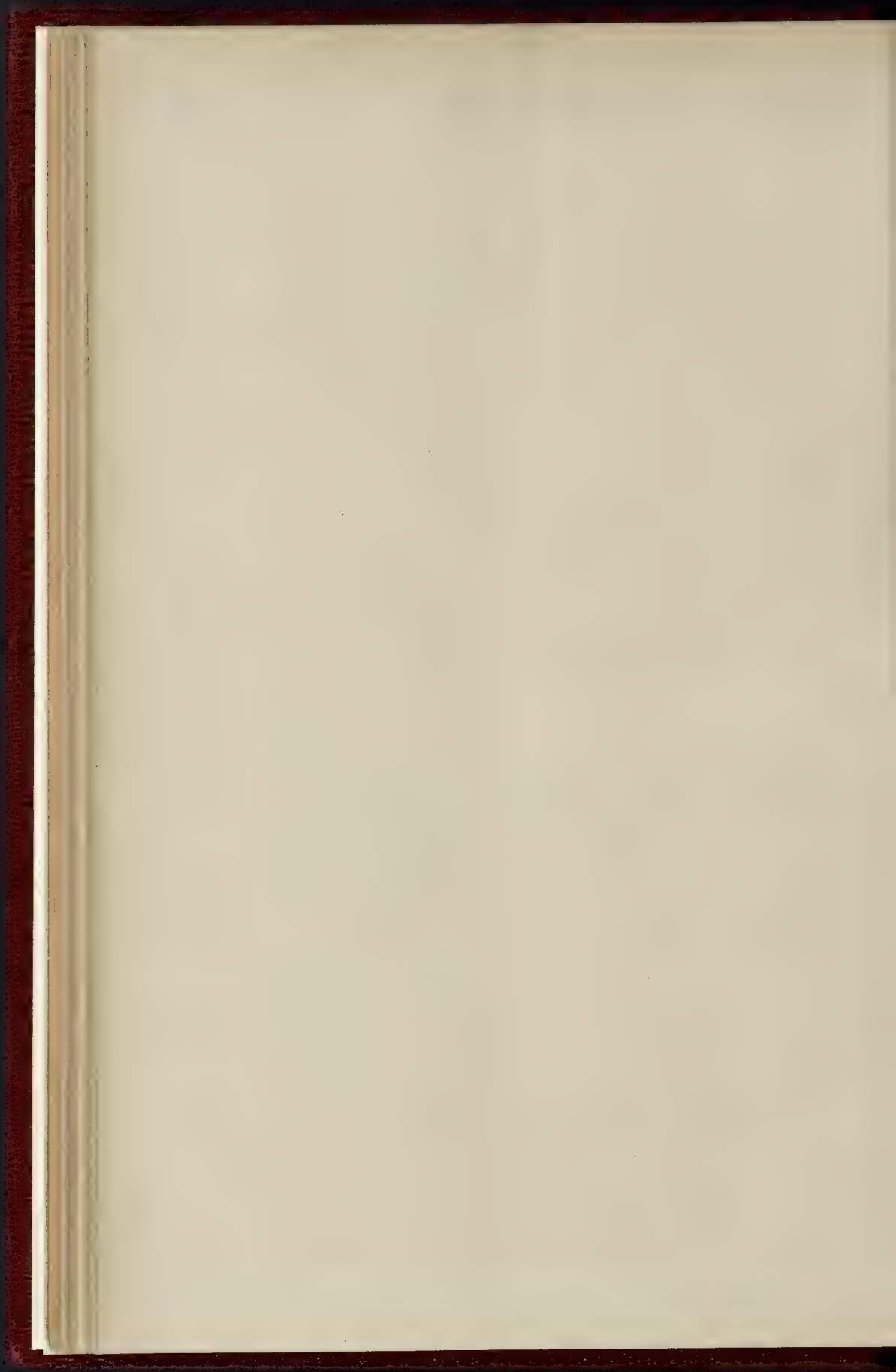




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# The Builder.

Vol. XLIX. No 224.

SATURDAY, JULY 11, 1885.

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The Argyll Ship Canal.



**ARRING** direct passage between the open sea waters of the Atlantic and the ports and harbours of the Clyde estuary and river, the peninsula of Cantire figures on the map as a huge

southerly disposed pendant from the West Highland terminations of the Grampian range. This has its advantages and its disadvantages. The firth is thereby secured in the enjoyment of comparatively quiet waters, no matter how the Atlantic may thunder outside; and miles upon miles of sheltered coast line, which but for Cantire would have been storm-beaten and ironbound, are utilised almost without stint or measure for purposes of watering-place resort, and yacht and pleasure steamer sailing. On the other hand, ship navigation to and from Glasgow and Greenock is habitually impeded, in the case of all vessels engaged in the West Highland trades and the Baltic or north of Europe voyage, the southerly *détour* at present necessarily implying an added sixty miles at least of circuitous navigation. Besides, the neighbourhood of the Mull of Cantire which has thus to be doubled is a noted playground for unruly tideways and capricious fogs,—these, separately or in combination, not un seldom causing very serious delay. The peninsula of Cantire hangs to the main body of Argyllshire at Tarbert by the merest tag,\*—less than one mile of width between inner and outer seas,—and the feeling has prevailed for a good many centuries that this trifling oversight on the part of nature ought to be artificially amended. Indeed, in the old time when the "Isles" were in possession of the Macdonalds by Royal grant and treaty, this family ultimately came to regard the existence of an isthmus at this point as a grievance too great to be borne.

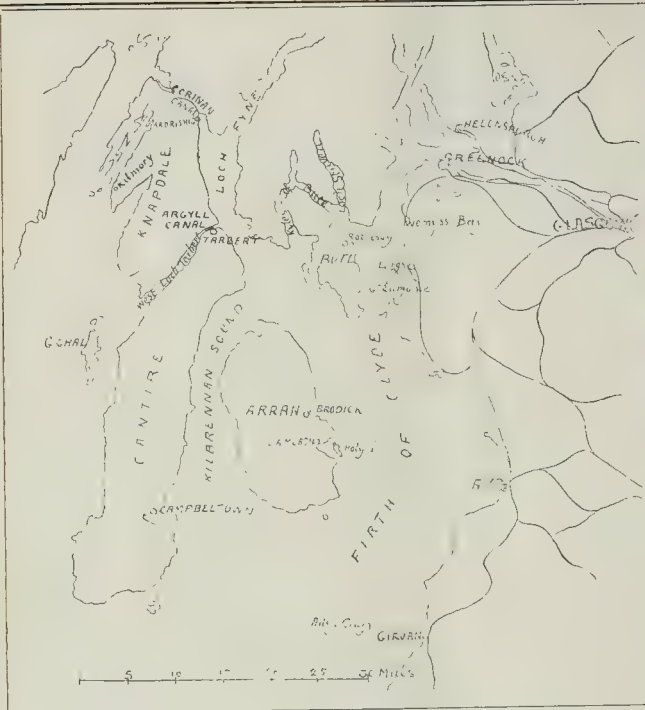
As a part of the mainland, Cantire could not be claimed; as an island it could. Accordingly, in the year 1193, Macdonald, the then reigning Lord of the Isles, made Cantire an island to the satisfaction of his own conscience at least, not by the tedious and costly process of cutting a water channel, as is now proposed, but by sailing his war galley into West Loch Tarbert, and causing her to be dragged across the mile of neck with all her canvas set. The title thus acquired held its own till the reign of the fifth James, when the whole of that country fell into the possession of an ancestor of the existing Argyll family.

\* See the diagram on next page.

The name "Tarbert" is common to a number of similarly situated parts on the west and north-west of the Highland coast-line, and means simply the "boat-carrying place," across which the light craft of the natives have for ages been carried or carted, towards the saving of many miles of round-about navigation. The neck between East Loch Tarbert and West Loch Tarbert is not only narrow in its direct line from beach to beach, but free of hilly ridge also, the summit level having an altitude above high-water mark of 56 ft. 6 in. only. The temptation to make Cantire really an island has naturally existed in strong force ever since canal-cutting became common within the British islands, and many have been the schemes propounded towards this end. In the year 1708 a preliminary Act was procured empowering the construction of a harbour at East Loch Tarbert, near to the eastern termination of the famous "portage." The work was carried out, and of small scope though it be, it has done good local service. In 1771 James Watt, of steam power renown, examined the isthmus, and pronounced in favour of a ship canal. Some years afterwards the crossing of the general peninsula at a point about fifteen miles further to the north became advocated, and the Crinan Canal was the result, an affair which the growth of steam navigation speedily put out of date,—limited as it is in draught of water, impeded by locks of small capacity, and involving some nine miles of trackage over a works summit level of 117 ft. The Crinan, well known to tourists, has been a convenience to one special line of coast steamers, furnishing, under normal conditions, water-communication of a kind between the two services of which the "Royal Route" is composed; but as a channel fed from uncertain fresh-water sources only, it is inconveniently subject to casual interruption through the effects of summer droughts, winter ice, sudden floods, and other causes. At the beginning of the present century Telford reported on the Tarbert scheme, and from time to time the call for a ship navigation cut at this point would as a matter of habit touch the acute stage, subside, and go temporarily to sleep again. Towards the middle of the century the problem was attacked with something more than the customary determination, and a Bill for works at a cost of 150,000*l.* was actually carried through Parliament in the year 1846, only to be succeeded, however, in 1849 by another Act sanctioning an abandonment of the enterprise.

Over the greater part of the intervening thirty-five years from then till now, the topic has been one for informal stock discussion. Finally, in July of 1882, an influential meeting was held in Glasgow, the Duke of Argyll pre-

siding, when the resolution was taken to form a company at once, and embark upon the undertaking forthwith. Parliament was applied to, and in the following year, 1883, the "Argyll Ship Canal" Act was duly passed. The works thus sanctioned have not been commenced yet, but the probability is that the lapse of 1846-9 will not now be repeated, even should the profound commercial depression,—really the only existing hindrance to an immediate commencement of operations,—prove more lingering in character than is anticipated. All canal projects of later times which offer *bond fide* facilities to large ship navigation have been endowed with a powerful vitality by the strides made during the last thirty or forty years in ship-building and in the improved application of steam propulsion, and this vitality is in all likelihood destined to carry into execution works compared to which the engineering task at Tarbert must rank as a trifle. From the anchorage ground off Greenock to the waters of West Loch Tarbert the straight-line distance is twenty-five miles only, while by the present sea route round the Mull of Cantire it is about 120 miles. True, the net difference between these two distances cannot be put to the credit of the proposed new cut, because of the somewhat circuitous nature of the navigation way between Greenock and East Loch Tarbert, but the saving may at least be set down at from fifty to sixty miles. To this, however, must in fairness be added, deliverance from the capricious tidal and meteorological moods of the Mull of Cantire, which often render the doubling of that point a matter of both risk and delay. Of course, only a portion, and that not by any means a conspicuous portion, of the entire traffic in and out of the Firth of Clyde would follow the new route. The extensive north-west coast intercourse by steam and sailing craft, now prosecuted *via* the Mull, would be assured, as also the Baltic and general North of Europe trades. It would, to a certainty, be largely used for the passage of fishing-boats; and it is possible that, in certain weathers, Atlantic craft of all kinds, bound in or out, might take their custom that way. A considerable exchange trade in coal and agricultural produce has for some time existed and still grows along this line, and the Duke of Argyll, at the promoters' meeting of 1882, was so sanguine of the future of the Western Islands under the improved traffic conditions contemplated as to predict that these might yet, in the matter of dairy produce for the London market, supplant the west coast of France, which, at the time of speaking, carried off the best prices there. From all sources the traffic, according to the promotion estimate, is set down at close upon 500,000 tons annually.



yielding, at the rate of 6d., a revenue of 10,000l.

One reason for hesitation with regard to embarking seriously on the enterprise of cutting the Tarbert neck by means of subscribed capital exclusively, has been a very lively and very general impression that the Government itself would sooner or later undertake the work. It was unsuccessfully urged to do so in 1847, when famine raged in the Highlands, as an instant means of relief to a suffering people, and with great ultimate profit in prospect through the cheapness of the labour thus obtainable. Probably the sorry financial results of the great Caledonian Canal, — an undoubted engineering triumph, finished on Government money in 1822, — had estranged the minds of ministers from projects of the kind, and naturally so. Expectation with regard to this high quarter did not die out readily, however, the advantage of an alternative war-vessel route in and out of Clyde waters being deemed a strong inducement; but there has been no official movement in the desired direction, and the Duke of Argyll, in his address at the Glasgow initiatory meeting of 1882, was fain to declare that the project must henceforth be held as one for private enterprise.

The isthmus it is proposed to cut is situated rather over forty miles to the north of the Mull of Cantire, — at the nominal northern extremity of that peninsula, indeed; the district of Argyllshire further to the north, — though geographically considered but the inner portion of the same peninsular arrangement with the narrowed crossing of Orinan for isthmus proper, — being separately known as Knapdale. The long strip of Cantire, over forty miles in length, — a kind of breakwater on a Titanic scale, — has an average breadth of about six miles. West Loch Tarbert, cutting about ten miles inward from Atlantic waters, approaches the head of East Loch Tarbert a very small sheet projected westward from Loch Fyne, and suddenly reduces the width of this great natural mole to less than one mile. There is a pier at the south lip of the eastern loch, and a small village at its most westerly projection, the mile of distance thence to the head of the western loch being along a good

and fairly straight road. The western loch, forming with its fringe of mingled rock, wood, and heath, a picture of no little beauty, has an excellent natural harbour and a good area of safe anchorage-ground. A weekly packet sails out of it for the outer islands, and in early times the route occupied a foremost rank.

The canal itself, or rather the artificial sea-channel as it may more appropriately be called, as designed by the Company's engineers, extends to about two miles in length from deep water to deep water, and includes within this the laying-down of training walls and a partial deepening of the head waters of both lochs. High water at West Loch Tarbert being in advance of that mark on the other side of the neck, a difference of water-level always exists to the extent of 2 ft. or 3 ft. at least, this, however, being liable to some considerable exaggeration during the prevalence of strong winds. For the purpose of regulating the flow to which this discrepancy would give rise the works will be furnished with a tidal lock, 400 ft. long, at the eastern entrance. Ships will pass freely in and out at all conditions of tide, and there will thus be afforded, from inner Firth to open Atlantic, a practically unimpeded and altogether weatherproof sea-water passage, 56 ft. wide and 18 ft. in minimum depth, in virtue of which Cantire becomes an island in fact as well as theory. The cutting, blasting, and dredging necessary will not be great, owing to the lowness of the summit level, the highest point, as already stated, being less than 60 ft. above the line of high-water mark. At first, vessels in excess of 17 ft. draught will be refused passage except under specific conditions, but the work will be executed throughout with a view to deepening and widening at some future period. The Argyll Ship Canal Company, by whom the waterway is to be built, start with a nominal capital of 200,000l. in 10l. shares, a sum thought to be amply sufficient for the object in view. The business domicile of the company is Glasgow, and the directorate will consist of from three to seven members. Mr. John Ramsay, of Kildalton, Islay, M.P. for the Falkirk Burghs, heads the directorate

at present, and the Duke of Argyll is largely interested. Land-purchasing powers last till July 1886, under the Act, the limit for the execution of the works being seven years from the date of passing. Much of the capital has been subscribed, but the protracted general depression has hindered the swift progress which was anticipated at the initiation of the scheme. Messrs. Andersons & Pattison, solicitors, St. Vincent-street, Glasgow, are the law agents of the undertaking; Mr. J. Wyllie Guild, C.A., of the same city, acting as secretary. The engineers are Messrs. Blyth & Cunningham, C.E., Edinburgh.

#### NOTES ON SCULPTORS' MATERIALS.\*

BY GEORGE SIMONDS.



WE now come to what the public are chiefly accustomed to consider as sculptors' materials, I mean stone and metal. The former may for sculptural purposes be roughly divided into porphyries, granites, limestones, and sand or grit stones. It is superfluous here to enter into their geological history and structure: I shall treat of them merely with regard to their fitness for sculpture. Porphyry is of two kinds, red and green; it is more durable than any other stone, and also more difficult to work. It is so hard that it can only be worked with the aid of the diamond or corundum wheel, or possibly, — though I do not know if that has ever been done, — by the modern sand-blast. Some idea of the difficulty and expense of working this stone may be gathered from the fact that the restoration of the Vatican sarcophagus, popularly known as that of St. Helena, took about twenty-five years to complete, and is said to have cost about twenty thousand pounds. Yet notwithstanding these difficulties, there are at least two colossal statues wrought from this intractable material by the hands of European artists: I mean the statue of Justice at Florence, and that of Rome on the Capitol; the head, hands, and feet of this latter are of white marble. During the sixteenth and seventeenth centuries a great many vases, busts, and other small works were produced in Italy, but of late years I do not know of any attempts to produce artistic work from this thankless material, although it is cut into thin veneers for architectural purposes, and is chiefly, I fancy, used in church repairs. The price of antique porphyry varies from time to time, but in Rome the usual price used to be about 4l. per cube foot, the price increasing with the dimensions of the block. All the supply was derived from the excavations. The modern porphyry seems inferior in colour to that used by the ancients. Granite, both red and grey, was of course much used for sculpture in Egypt, but it is too hard and too unpleasant to work to be of much use to a sculptor in the present day. The limestones are the most important, and under this heading we may class the various marbles, alabasters, dolomites, and oolites.

The marbles are very diverse in appearance and even more so in quality, some being so hard and flinty as to be almost useless for sculptural purposes whilst others are so soft and perishable as to be almost equally so. The marbles used by the sculptor are chiefly of two kinds, namely, white with a warm or yellowish tinge, and white with a cold bluish tinge. The first is known as statuary marble, the second is popularly called "Sicilian," although that is merely an English trade name, the marble having nothing whatever to do with Sicily and being quarried in the Carrara mountains. The chief quarries of these Sicilian marbles are in the valleys of Canal Bianco and Ravagione. This quality of marble is well suited for exterior work, but its cold tint is rather objectionable. As a rule the blocks are more or less veined with dark stains of a harder nature than the rest of the block, but it can be obtained free from these impurities and, indeed, so closely approaching the quality of statuary, as to be easily mistaken for the latter by the inexperienced when seen in the sunlight. And here I

\* See p. 3, ante.



may as well remark that no sculptor should attempt to judge marble after the sun is up, and in Italy no one does. The best time for judging marble is on a dark rainy day, shortly after daybreak. On such a morning in Rome you would be sure to find a number of sculptors, each with his pointer, measuring and turning over the blocks on the Marmorata. By about six o'clock they will all have disappeared, having noted down the numbers and marks of those blocks which seemed to suit them best to communicate with the owners and strike a bargain at leisure. As the statuary marble all comes to market in blocks of rough shape and untrimmed, and, as the price is always by cube measurement, it often happens that disputes arise as to the number of cubic feet contained in a block, as all the corners, however useless, must be paid for. The price ranges up to two pounds per cubic foot for the best qualities, indeed I have known higher prices paid for exceptionally fine blocks.

Some years ago, when Pope Pius IX. had the old Marmorata excavated under the direction of Prof. Visconti, some large and fine blocks of statuary marble were discovered perfectly preserved amongst the river silt that had covered them to a depth of several feet. These proved to be Greek marbles, both Parian and Pentelic. These marbles are not pleasant to work, nor very pleasing in effect when freshly cut; they have an unpleasant amount of sparkle from the size and brilliancy of their crystals, and are also very unequal in hardness. The chisels strike sparks from them and are soon blunted. The Pentelic in this respect is worse than the Parian, and is, moreover, rather slaty in character, being in layers of hard and soft, with a more defined cleavage than most marbles show.

They have both, however, one advantage, namely, that with age they acquire a very lovely warm tint.

Resembling these in character are the statuary marbles of Tyrol, with the difference, however, that they are warmer in colour when freshly worked. I do not know these quarries myself, but I had opportunities of seeing these marbles worked in the studio of Prof. Steinberger in Rome, and they appeared, as I believe Prof. Steinberger found them, perfectly satisfactory. Another marble having the same warm tint and large crystals, and by no means an unpleasant marble to work, comes from an interesting but little group of quarries at Monterombolo, in the Maremma. The remarkable fact concerning the Monterombolo marbles is their strange diversity, every conceivable variety of statuary marble and many-coloured marbles also being found within the limits of a few acres. It is also interesting from the fact that in clearing out an old disused quarry some years ago an old Etruscan working was brought to light, and bronze quarry tools were found.

In the hands of the late owners these quarries were much mismanaged, and were a total failure financially. I have not been there for several years, but I do not fancy that they are being regularly worked at present. I know that there is statuary marble of the very finest quality there, but whether it will ever be available is another matter.

The principal statuary marble quarries at Carrara are the following:—Grestoli, of which a few years ago two quarries were open; Betulia; La Mossa; Polvaccio, also with two workings; Binelli; Poggio Silvestro; and last, but best of all, the splendid quarry of Monte Altissimo at Seravezza, of which M. Henraux is the fortunate possessor. Of all these marbles none is so well suited for sculpture of every description as Seravezza. It has only one defect; it is apt to bear vents. This, I think, is not a defect natural to the marble itself, but I think is occasioned by the quarrying. It is an extremely costly quarry to work, and, after all, by careful selection of a block it is quite possible to get one that is perfectly sound. Some years ago I got over a block from this quarry which contained nearly 200 cubic feet, part of which I used for a group of Dionysos seated on a tiger, and the remainder was used for other works without my ever having to complain of any flaw or blemish. This was,

M. Henraux told me, the first block of any size that had been sent to England. In France it is more used than any other. There is much jealousy between Carrara and Seravezza, and the merchants and owners of the former place always try to prevent any one from going to the latter in search of marble.

Grestoli is, perhaps, the best of all the Carrara marbles; it is close-grained, as, indeed, all these marbles are, of a good tint, and works pleasantly under the chisel; it is harder than the other Carrara marbles. It runs in blocks up to about 50 cubic feet, rarely over. It is the most economically worked of any of the statuary quarries. Poggio Silvestro is on the opposite side of the valley; it is a fine marble, less transparent than Grestoli, and commands about equal prices. Betulia is a very white marble, and rather opaque; has a sugary appearance, with a small bright sparkling crystal; it works very easily under the chisel, and takes a good polish, but it is cold in tint. It is rather subject to "moschini" (small black specks). It decays very fast in the open air, and no one should ever use it for work that is to be at all exposed. A very great deal of it is sent to England, and is used almost entirely for the cheap commercial sculpture of Carrara. It is but little used in Italy for works of importance. The quarry has been much improved of late years, and yields the largest blocks of any statuary quarry in Italy. The quality of the marble has also somewhat improved.

La Mossa (often called Pianella from its situation) is an excellent marble, and fetches as high a price as Grestoli when found in large sizes.

Polvaccio, like Grestoli, is worked in two quarries. The expense of working these quarries is very great. The only fault I have to find with it is the frequency of faint yellow lines that scarcely are perceptible until the work is well advanced. It fetches a very good price.

Binelli is a beautiful marble of the Grestoli character; it is very costly to get, as the blocks have to be raised from a great depth from the quarry before they can be again lowered down the drift to the road. It is rarely seen, except at the quarries, so perhaps it is usually confounded with Grestoli in the workshop.

The quarries of Sicilian, or, properly speaking, "Marmo Ordinario," are legion in Carrara. I shall therefore only mention one of the most remarkable, called La Piastra. It is situated at the junction of the Ravagioni valley and of the Canal Bianco, but in character it belongs to the latter. It is considered to be a model of what a marble quarry ought to be, and is remarkably well worked. The joints are nearly vertical, and very little powder is used in this quarry. The marble is very uniform in tints, and blocks of enormous size are obtained. The drift forms a platform about sixty yards square, on which is built a convenient shelter for the men, with even an attempt at a garden. The blocks are all squared up on this platform, loaded on sledges, and lowered over the drift, with ropes, to the loading-stage in the valley below. The ropes have to be renewed about once in three weeks. This marble fetches about 5s. per foot cube at the quarry.

After the marbles, the most important of the limestones to the sculptor is certainly alabaster. This material, however, seems to have been driven from the field in a great measure by the inferior Carrara marbles, and, indeed, it seems probable that had our predecessors in the art been able to have secured a plentiful supply of marble at a reasonable price, they would not have used alabaster as much as they did for ecclesiastical sculpture. In the present day little or no important work is executed in that material, which has chiefly passed from the hands of the sculptor to those of the architectural carver. I am more than half inclined to regret this, as alabaster is pleasant to work and admits of a high degree of finish. It also lasts remarkably well when protected from the weather. The best is quarried in the neighbourhood of Volterra, and is carved into all manner of vases and figures,—usually said

rubish,—which is purchased as a souvenir by the too-indulgent traveller.

The next in rank are the oolites and the dolomites, or magnesian limestones. These latter we may soon dismiss. They are too perishable to be placed in exposed positions, and although they might do very well for interior work, they have so little to attract the sculptor that they may well be left to the architectural carver. It is said, indeed, that when the carbonates of lime and of magnesia are present in nearly equal proportions, they approach more nearly to the character of marble. But, granting such to be the case, we had still better use marble.

Of the oolites those best known to the sculptor are the Portland and Bath stones. They both allow of a certain amount of finish, as much, perhaps, as is desirable in large work. Bath stone is hardly suited for work that is to be placed in the open air, and, perhaps, it is hardly good enough for much else. Portland stone of really fine quality is for outside work hardly to be surpassed, but it varies very much in this respect. It is a pity that merchants, workmen, and employers all seem to prefer a stone that can be rapidly and cheaply worked to one that has qualities promising greater durability. The well-known Caen stone from Normandy belongs to this family, but is too soft to be of much use where it is exposed, though it is very largely used in France. It hardens, indeed, to some extent by exposure, but it is better employed where frost and rain cannot get at it. The last of the oolites which I have to mention is lithographic stone. This beautiful stone is extremely durable and can be finished to any required degree of delicacy. It does not work well at all under the chisel, and should be finished with the graver. It is tedious work and yet it is well worth the labour. The work when finished should be well oiled to bring out the colour. I have only used it for medallions, unfortunately it is not to be had in sizes large enough for anything more important.

Next and last come the sandstones. These are, I believe, very little used in this country except where the red sandstone has been carved for architectural decoration, as, for instance, in the abbey at Arbroath. In Germany, on the contrary, and especially in Saxony, a very great use has been made of this material, which is quarried of very fine quality and in very large sizes in the valley of the Elb, within a few miles of Dresden. As examples of the excellent work that may be done in this material I may mention the groups by Professor Schilling, of Morning, Evening, Noon, and Night, which adorn the steps of the Brühlische Terrace, and the statue of Raffaele, by Professor E. Hänel, on the Picture Gallery at Dresden.

The next materials to be considered are the metals, and these are, indeed, of great importance to the sculptor, though, for some reason or other, it is rarely that a sculptor at the present time does any metal-work himself. He is usually satisfied to hand it over to the manufacturer, who makes a more or less accurate copy of his model to the destruction of its value as an autograph work.

I freely admit that it is at times impossible for a sculptor to be his own founder and metal-worker. Where large work is concerned the premises and appliances required are far beyond what is to be found in a sculptor's studio, and although in the old days men like Michelangelo and Benvenuto Cellini did not disdain to cast their own works, and, even in our own time, sculptors have occasionally set up a foundry as an adjunct to the studio, it has been the exception and is, I fear, hardly likely ever to become the rule. Nevertheless, works of cabinet size may be executed in metal, without much inconvenience, in the sculptor's studio, and surely a sculptor who does not understand metal-work and casting is ignorant of a very important branch of his profession, and is at the mercy of the workmen or manufacturers whom he may employ. I trust the time is not far distant when the public will awake to the importance of autograph work in sculpture, and will insist on having it, at least in so far as cabinet works



are concerned, and that the much-vexed question of legitimate assistance may be at last set at rest.

The metals chiefly used by the sculptor are copper and its various alloys, iron, lead, and zinc. To this list may be added gold, silver, and aluminium, but these are, of course, uncommon.

Pure copper has been much used for sculpture, where it was desired to produce works of little weight. In this case the statue was composed of beaten plates of copper, and mounted on an iron framing. At the present moment, only three examples of important works of this description occur to my mind, and, curiously enough, the two last no longer exist, having been destroyed by fire. These three are the equestrian statue of Augustus the Strong, Elector of Saxony and King of Poland, in Dresden; and the other two were the equestrian statue of the Comte de Montmorency at Chantilly, and the Quadriga, with the figure of Brunonia, in front of the Ducal Palace at Brunswick. It is probable also that most of the gigantic statues of antiquity were of wrought copper, not cast bronze. The advantage would be economy in metal, and also in facility of construction. For most purposes, however, the sculptor will find cast bronze the most convenient material. There are, of course, many different copper alloys that are called bronze, but, properly speaking, the term should be applied only to alloys of copper and tin. The proportions vary considerably, but in no case should the tin exceed 10 per cent., which, to my mind, is already too large a proportion. All founders have their own favourite mixture, and probably have good reason for preferring it to that used by another. Founding is so nice an operation that when a founder has by practice found an alloy that suits him, and knows the exact degree of heat at which he obtains the best results, it is natural and right that he should not care to adopt other mixtures. Many founders do not care to use pure bronze for sculpture, but prefer some admixture of zinc and even lead. Keller used both zinc and lead, as well as tin, in his bronzes, which are of remarkably fine character. In England, it is not uncommon to use a mixture of gun-metal and yellow brass. This flows very well, and is an excellent metal for many purposes. The worst practice of all, and one that is very prevalent in Italy, is to use a mixture of old scrap brass of every description. This, of course, is not done by such founders as Galli or Nelli, but is a common practice in most of the small foundries. The metal resulting from this is, of course, very unreliable as to quality and colour, and is often extremely difficult to chase.

Lead and zinc have been much used for sculpture, but lead is probably of all materials the worst, being too soft even to carry its own weight. Zinc is better in this respect and casts very well, and is much used in Germany as a cheap substitute for bronze. It is, however, at best only a makeshift, cast zinc being too weak and brittle for sculptural purposes. Aluminium is a far better material, but unfortunately its prime cost is too considerable to make it generally available. It melts at a comparatively low temperature, and produces beautifully clean castings. It forms an excellent bronze when used as an alloy for copper.

Last of all we come to iron,—a material which until recently has been much neglected by sculptors, and, indeed, is but little used even now, though there are not lacking examples of what may be done in this metal both in our streets, as, for instance, the candelabra at Northumberland-avenue and in our museums, which contain beautiful examples of iron casting. It seems to me to possess many advantages for colossal work especially. It is cheap and durable, and no statue in iron is likely to come to the melting-pot for the sake of the metal, a fact that has befallen so many fine bronze statues. I see no reason why nine-tenths of the monuments in London would not have been quite as effective in iron as they are in bronze, and holding this opinion I am executing an important public monument in iron

at the present time, and I have little doubt that before long iron will be quite as much employed for this class of work as bronze if it does not drive the latter entirely from the field. For works of medium size bronze is, of course, the finer material. In concluding these few remarks on materials, I must crave forgiveness if I have omitted some, and have, perhaps, done scant justice to others. Each of the more usually employed materials would demand an article to itself if the subject is to be treated otherwise than superficially. This would involve also the various processes for which they are used, and would, in fact, become a treatise on sculpture itself.

#### THE BEAUMONT TRUST BUILDING SITE.



REcently adverted\* to a proposal for establishing in the East End of London, in connexion with the Beaumont Trust, a people's palace of industry and diversion. In furtherance of that scheme Lord Rosebery engages to bear the cost of a swimming-bath; the Duke of Westminster, the Clothworkers' Company, and Mr. Tate, contribute 1,000l. each; and the Drapers' Company have promised 20,000l. if an equal amount shall be forthcoming for the library and reading-room. The Charity Commissioners offer to sell for 22,400l. the site of Bancroft's Hospital, being about 4½ acres in area, at Mile End.

In St. Helen's Church, Bishopsgate, stands the vault which Francis Bancroft, grandson to the archbishop of that name, caused to be erected in the year 1723. Dying in 1727 he enjoined that his remains should be embalmed and exposed to view, and that his tomb should be visited by each newly-elected master of the Drapers. The vault, now closed, long formed an object of curiosity with the vulgar. Having enjoyed no particularly enviable reputation when alive (it is said the church bells were rung for joy at his death), Bancroft sought to make his peace with the world by his manner of leaving it. First providing for the care of his body, he gave nearly all his personal and real estate in trust to the Drapers' Company, computed by him to be worth 28,000l. His property lay mostly in Prittlewell, Dunmow, with other Essex parishes; in Rayson, Hadley, and Layham, Suffolk; in Chiswick, St. Giles's-in-the-Fields, St. Margaret's, Westminster, and in St. Gregory parish, Castle Baynard Ward. He directed the Drapers to devote from 4,000l. to 5,000l. out of his personal estate to purchasing a plot of ground in or near London, and the building thereon of almshouses for twenty-four old men, together with a chapel and school-room for 100 poor boys, and separate dwelling-houses for two masters. Each headmaster was to be paid 8l. a year, and to receive an allowance of coals, with a haize gown every third year. In 1735 the executors handed over the residue of the personal estate, to the extent of 23,127l. 8s. 6d. to the company, who forthwith expended nearly 6,300l. in erecting the buildings, to which six more almshouses were subsequently added. The trusts now yield an income, from all sources, of about 7,500l. per annum. Besides the real estate already mentioned several properties in London contribute to the income of this eleemosynary endowment. These latter are severally situated in St. Helen's-terrace (Nos. 1 to 6), Mile End; in the Poultry and Honey-lane Market; in Holborn (Nos. 273, 274, 276, and 277); and in Godman-street (No. 9) and Basinghall-street. Rent is also obtained from certain farms issuing out of manors in Yorkshire, with that of Apsley Grange, Lincolnshire. The almshouses, which will thus be shortly removed, are a conspicuous feature on the northern side of the Mile End-road, a little beyond the cemeteries belonging to the Dutch and Portuguese Jews. The Beaumont Institution itself was originally established in the neighbouring square to which it has given its name. Mr. J. T. E. Beaumont died in 1841, endowing his institute with a capital sum of 13,500l. An apposite commentary upon the somewhat

various purposes which the new Beaumont Trust will serve is supplied by a statement which a mission clergyman in this district has lately made. He insists upon the moral and material value of men's clubs, and says:—"For our boys we are very lucky; we have got for them an excellent club; upstairs there is a quiet room for games, downstairs a first-rate gymnasium. A gentleman comes once a week to teach them to box: we do not bring them up on Dr. Watts's hymns."

#### NOTES.



HE alarms of earthquakes are becoming too numerous and too near for us to disregard them, or treat them as phenomena only remotely possible. The record of the last month's seismology shows that the earthquake influence, which reached such a terrible pitch at Krakatoa, in the island of Java, is not only far from being exhausted, but is travelling with increased intensity towards European and English areas. The Cashmere disturbance, in which over 70,000 buildings were destroyed at the beginning of June, is being repeated, while in France a severe shock was experienced only a fortnight ago. This has been followed by earthquakes in Yorkshire, the effects of which were felt from Leeds to Driffield; also on the same day in Argyllshire, and a day or two later, in the localities of Friburg and Geneva, while on July 1st, the whole Lake District in the neighbourhood of Ambleside and Grassmere underwent the same paroxysms. Worse than all this, we are promised by M. Delaunay, a seismic prophet who, so far, has been remarkably correct in his prognostications, that the year 1886 will be marked by earthquake disturbances of extreme intensity. We read of such occurrences with considerable composure when they happen a long way off; but when our own walls are tumbling about our ears, we shall begin to understand the terrible alarm that is constantly present with populations in tropical centres. Perhaps the threatened earthquakes of 1886 may indirectly do us a good turn by bringing down the badly-constructed houses of the jerry builders, which assuredly were never meant to stand such rough usage.

THE case of Saunders v. Pawley, tried last week by Mr. Justice Day and a special jury, is, perhaps, the most encouraging to sanitary reformers of any of the cases which have lately come into the law courts. We print a short report of the case in another column, but it is very important as showing how careful house-owners will in future have to be in regard to drainage matters. The two main faults were bad joints to a soil-pipe, and a broken trap to a rain-water pipe. At the same time, it has to be borne in mind that the jury found that the owner of the house, whom we regret to find is a practising architect, falsely alleged that the house was in a perfect sanitary state. We believe that many such false representations are made recklessly, but yet not with fraudulent intent, but sufficiently without care to amount in law to false representations. Mr. Pawley is condemned in damages to the amount of 2,228l. odd, not to speak of costs, so that with this verdict before their eyes it is to be hoped that owners of houses will take care that the drainage of their houses is in a proper state before they let them to tenants.

THE question of the safety, or, rather, the non-safety, of the National Portrait Gallery, brought to mind again by the recent fire at the Inventions Exhibition, was the subject of the first communication made to Parliament by the new First Commissioner of Works, Mr. Plunket, on Tuesday last. In reply to Mr. Coope, the First Commissioner said, "I have for some days been inquiring into it, and I am glad to be able to inform him that the actual danger to the National Portrait Gallery is not as great as his question seems to imply. The building is of ordinary construction,

\* Vide the Builder (27th June, 1885), vol. xlviii., p. 695.



with brick walls and wooden joists and floors; the roof is slated, and has skylights; it is not covered with tarred felt; and it is separated from the wooden corridors outside by brick walls and iron doors; it cannot be said in any sense to be in an equally hazardous condition with the International Exhibition, which is built entirely of wood, covered with asbestos paint." Mr. Plunkett admitted, however, that the risk of fire is increased by the proximity of the Exhibition building, and promises further suggestions. There ought of course to be a new building on another and less dangerous site.

**A** LETTER from Mr. G. H. Leane, F.S.I., in the *Times* of Saturday last, drew attention, in by no means too strong terms, to the unsatisfactory nature of the provisions of the "Corporation of London Tower Bridge Bill," which provides that "the bridge shall be continuously open during such period at or about the time of high water as the Corporation shall from time to time direct," the clause further empowering the Corporation to open the bridge at any other time of the tide when the navigation of a vessel would be prevented or delayed by the interposition of the bridge. It seems difficult to understand how any people in their senses can propose a bridge Bill with such provisions, or imagine that it will be sanctioned. A bridge which may be interrupted or closed to land traffic at any time, and which must be so for a considerable period, at constantly varying times, twice in every twenty-four hours, is simply useless for such traffic as it is required to provide for; and we hope money will not be allowed to be spent on any such absurd project. Whatever communication be provided across the river east of London Bridge, it must be a permanent road, either under the river or over it; nothing else will be worth the cost of making.

**T**HERE are probably not many places in England in which the almost obsolete system of government by vestry prevails, and the proceedings, financial and otherwise, of the Richmond Select Vestry, must make the inhabitants of that once pleasant little town seriously consider whether they could not with advantage change their form of administration for one that is more satisfactory and in keeping with the times. Local Government Board enquiries have been ominously numerous in Richmond of late years, all, of course, tending to one end,—that of borrowing,—the vestry being in the habit of incurring the expenditure for works (many of which have been failures) before obtaining sanction for such expenditure. The consequence of this laxity is that the rates are to be raised from 4s. 6d. to 5s. 6d. in the pound. The water-rate that forms part of this charge is to be increased from 1s. to 1s. 4d., a pleasant reflection for the ratepayers who, a few years ago, were induced by the promise of a 6d. rate to approve of the undertaking of the now notorious Richmond well, which, from first to last, has cost nearly 70,000*l*. In the course of this last official inquiry, bitter complaints were uttered at the impossibility of ratepayers obtaining information from the water committee as to the condition of the accounts; and the generally secretive policy of the vestry may be gathered from the fact, that out of the hundred bills ordered to be printed to announce the holding of the inquiry, only seventeen were posted, and the remaining eighty-three used as waste paper by the parish beadle. It is to be hoped that the agitation in favour of a corporation will again be set on foot, as offering a chance of obtaining better government.

**A** SOMEWHAT interesting event in the world of art will be the Exhibition of English Water-colours which it is intended to hold in Boston, Massachusetts, in the autumn of this year. The Exhibition will be under the management of the Trustees of the Museum of Fine Arts at Boston, and is to open in October next. The works will be admitted free of duty for six months (the period during which the Exhibition will be open), and the Cunard

Company will transport them, carriage free, by their steamer *Pavonia* on the 2nd of September. The number of drawings to be sent is limited to 500. We hope the English water-colour school, in which branch of art, at all events, England is at present *facile princeps*, will be thoroughly well represented at Boston. Taking the best productions of a few years, we ought to be able to send Boston a collection of 500 masterpieces. Information as to the Exhibition can be obtained from Mr. Henry Blackburn, the Hon. Secretary, 103, Victoria-street, S.W.

**I**T is understood that Count Gleichen is engaged on a marble statue of the Queen, to be placed in the first quadrangle of the Holloway College for Women at Egham, and a group of the founder and his wife, to be placed in the second quadrangle of the same institution. In commemoration of the opening of the Holloway Sanatorium on the 15th of June last, the Prince and Princess of Wales have also consented to give sittings to Count Gleichen for busts, which are to be placed in the great hall of the Sanatorium.

**T**HE Duchess of Westminster laid the first stone last Saturday of a very large Assembly-room in Mile End-road, for Sunday evening services in connexion with the Tower Hamlets Mission. The building is to accommodate 5,000 persons. Taking this in connexion with the "Palace of Delight," to be erected out of the Beaumont Trust Fund, there seems to be considerable provision being made both for the spiritual and the mental health of the inhabitants of East London, though there is room for much more to be done still. Mr. Charrington is the promoter of the Assembly-rooms scheme, the funds for which are being raised by subscription.

**T**HE remaining portion of the pictures and sketches by the late Louis Haghe were sold by auction by Messrs. Christie, Manson, & Woods, on Friday and Saturday last, and realised for the most part only moderate prices. The works sold consisted chiefly of sketches in Belgium, France, and Italy, and studies for pictures in water-colour and oil, with a few finished drawings. Two large studies for the picture of the "Death of Jean Goujon" fetched only 4 guineas; an interior of the Mosque of Santa Sophia, 21 guineas; an interior of St. Anne's Church, Bruges, 20 guineas; Quentin Matsys's Well, Antwerp, 17*½* guineas; and others in like proportion. A highly-finished drawing of the interior of the painter's studio, with several portraits, realised 58 guineas.

**T**HE Liverpool Architectural Society have addressed a memorial, of which a copy has been forwarded to us, to the Chairman of the Insanitary Property Committee of the Corporation of Liverpool, in regard to the conditions of a competition advertised by that Committee for a large block of labourers' dwellings. The memorial draws attention to these points:—

(1) There is no mention of a professional adjudicator, and hence 1,450 architects in the United Kingdom are debarred, by their own pledges, from competing. (We fancy this will be a new light to the Committee); (2) The amount of premiums offered is quite inadequate for a building to cost 40,000*l*. (The highest premium appears to be 50*l*.); (3) Designs for which premiums have been adjudged ought not to become the property of the promoters. (In this we entirely concur, unless the promoters pay at a much higher rate than competition premiums generally amount to); (4) That the instructions are inadequate, saying nothing as to scale of drawings (1) or whether or not perspectives will be admitted; (5) that the architects are asked to provide remunerative dwellings under conditions rendered impossible by the Corporation's own By-laws; and (6) that there should be some guarantee that the successful architect will actually be employed, a condition which the past history of architec-

tural competitions in Liverpool renders it necessary to emphasise. The fifth objection is matter for argument; the Corporation Committee may think there is a chance of discovering some genius who will cause two-and-two to make five-and-three-quarters instead of four; but in every other respect the memorialists are in the right, and the profession ought to be obliged to them for making a stand against what appear to be very unsatisfactory conditions for an important competition.

**T**HE "Home Arts and Industries" Association, to which we referred in a "note" recently, has been holding an exhibition this week at 3, Carlton House-terrace, by Lady Brownlow's permission, showing some of the work which has been done by lads in the country and in London under the encouragement and training of members of the society. The exhibits of wood-carving were the most numerous, and some of them showed great aptitude and promise for beginners. At present there is rather a want of aim about the work; the society has only been in existence a few months; but it is hoped that much has been done to awaken an interest in home art, and to lead in time to the making of common things for actual use in such a way that they may become a source of enjoyment to the makers and to those who use them when made.

**S**OME of the Liverpool architects are about to follow the example of the Architectural Association and institute a "sketch-book" for the publication, in lithographed form, of sketches under the title "The Draughtsman's Sketch-Book." Mr. T. J. Dalziel is the editor. Some of the leading contributors are members of the Liverpool Architectural Society, but we do not gather that the intended publication is in any way formally connected with that society.

**T**HE autobiographical record of Mr. Artemus Ward commenced, if we remember right, with a copy of a model letter to be written to the editors of the newspapers of any town in which his celebrated "moral waxworks" were intended to be exhibited, the most emphatic sentence in which was somewhat to this effect:—"I tell yer that I intend to hev all my advertisements in yoor kollums, and all my posters printed to yoor printin' wex." Artemus seems to have left what he would probably have called a "brite eggsumpul" to not a few inventors and purveyors of building materials and appliances, who favour us with diplomatic letters inviting our attention to their contrivances, accompanied by assurances which only differ in the minor matter of orthography from that of the astute Mr. Ward. Perhaps it will save these diplomatic correspondents a little trouble if we explain, once for all, that whatever facilities for that kind of *quid pro quo* arrangement may be found in some other quarters, they will be wiser, in asking for our support, to confine themselves to proving that they have something really good to introduce to the public. Those who can convince us of that will always have our ready support; those who cannot must be content without it.

**Paisley Baptist Chapel.**—In our last issue [p. 8, ante], in giving a review of the drawings in the above competition, we should have said that Mr. Charles Bell, of London, was one of the six architects originally selected to compete, though by an oversight of our contributor his design was passed over at the time. Mr. Bell's plan is designed for Congregational worship, so that all can see both pulpit and baptistery, a point overlooked by some of the other competitors. The nave is treated in one span, with no columns to intercept the view, and there are wide transepts with a groined dome at the crossing. The arrangement for securing privacy after baptisms is to be commended. The style of architecture is Early English; the front elevation has a boldly-treated gable flanked by a well-proportioned tower and spire. The difficulty of approaches has been well met,—a carriage drive being arranged both to reach the central entrance in Design A, or the side entrances in Design B,



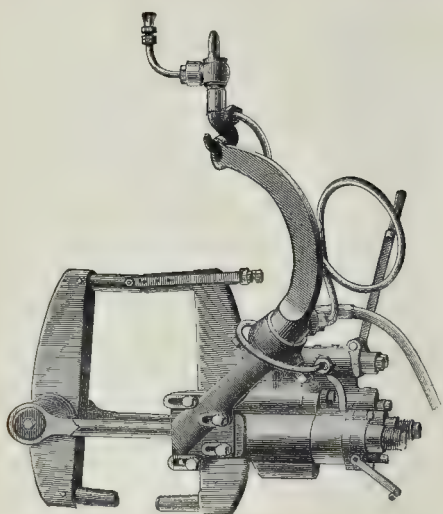


Fig. 1.

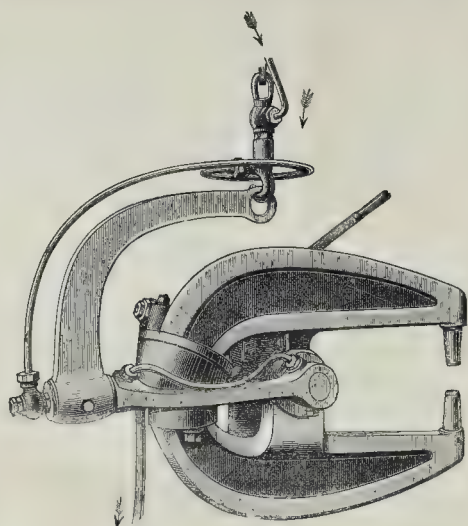


Fig. 2.

MACHINE TOOLS AT THE INVENTIONS  
EXHIBITION.  
HYDRAULIC RIVETERS.

It is only within the last few years that the full importance of hydraulic power for the purpose of working machine tools has been generally recognised, and no doubt this recognition would have been still further delayed had not the growing demands of the marine engineer for higher steam-pressures forced boiler-makers to use every exertion in endeavouring to obtain the highest results in both workmanship and material. In 1871 Mr. R. H. Tweddell, who has done more to advance this system than any one else, made his first hydraulic riveter, and since then, in the face of much opposition, has so far succeeded in his mission as now to have more than 800 machines at work in different parts of the world. For some time Mr. Tweddell was unable to find a

firm of manufacturing engineers who would take the question up, but at last in Messrs. Fielding & Platt, of Gloucester, he met with those who had the intelligence to see the value of his scheme, and the enterprise to follow it up in a liberal manner.

At the Inventions Exhibition this firm has a large stand, upon which some of the most important hydraulic tools they manufacture are exhibited. The water for the supply of the tools, which are shown in action, is drawn from a small overhead tank and pumped by a pair of powerful pumping-engines into a hydraulic accumulator. These engines have been specially designed for the work in question, and this accumulator is constructed so that the pressure can be easily varied through throwing one or more of the weights out of use by supporting them on the framework in which they are guided. The arrangement by which the engines are stopped and started when the accumulator either wants pumping up or reaches the top of its stroke is different to the ordinary gear used for this purpose. To shut off steam from the engine a specially-designed stop-valve is used. The valve-spindle is, at the same time, a small hydraulic ram, and when water at pressure is admitted beneath this valve is withdrawn from its seating, admitting steam to the cylinders. The admission of water to effect this object is controlled by a two-way cock worked by tappet-gear, which, in turn, is brought into action by the rising or falling of the accumulator. This arrangement appears to be simple and effective, and is, no doubt, an improvement on the old style of tumbling and trip gear. From the accumulator a main is carried beneath the floor to the different machines. The general arrangement in actual work is for the exhaust main to be placed in the same trench as the pressure water-pipes, but at the Exhibition the exigencies of the stand do not allow of this.

The first machine to be noticed is a double-ended and double-power portable riveter, which we illustrate in fig. 1. This was the subject of Mr. Tweddell's first patent as a portable riveter, and, although since this was brought out many other forms of machine have been introduced by the inventor, it is still unsurpassed for use in special bridge girder work and for railway wagon and carriage underframes, &c. The general arrangement is well shown in our illustration.

A second form of machine is that shown in fig. 2. It is known as the Fielding type of riveter, and is well adapted for bridge, girder, and ship work. In consequence of the cylinder being well out of the way the machine is very convenient for working in very confined spaces, such as the corners in girders and the intercostals of ship work. In order to illustrate this

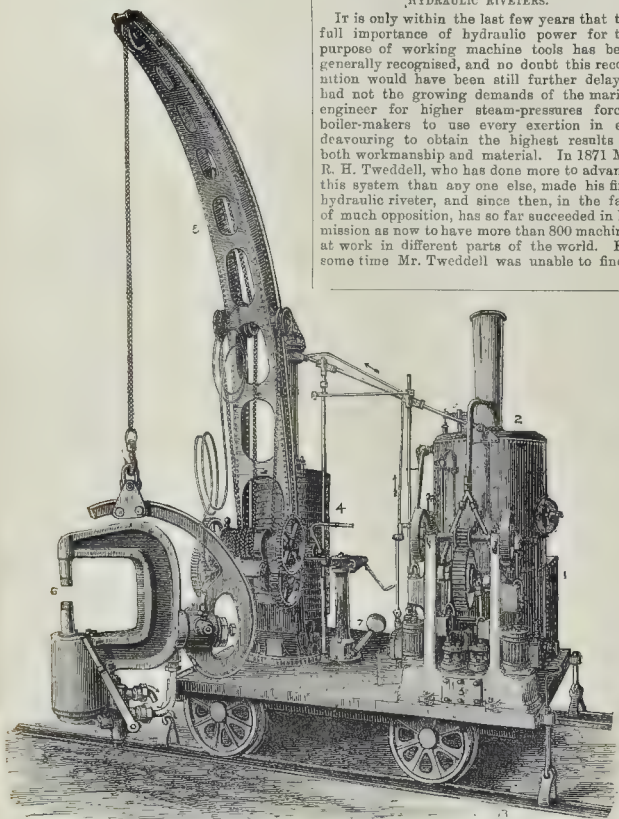


Fig. 3.



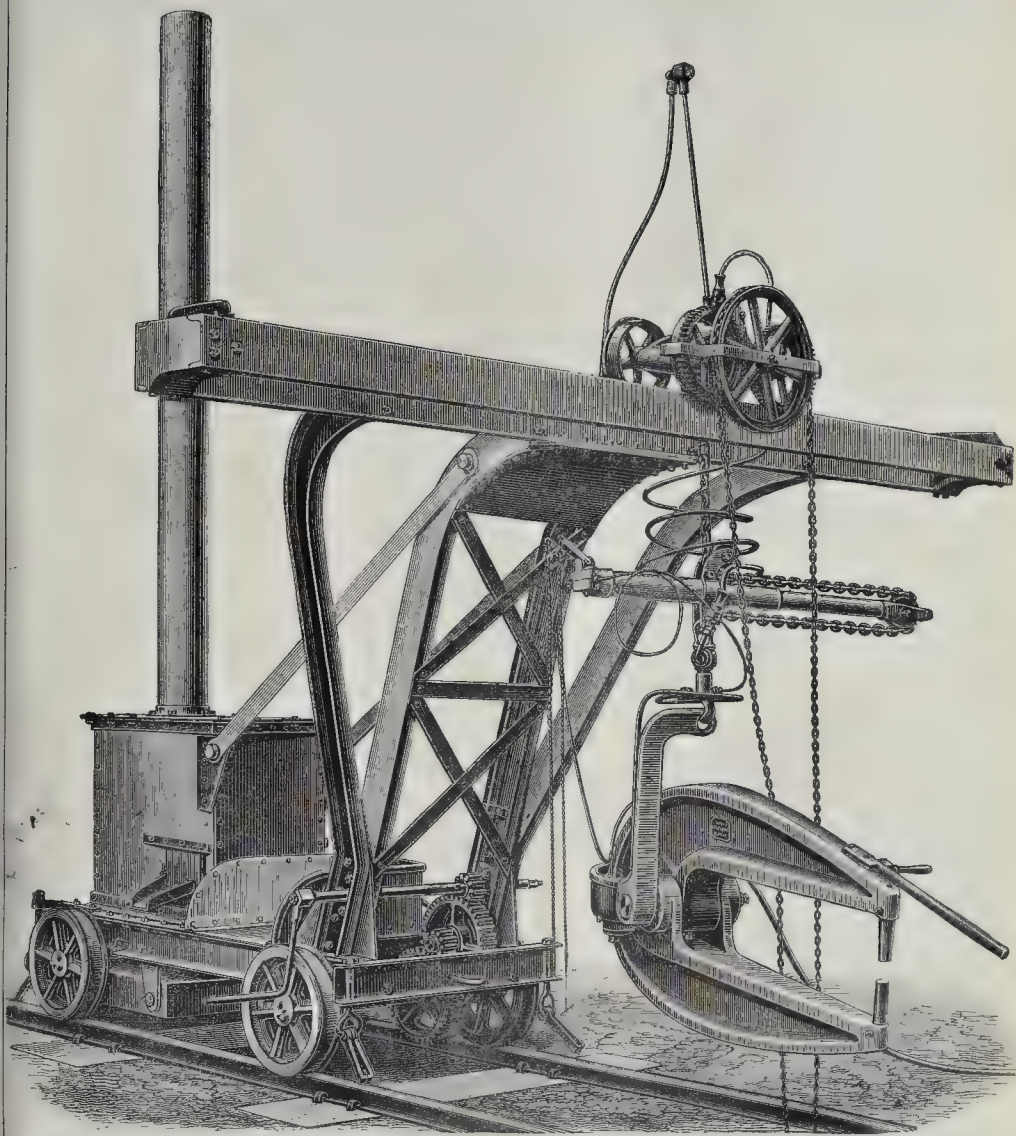


Fig. 4.

more fully a portion of the floors and keel of a ship has been introduced into the exhibit. The most noticeable feature in this machine is the arrangement of ram and cylinder, which are, as may be seen by the illustration, respectively turned and bored to a curve struck from the centre of the gudgeon upon which the arms rock, so that the travel of the ram is through an arc having a radius corresponding to the distance of the axis of the ram from the centre of the fulcrum formed by the gudgeon. The machine has the appearance of being difficult to manufacture, and in ordinary circumstances doubtless this would be the case, but Messrs. Fielding & Platt have designed special machinery for boring and turning these curved parts, and they say they can now construct the rams and cylinders for these machines as easily as if they were straight. The advantages of the design are very apparent, the chief being that the ram and cylinder form a substantial guide for the arms, each of which can be cast in one piece with them respectively, thereby insuring rigidity

and steady work. Any swerving, through side strains on the arms caused by the heads of the rivet not being quite opposite each other, is in this way prevented.

On this same section of a ship's bottom a keel-riveting machine is also shown. In no other position is the advantage of machine riveting more apparent than in the heavy work required for closing the rivets in the keels of large vessels. In the largest ships this riveting can hardly be done by hand. This was especially found to be the case during the construction of the *City of Rome*, the *Alaska*, and the *Servia*, on all of which vessels a machine of the type exhibited was used. We may mention that the example of the work shown represents the *Servia's* keel and garboards. The machine is carried on a travelling-carriage, which runs on lines laid under the ship's keel. By means of a system of parallel balanced levers, the closing dies are brought up to the same height, and kept level so as to work fair. A swivelling motion can be given to the machine, so as to

take work which is not quite square to the line of travel of the apparatus.

In fig. 3 we give an illustration of one of Tweddell's portable riveting plants, specially adapted for riveting up bridges *in situ*. It will be seen that the whole apparatus, consisting of boiler, engines, pumps, accumulator, crane, and rivet furnace, is all mounted on a trolley, thus enabling the whole to be moved about bodily into any position in a yard or on a bridge in course of construction. The fire which heats the rivets is also used for raising steam in the boiler, the waste heat from the rivet furnace being sufficient to supply the power for closing the rivets. The riveting-machine is of the bear type, and is shown suspended from a lofty crane, which may be turned round the centre of the accumulator, or can be adjusted to rake when required. The flexible copper piping allows the machine to be raised and lowered or swung about in any position without the connexion to the accumulator having to be broken. Two, three, or more machines are often worked



from water supplied by one of these portable plants, which have come very much into use of late.

In some instances, however, the nature of the construction, especially in bridge work, will not admit of the whole weight of the plant being upon one set of wheels. To meet such cases, the design which we illustrate in fig. 4 has been introduced, where, it will be seen, the motive-power machinery is carried on a separate truck. This arrangement was lately adopted by a contractor, who had to rivet up the buckle-plate in a bridge under construction in India. It is stated that in this instance, with native labour alone, upwards of 4,000 rivets were closed per day of ten hours with one machine. The crane is fitted with walking-pipes, flexible copper tube, and many ingenious contrivances for enabling the machine to be easily moved.

We understand that Messrs. Fielding & Platt intended showing one of their large stationary hydraulic riveters, but the demand for these tools has been so great that they have never been able to get far enough ahead of the work to spare one for exhibition purposes. There is, however, a full-size sectional working model of the cylinder of one of these machines; and no doubt this will convey to most people a more definite idea of the action of the mechanism than the machine itself would have done. To meet the exigencies of riveting boilers for high-pressure steam,—a circumstance to which we have already made reference,—plates of thicker gauge than can be brought together by the ordinary machines are necessary, and the form of tool under consideration has been designed for the purpose. There are two powers. In the first operation a ram is brought forward which is fitted with a cage that encircles the rivet, and this effectually brings the overlapping parts of the plates closely together. Another ram is then brought forward, and this closes the rivet, after which the pressure which was on the plates is relieved from the cage, but is transferred to the closing dies in addition to the original pressure already on them. This gives a final squeeze to the rivet, and perfects the work with a minimum expenditure of power for the stiff work that has to be done. Specimens of very heavy riveting done in this way are shown. In one of these the piece has been planed through the centre line of rivets, and certainly nothing could be more perfect than the manner in which the holes are filled and the plates closed together. Models of forging, flanging, and other presses are shown, and also photographs of different applications of the machinery. There are also many details in the application of the tools, which we have been unable to dwell upon, but which cannot fail to be of interest to those engaged in riveting work of any description.

#### HISTORIC GRANTS OF ARMS.

We believe it was Victor Hugo who said that the history of the latter half of the Middle Ages was as clearly written in the blazon of heraldry as that of the first half was in the symbolism of the Roman Church.

It is with the heraldic period that we are about to treat, and the truth of the French author's remark is nowhere more apparent than in "Augmentations" (as they are technically termed), or bearings added to coats of arms by favour of the sovereign as a reward for acts of valour or loyalty, or from any other cause more or less worthy of such a distinction.

To our mind there is nothing amongst all these historic charges that can claim a more romantic origin, or one more honourable to its possessors, than the crowned heart of the Douglas family. Robert Bruce, king of Scotland, had always wished to make a pilgrimage to the Holy Land, but it was not to be, and at his death he desired that his heart might be taken there, and buried within Jerusalem, and this task was performed by his faithful knight, "The Good Sir James" Douglas (the hero of some seventy battles), who loyally carried out his perilous duty (but was slain on his return by the Saracens in 1331), and thus earned for his descendants this most noble and appropriate addition to their shield. Boutell says that the crown was not added till comparatively recent times.

The Pelham buckle has been borne as a badge from time immemorial, so to speak, but early in the seventeenth century the following quartering was allowed the family to com-

memorate the capture of the French king at the battle of Poitiers by one Sir John de Pelham, of which exploit Froissart gives an account:—"Gules, two demi-belts, paleways, the buckles in chief argent." Lower tells us that sometimes a cage was added as an appropriate device.

We have referred to the Norfolk arms in a former paper, but omitted to say that the Earl, to commemorate the battle of Flodden, used as the supporters of his shield tramping down the red lion of the Scots and rending it with tooth and claw, an unmistakable instance of "history in blazon," and one that would doubtless delight the wearers of such a spirited device. Augmentations have at times been made to Englishmen by foreign potentates, but perhaps such grants have never been held in much favour by the bearers thereof. Queen Elizabeth was once appealed to on the subject, and replied, "that for her part she did not care her sheep should wear a stranger's mark, nor dance after the whistle of every foreigner."

Charles I. was a liberal dispenser of augmentations amongst his faithful followers, and many are the crowns, roses, and lions that we owe to this monarch. His son, Charles II., followed to some extent in the same path, such honours being about all he had to bestow. We may just record two of his grants to Carlos:—"Or, on a mount an oak tree proper; over all a fesse gules, charged with three regal crowns proper"; and to Ponderell the same charges with a different colour. Both of these families assisted the fugitive king when he was concealed in the oak tree at Boscombe.

Through Jane Seymour's marriage to Henry VIII. her family were assigned the following quarter to their paternal shield:—"Or, on a pile gules, between six fleurs-de-lis azure, three lions of England." This monarch has contributed much to our badges and bearings through finding devices for his numerous wives and their relatives; but how paltry they must all appear compared with the Douglas Heart.

Some of the augmentations of recent times are in exceedingly bad taste and unworthy of the heroes they are bestowed upon, and some are simply idiotic instead of historic, such as the one granted to a family to commemorate the feat of one of its members in writing the Lord's Prayer on the space of a fourpenny bit!

Lower records such abominations as landscapes and large letters, bomb-shells and bayonets, East Indians and American Indians, sailors and soldiers, medals and outlandish banners, figures of peace, and Grenadiers of the 79th Regiment, and adds "Could absurdity go further?" "Shades of Brooke, and Camden, and Gwillim, and Dugdale! what think ye of this?" "Jam satis."

#### THE WATER SUPPLY OF ANCIENT ROMAN CITIES.\*

As the supply of water to large populations is one of the most important subjects in connexion with sanitary matters, and one upon which the health of the populations to a very large extent depends, I have thought that it would not be uninteresting to the members of this Institute were I to give them a short account of some of the more important works carried out for this purpose by the ancient Romans, the great sanitary engineers of antiquity, more especially as I have had exceptional opportunities of examining many of those great works in Italy, in France, and along the north coast of Africa. Many of them are well known, and have often been described, but others,—and those, as we shall see, in many respects by far the most important,—have not received the amount of consideration that they deserve.

Of the aqueducts constructed for the supply of Rome itself we have an excellent detailed account in the work of Frontinus, who was the controller of the aqueducts under the Emperor Nerva, and who wrote his admirable work on them about A.D. 97.

It may be interesting in passing to mention that Frontinus was a patrician who had commanded with distinction in Britain under the Emperor Vespasian before he was appointed by

the Emperor Nerva as controller (or, we should say, surveyor) of the aqueducts. He was also an antiquarian, and in his work he not only describes the aqueducts as they were in his time, but also gives a very interesting history of them.

He begins by telling us that for 441 years before the building of the city, that is to say, before B.C. 312, there was no systematic supply of water to the city: that the water was got directly from the Tiber, from shallow wells, and from natural springs, but that these sources were found no longer to be sufficient; and the construction of the first aqueduct was undertaken during the consulship of Appianus Claudius Crassus, from whom it took the name of the Appian aqueduct. This was, as may be expected from its being the first aqueduct, not a very long one. The source was about eight miles to the east of Rome, and the length of the aqueduct itself rather more than eleven miles, according to Mr. James Parker, to whose paper on the "Water Supply of Ancient Rome" I am indebted for many of the facts concerning the aqueducts of Rome itself. This aqueduct was carried underground throughout its whole length, winding round the heads of the valleys in its course and not crossing them, supported on arches, after the manner of more recent constructions; it was thus invisible until it got inside the city itself, a very important matter when we consider how liable Rome was, in these early times, to hostile attacks.

It was soon found that more water was required than was brought by this aqueduct, and it was no doubt considered desirable to have tanks at a higher level in the City than those supplied by the Appian aqueduct. It was determined, therefore, to bring water from a greater height and from a greater distance, and the River Anio, above the falls at Tivoli, was selected for this purpose. The second aqueduct, the Anio Vetus, was no less than forty-two miles in length, and was, like the Appian, entirely under the surface of the ground except at its entrance into Rome at a point about 60 ft. higher than the level of the Appian aqueduct.

Little search has been made for the remains of this aqueduct, and its exact course is not known, but during my examination of the remains of the subsequent aqueducts, at a place called the Porta Furba, near Rome, where the ruins of five aqueducts are seen together, and at, or close to, which point the Anio Vetus must also have passed underground, I was rewarded for my search by discovering a hole, something like a fox's hole, leading into the ground, and on clearing away a few loose stones which had, apparently, been thrown into it, and patting my arm in, I found that it led into the specus, or channel, of an underground aqueduct; and, on relating this incident to the late Mr. John Henry Parker, the antiquary, who was then in Rome, and showing him a sketch of the place, he said that he had no doubt that I had been fortunate enough to discover the exact position of the veritable Anio Vetus at that spot.

These two aqueducts sufficed for the supply of Rome with water for about 120 years, for Frontinus tells us that 127 years after the date at which the construction of the Anio Vetus was undertaken,—that is to say, in the 608th year after the foundation of the city,—the increase of the city necessitated a more ample supply of water, and it was determined to bring it from a still greater distance. It was no longer considered necessary to conceal the aqueduct underground during the whole of its course, and so it was, in part, carried above ground on embankments or supported upon arches of masonry. The water was brought from some pools in one of the valleys on the eastern side of the Anio, some miles further up than the point from which the Anio Vetus was supplied; and the new aqueduct, which was fifty-four miles in length, was called the Marcian, after the Emperor Marcus to whom the work was entrusted. Frontinus also tells us the history of the other six aqueducts which were in existence in his time, viz., the Tepulan, the Julian, the Virgo, the Alsietine or Augustan, the Claudian, and the Anio Novus,—the last two being commenced by the Emperor Caligula and finished by Claudius, because "seven aqueducts seemed scarcely sufficient for public purposes and private amusements"; but it is not necessary for our purpose to give any detailed account of the course of these aqueducts; it is only necessary to mention one or two very interesting points in connexion with them.

\* An address delivered at the Anniversary Meeting of the Sanitary Institute of Great Britain at the Royal Institution, Albemarle-street, July 9th, by Professor W. H. Corfield, M.A., M.D. (Oxon), Hon. Assoc. Inst. Brit. A. Ch.



In order to allow of the deposit of suspended matters, piscines or settling reservoirs were constructed in a very ingenious manner. Each had four compartments, two upper and two lower; the water was conducted into one of the upper compartments, and from this passed probably by what we should call a standing waste or overflow pipe, into the one below; from this it passed (probably through a grating) into the third compartment at the same level, and thence rose through a hole in the roof of this compartment into the fourth, which was above it, and in which, the water, of course, attained the same level as in the first compartment, thence passing on along the aqueduct, having deposited a good deal of its suspended matter in the two lower compartments of the piscine. Arrangements were made by which these two lower compartments could be cleaned out from time to time. The *specus* or channel itself was, of course, constructed of masonry, generally of blocks of stone cemented together, and it was frequently, though not, it would appear, always lined with cement inside. It was roofed over, and ventilating-shafts were constructed at intervals; in order to encourage the aëration of the water irregularities were occasionally introduced in the bed of the channel.

The water supplied by the different aqueducts was of various qualities; thus, for instance, that of the Alisette, which was drawn from a lake about 18 miles from Rome, was of an inferior quality, and was chiefly used to supply a large *nammachia*, or reservoir in which imitation sea-fights were performed: while, on the other hand, the water of the Marcian was very clear and good, and was therefore used for domestic purposes.

Frontinus gives the most accurate details as to the measurements of the amount of water supplied by the various aqueducts, and the quantities used for different purposes. From these details Mr. Parker computes the sectional area of the water at about 120 square feet, and says "We can form some opinion of the vast quantity if we picture to ourselves a stream, 20 ft. wide by 6 ft. deep, constantly pouring into Rome at a fall six times as rapid as that of the River Thames." He considers that the amount was equivalent to about 332 million gallons a day or 332 gallons per head per day, assuming the population of the city to be a million.

When we consider that we in London have only thirty gallons a head daily and that many other towns have less, we get some idea of the profusion with which water was supplied to ancient Rome.

But the remains of Roman aqueducts are not only to be found near Rome. Almost every Roman city, whether in Italy or in the South of France or along the north coast of Africa, can show the remains of its aqueduct, and almost the only things that are to be seen on the site of Carthage are the remains of the Roman water-tanks and the ruins of the aqueduct which supplied them.

The most beautiful aqueduct bridge in the world, on the course of the aqueduct which supplied the ancient Nemausus, now Nîmes, still stands, and is called from the name of the department in which it is, the Pont du Gard. It consists of a row of large arches crossing the valley, over which the water had to be carried, surmounted by a series of smaller arches, and these again by a third series of still smaller ones, carrying the *specus* of the aqueduct. This splendid bridge still stands perfect, so that one can walk through the channel along which the water flowed, and it might be again used for its original purpose.

There was, however, one city which, from the fact that a great part of it was situated upon a hill, was more difficult to supply with water than any of the rest, and which at the same time, from its size, its great importance, and the fact that it was the favourite summer residence of several of the Roman Emperors, and notably of Claudius, who was born there, and who had a palace on the top of the hill, must of necessity be supplied with plenty of water, and that, too, from a considerable height. I refer to Lugdunum (now Lyons), then the capital of southern Gaul.

A somewhat prolonged residence in this city on two different occasions gave me the opportunity of examining on the spot the remains of the aqueducts constructed there by the ancient Romans, and more especially of the one constructed by the Emperor Claudius, and so, as they are but little known, although by far the most remarkable of the Roman waterworks, I

have thought that it would not be uninteresting to you if I were to give, with the aid of the diagrams I have prepared, a somewhat detailed account of them.

The city of Lugdunum was built by Lucius Munatius Plancus by order of the Senate in A.U.C. 711. Augustus went there in A.U.C. 738, and afterwards lived there from 741 to 744. It was he who raised it to a very high rank among Roman cities. It had its forum near the top of the hill now called Fourvières (probably a corruption of *forum vetus*), an imperial palace on the summit of the same hill, public baths, an amphitheatre, a circus, and temples.

In order to supply this city with water, standing, as it did, on the side of a hill at the junction of two great rivers (now Rhône and Saône), it was necessary to search for a source at a sufficient height, and this Plancus found in the hills of Mont d'Or, near Lyons, where a plentiful supply of water was found at a sufficient height, viz., that of nearly 2,000 ft. above the sea. From this point an aqueduct, sometimes called from its source the Aqueduct of Mont d'Or, and sometimes the Aqueduct of Ecully, from the name of a large plain which it crossed, was constructed, or, rather, two subterranean aqueducts were made and joined together into one, which crossed the plain of Ecully in a straight line still underground; but the ground around Lyons was not like the Campagna near Rome, and it was necessary to cross the broad and deep valley now called La Grange Blanche. This, however, did not daunt the Roman engineers; making the aqueduct end in a reservoir on one side of the valley, they carried the water down into the valley probably by means of leaden pipes, in the manner which will be described more at length further on, across the stream at the bottom of the valley, by means of an aqueduct bridge, 650 ft. long, 75 ft. high, and 25 ft. 6 in. broad, and up the other side into another reservoir, from which the aqueduct was continued along the top of a long series of arches to the reservoir in the city after a course of about ten miles.

In the time of Augustus, however, it was found that the water brought by this aqueduct was not sufficient, especially in summer, and as there was a large Roman camp, which also required to be supplied with water, situated at a short distance from the city, it was determined to construct a second aqueduct. For this purpose the springs at the head of a small river, called now the Brevonne, were tapped and conveyed by means of an underground aqueduct (known as the aqueduct of the Brevonne), which wound round the heads of the valleys, and after a course of about thirty miles is believed by some to have arrived at the city, but by others to have been constructed exclusively for its supply. I have here a diagram (after Flachéron) showing a section of this aqueduct, and this will give a very good general idea of the section of a Roman aqueduct where constructed underground. It will be seen that the *specus* or channel is 60 centimètres (or nearly 2 ft.) wide, and 1 m. 57 c. (or a little over 6 ft.) high, and that it is lined with a layer of 3 c. (or nearly 1½ in.) of cement. It is constructed of quadrangular blocks of stone cemented together, and has an arched stone roof. It will be noticed also that the angles at the lower part of the channel on each side are filled up with cement; it appears also that this aqueduct crossed a small valley by means of inverted siphons.

But neither of these aqueducts came from a source sufficiently high to supply the imperial palace on the top of Fourvières. Their sources are, in fact, according to Flachéron, at a height of nearly 50 ft. below the summit of Fourvières, and it was, therefore, considered necessary by the Emperor Claudius to construct a third aqueduct. The sources of the stream now called the Gier, at the foot of Mont Pilâ, about a mile and a half above St. Chamond, were chosen for this purpose, and, from this point to the summit of Fourvières, was constructed by far the most remarkable aqueduct of ancient times—an engineering work which, as will be seen from the following description, partly taken from Montfalcon's "History of Lyons," partly from Flachéron's account of this aqueduct, and partly from my own observations on the spot, reflects the greatest possible credit on the Roman engineers, and shows that they were not, as has been frequently supposed by those

who have only examined aqueducts at Rome, by any means ignorant of the elementary principles of hydraulics.

To tap the sources of a river at a point over fifty miles from the city, and to bring the water across a most irregular country, crossing ten or twelve valleys, one being over 800 ft. deep and about two-thirds of a mile in width, was no easy task; but that it was performed the remains of the aqueduct at various parts of its course show clearly enough. It commences, as I have said, about a mile and a half from the present St. Chamond, a town on the river Gier, about sixteen miles from St. Etienne. Here a dam appears to have been constructed across the bed of the river, forming a lake from which the water entered the channel of the aqueduct, which passed along underground, until it came to a small stream, which it crossed by a bridge, long since destroyed. After this it again became subterranean for a time, and then crossed another stream on a bridge of nine arches, the ruins of some of the columns of which are still to be seen, and from these ruins it would appear that the bridge had, at some time or other, been destroyed, probably by the stream running under it having become torrential, and subsequently rebuilt; again it became concealed underground to reappear in crossing a small valley and another small stream, when it was again concealed by the ground, and in one or two places channels were even cut for it through the solid rock, after which it reappeared on the surface at a point where now stands the village of Terre-Noire, and where it was necessary that it should somehow or other cross a broad and deep valley. It ended in a stone reservoir, from which eight leaden pipes, descending into the valley, were carried across the stream at the bottom on an aqueduct bridge, about 25 ft. wide, and supported by twelve or thirteen arches, and then mounted the other side of the valley into another reservoir, of which scarcely any remains are now seen, from which the aqueduct started again, disappearing almost immediately under the surface of the ground to appear again from time to time crossing similar valleys and streams upon bridges, the remains of some of which may still be seen until it reached Soucieu, on the edge of the valley of the Garon, where are still seen the remains of a splendid bridge, the thirteenth on its course, nearly 1,600 ft. long, and attaining a height of 56 ft. at its highest point above the ground. The object of this bridge was to convey the channel of the aqueduct at a sufficient height into a reservoir on the edge of the valley. The remains of this bridge leave no doubt that it was purposely destroyed by barbarians; some of the arches near the end of it remain, while the rest have been thrown down, some on one side and some on the other, but happily the arches next to the reservoir, at the end of the bridge and on the edge of the valley, remain, and the reservoir itself is still in part intact supported on a huge mass of masonry. Four holes are to be seen in that part of the front of the reservoir which is left, being the holes from which the lead pipes descended into the valley. It would appear from the remains of the reservoir that there must have been nine of these pipes in all. These holes are elliptical in shape, being 12 in. high by 9½ in. wide, and the interior of the reservoir is still seen to be covered with cement. The walls of the reservoir were about 2 ft. 7 in. thick, and were strengthened by ties of iron; it had an arched stone roof, in which there was an opening for access. From this the nine lead pipes descended the side of the valley supported on a construction of masonry, crossed the river by an aqueduct bridge, and ascended into another reservoir on the other side, as seen on the plan, entering this reservoir at its upper part just below the spring of the arches of the roof. From this reservoir the aqueduct passed to the next on the edge of the large and deep valley of Bonnan, being underground twice and having three bridges on its course, the last of which, the sixteenth on the course of the aqueduct, ends in a reservoir on the edge of the valley. Only one of the openings by which the siphons, of which there were probably ten, started from the reservoir is now left. The bridge across the valley below, and of which I have here a photograph and some engravings, had thirty arches, and was about 880 ft. long by 24 ft. wide.

A number of the arches still remain standing, and, as will be seen by the photograph, in some instances, the pillars of the arches were con-



structed of transverse arches themselves. The work consisted of concrete formed with Roman cement, so hard that it turns the points of pickaxes when employed against it, with layers of tiles at regular intervals. The surface of the concrete is covered with small cubical blocks of stone, placed so that their diagonals are horizontal and vertical, and forming what is known as *opus reticulatum*. After crossing the bridge the pipes were carried up the other side of the valley into a reservoir, of which little remains, and then the aqueduct was continued to the next valley, passing over three bridges in its course.

This valley, that of St. Irénée, is much smaller than either of the others, but, nevertheless, it was deep enough to necessitate the construction of inverted syphons, of which there were eight.

Leaving the reservoir on the other side of this valley, the aqueduct was carried on a long bridge,—the twentieth on its course,—which crossed the plateau on the top of Fourvières, and opened into a large reservoir, the remains of which are still to be seen on the top of that hill. From this reservoir, which was 77 ft. long and 51 ft. wide, pipes of lead conveyed the water to the Imperial Palace, and to the other buildings near the top of the hill. Some of these leaden pipes were found in a vineyard near the top of Fourvières at the beginning of the eighteenth century, and were described by Colonia in his "History of Lyons." They are made of thick sheet lead, rolled round so as to form a tube, with the edges of the sheet turned upwards, and applied to one another in such a way as to leave a small space, as shown in the diagram, which was probably filled with some kind of cement. These pipes, of which it is said that twenty or thirty, each from 15 ft. to 20 ft. long, were found, were marked with the initial letters, "T. CL. CAES." (Tiberius Claudius Caesar), and afford positive evidence that the work was carried out under the Emperor Claudius. Lead pipes, constructed in a similar manner, have also been found at Bath, in this country, in connexion with the Roman baths.

It will be seen at once that the great difference between this aqueduct and those near Rome arises from the fact that instead of being carried across a nearly flat country, it was carried across one intersected with deep ravines, and that it was therefore necessary to have recourse to the system of inverted syphons. There can be no doubt that the inverted syphons were made of lead, although no remains of them have been found, for we know that the Romans used lead largely, and, as we have seen, pieces of the leaden distribution pipes have been found. It is possible, and even likely, that strong cords of hemp were wound round the pipes forming the syphons, as is related by Delorme in describing a similar Roman aqueduct syphon near Constantinople. Delorme also describes, in the aqueduct last mentioned, a pipe for the escape of air from the lowest part of the syphon carried up against a tower which was higher than the aqueduct; and it is certain that there must have been some such contrivance on the syphons of the aqueduct at Lyons. Fluchéron supposes that they consisted of small pipes carried from the lowest part of the syphons up along the side of the valley and above the reservoirs, or in some instances of taps fixed at the lowest part of the syphons.

The Romans have been blamed for not using inverted syphons in the aqueducts at Rome, and it has been said that this is a sufficient proof that they did not understand the simplest principles of hydraulics; but the remains of the aqueducts at Lyons, which I have been describing, negative this assumption altogether. The Romans were not so foolish as to construct underground syphons many miles long for the supply of Rome, but where it was necessary to construct them for the purpose of crossing deep valleys they did so. The same Emperor Claudius, who built the aqueduct at Rome known by his name, built the aqueduct of Mont Pila at Lyons, and it is quite clear, therefore, that his engineers were practically well acquainted with the principles of hydraulics.

It is thus seen that the ancient Romans spared no pains to obtain a supply of pure water for their cities, and I think it is high time that we followed their example and went to the trouble and expense of obtaining drinking-water from unimpeachable sources instead of, as is too often the case, taking water which we know perfectly well has been polluted and then attempting to purify it for domestic purposes.

## Illustrations.

### OFFICES OF THE COMMERCIAL UNION ASSURANCE COMPANY, DUBLIN.

**W**E give this week an illustration of this building, which has been erected at the corner of College-green and Grafton-street, Dublin, from the designs of Messrs. T. N. Deane & Son, at a cost of 5,644*l.* It was commenced in September, 1879, and completed in April, 1881. The material principally used externally was yellow Mansfield stone. The contractors were Messrs. Wardrop & Son, of Dublin.

As will be seen, the building forms one of the now more and more rare examples of modern Gothic applied to secular buildings, and in that respect is a good specimen of its class, solid and unpretentious in style and detail.

### ALTO-RELIEF PANEL BY MR. TINWORTH.

This panel, which is entitled "Waiting for the Head of John the Baptist," forms one of the examples of Mr. Tinworth's art now being exhibited at Messrs. Doulton's. As in most of Mr. Tinworth's treatments of Scriptural subjects, there is a strong realism and dramatic contrast in the figures. The grief of Herod is contrasted with the callous and critical humour of the daughter of Herodias; the remainder of the company make their various comments, the nature of which may be gathered from their varied expressions; the monkey takes advantage of the pre-occupation of the whole party to make free with the contents of the vase standing by the table.

### GOWEN'S WALK FREE SCHOOLS, RUPERT STREET, WHITECHAPEL.

THESE schools were founded by Mr. W. Davis of Leytonstone, whose connexion with Whitechapel through the sugar-refinery he had in the neighbourhood brought before him the immense difficulties which existed at that date (1808), before a sound useful education was possible to the very poor people living in that district.

Himself an ardent churchman, he erected two conditions before receiving children into his school: the one was the poverty of the parents; the other, willingness to attend the Sunday services of the Parish Church of St. Mary, Whitechapel.

In those days when there was little or no education for the poorer classes, this, freely offered, was an incalculable boon, greatly appreciated, and greatly repaid to the founder in the success of many of the scholars.

From 1808 to 1854 (the year of his death) these schools were under Mr. Davis's personal supervision; he attached to them a printing-press, which served the double purpose of greatly lightening the expense, and of training such boys who cared to learn, to follow the business of printing.

The girls were brought up to the use of the needle, and employed in making clothes for themselves and the boys, which were given gratuitously to those whose conduct was exceptionally good.

Seven trustees were appointed, and the school has always remained in the hands of Mr. Davis's immediate family; the Rector of Whitechapel, in virtue of his office, being the only trustee appointed unconnected with the founder.

The recent purchase of the original schools and site by the London, Tilbury, and Southern Railway Company, has made it compulsory on the trustees to buy other ground; but the original intentions of the founder have been adhered to, and the school has been re-erected in the same parish.

The arrangement on plan is as follows:—on the right of the main entrance, and facing Lambeth-street, is the residence of the superintendent and schoolmistress, connected on the ground-floor with the printing house. On the left, and extended backwards to Rupert-street, are the schools, to hold 184 children, with cloak-rooms, &c. The entrances for the two sexes being kept separate and accessible from their respective covered playgrounds, which extend under both school and cloak-rooms, the playground level being some 6 ft. below Rupert-street, the boys' entrance being from that side; the girls' entrance from Lambeth-

street. The space below printing-house is devoted in part to a dining-room for the children. The whole is faced with stock, wired brick dressings. Messrs. Kirk & Randall of Woolwich, are the contractors. The carvings have been executed by Messrs. Earp, of Lambeth. Mr. Ernest C. Lee is the architect.

### KUDAT CHURCH.

THIS was designed for the British North Borneo Company's settlement at Kudat. The construction had to be simple, and the material also such as could be easily obtained on the spot. The walls up to the top of the plinth are of brickwork faced with cement, as also are the angle buttresses, and the lower portion of the tower; with these exceptions, the superstructure is formed entirely of "Bilan," a very hard and durable wood, well suited for the framing of the walls and roof, and for filling up and covering the same. The entire area of the floor is filled up solid and paved, so as to allow no harbour for reptiles. The architect was Mr. W. Kidner.

### SECTION AND PLANS OF SIR C. BARRY'S COMPLETION OF WESTMINSTER PALACE.

**W**E give this week a section through Westminster Hall and the new wing which Sir Charles Barry proposed, in order to complete the quadrangle west of Westminster Hall, and also plan of his two schemes marked A and B. Scheme A, as shown in the lithographed section and in the engraved plan on a separate page, provides only one range of rooms in the new wing, with a corridor towards the Westminster Hall Court; scheme B provides a double range of rooms, but at the cost of somewhat unduly narrowing the courtyard. The modification made by Mr. C. Barry consists mainly, as far as the plan is concerned, in turning the line of it a little inward or eastward at the southern end, so as to allow more room for the roadway between the new building and St. Margaret's Church.

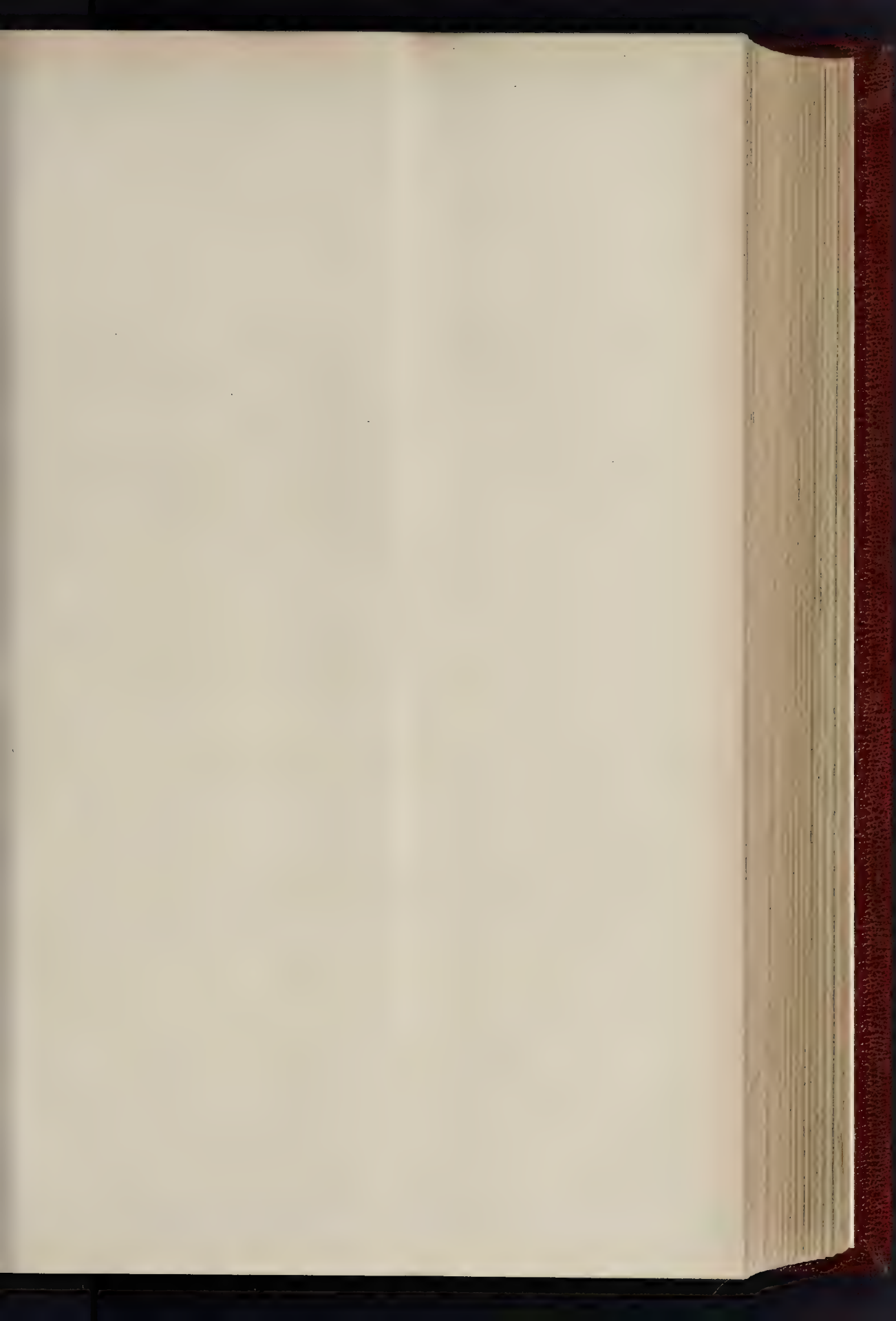
In reference to statements which have been circulated to the prejudice of the completion of Sir C. Barry's design, it will be observed that these plans show (1) that the new wing would not interfere with the light to Westminster Hall (which, besides, is more lighted by the end windows than by the side ones); (2) that it does not, as a matter of fact, necessitate the removal of any of the Westminster Hall buttresses, though it is probable that Sir C. Barry would have troubled himself very little about that one way or another; (3) that it does not necessitate the removal of St. Margaret's Church; and (4) that so far from narrowing the roadway adjoining St. Margaret's Church, the roadway shown on these plans is wider than there has ever been there yet. At the southern extremity of the new wing, on the lithographed plan, is shown by a dotted line the present footpath curb line, giving a width to the roadway of 37 ft. 3 in. at its narrowest part; while the completed building will leave the roadway 58 ft. wide at its narrowest part. "We hope here be truths."

### Australia and the British Unemployed.

There can be no greater mistake than that of shipping large numbers of people to New South Wales and other Australian Colonies simply because they cannot find employment here.

It is like jumping out of the frying-pan into the fire. It is not increased town population, but increased country population which is required; and of the thousands who are hopelessly seeking work in our great industrial centres, how many are familiar with the routine of agricultural or pastoral life? Now South Wales is not yet a great manufacturing country; most of its leading industrial establishments are on a modest scale compared with those of the United Kingdom; consequently those accustomed to labour in the workshop or factory should obtain assurance of employment before taking a passage to Sydney. Handy men, who can do work on their own accounts, such as tinsmiths, blacksmiths, carpenters, brickmakers, masons, and so on, who are willing to settle in the younger townships of the colony, can always do well, although at first they may have to "rough it" until the necessary experience has been acquired.—*Australian information for British Emigrants.*









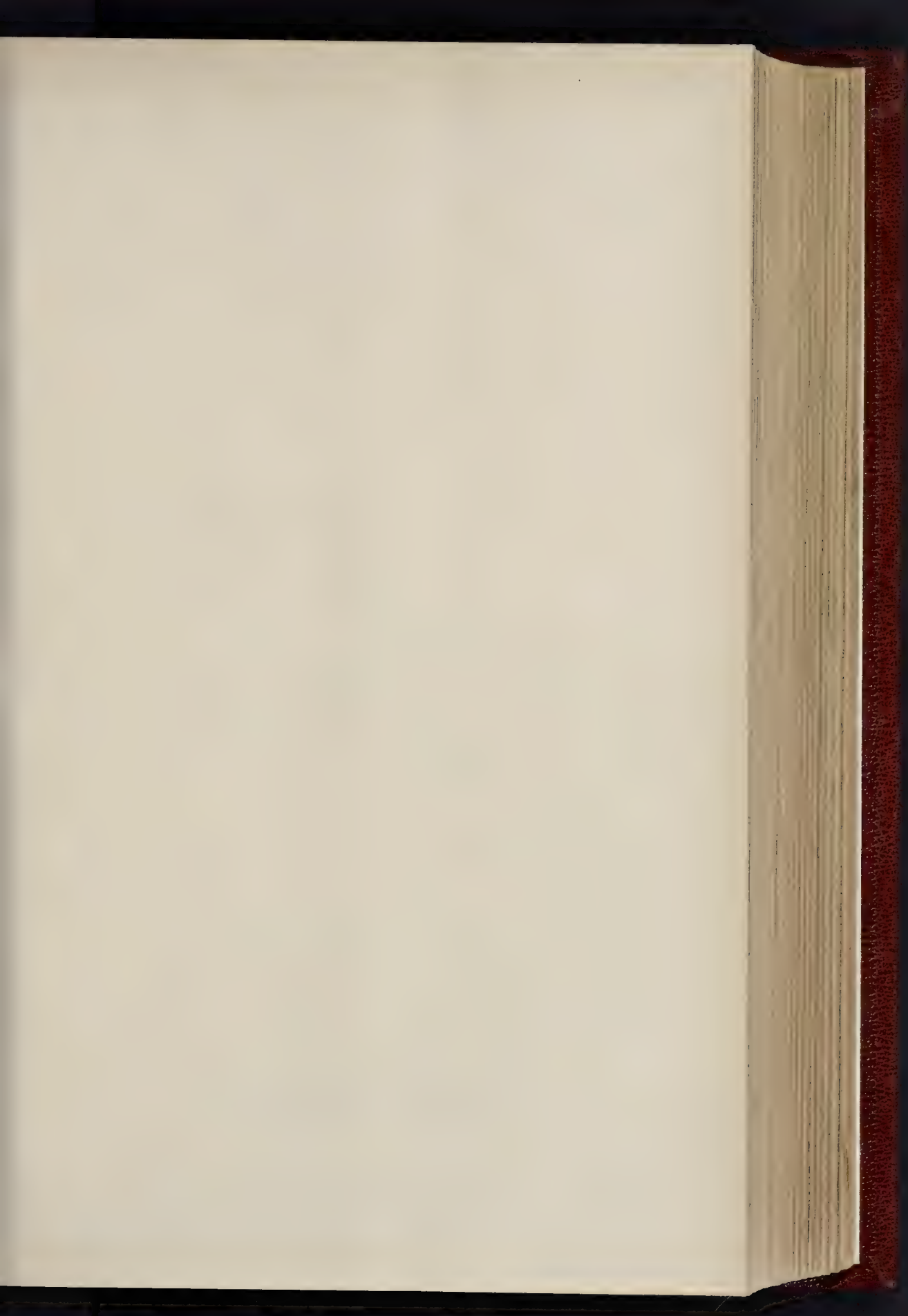
1885.



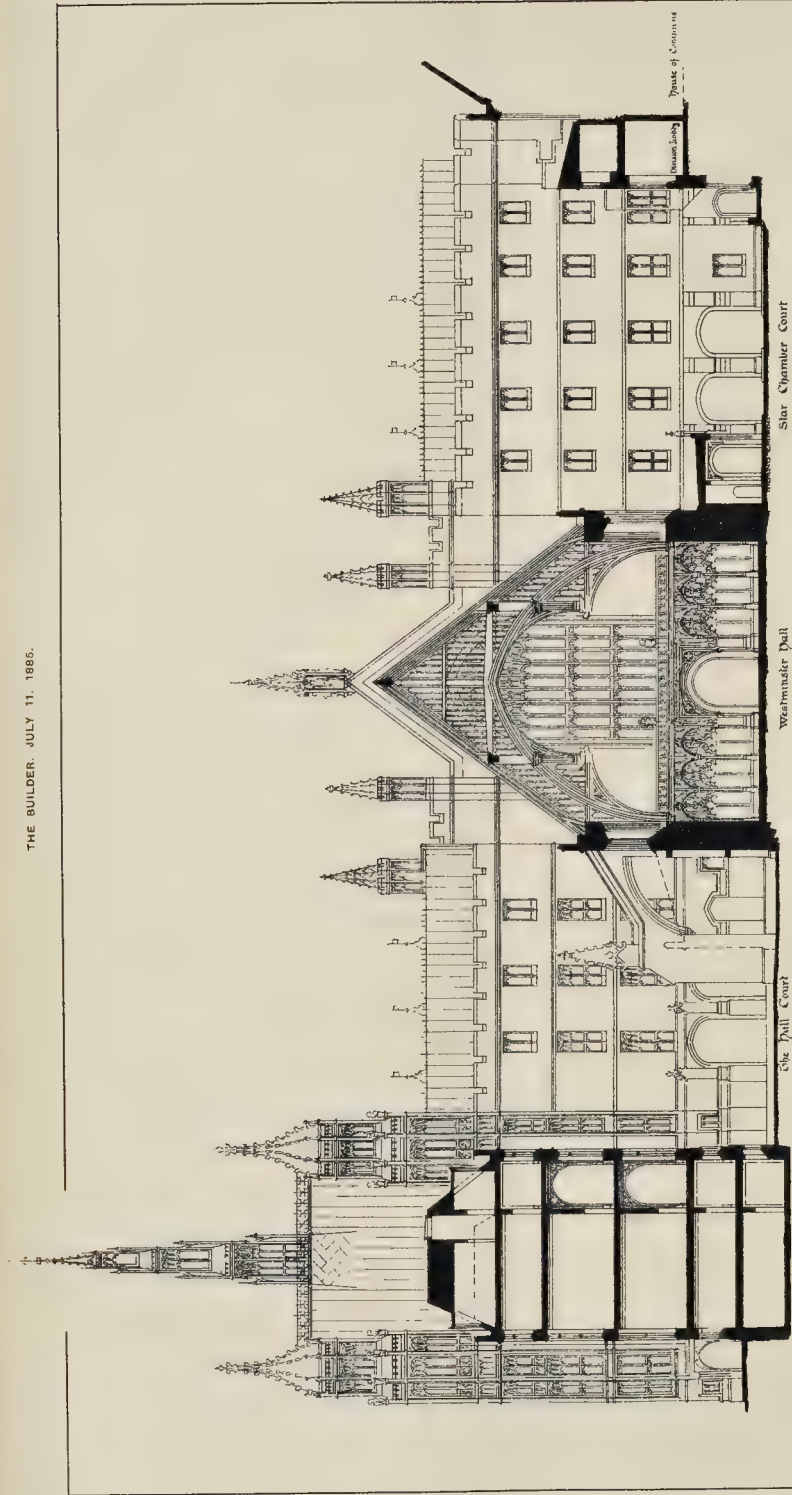
RA-COTTA,  
ULPTOR







THE BUILDER. JULY 11. 1885.

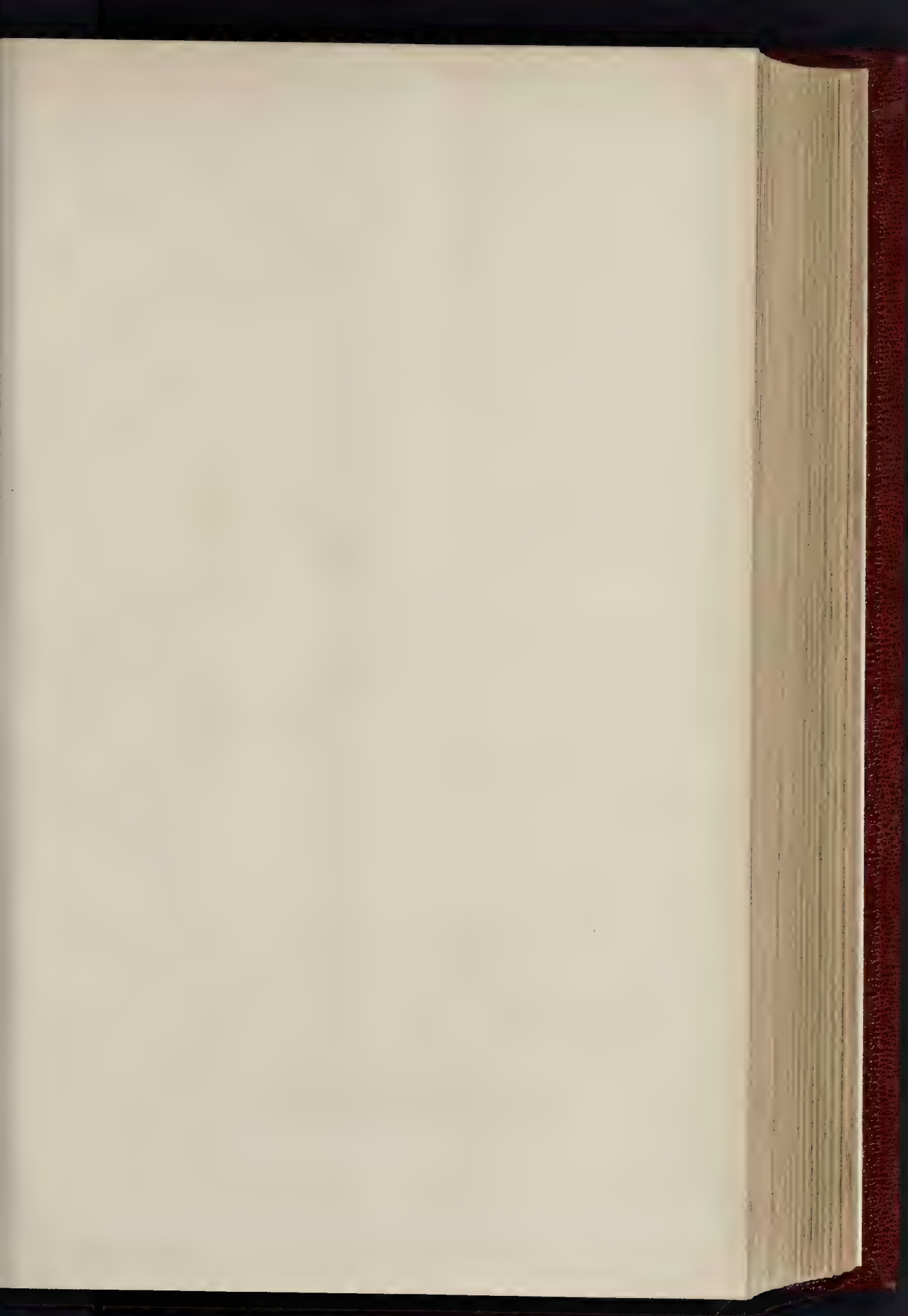


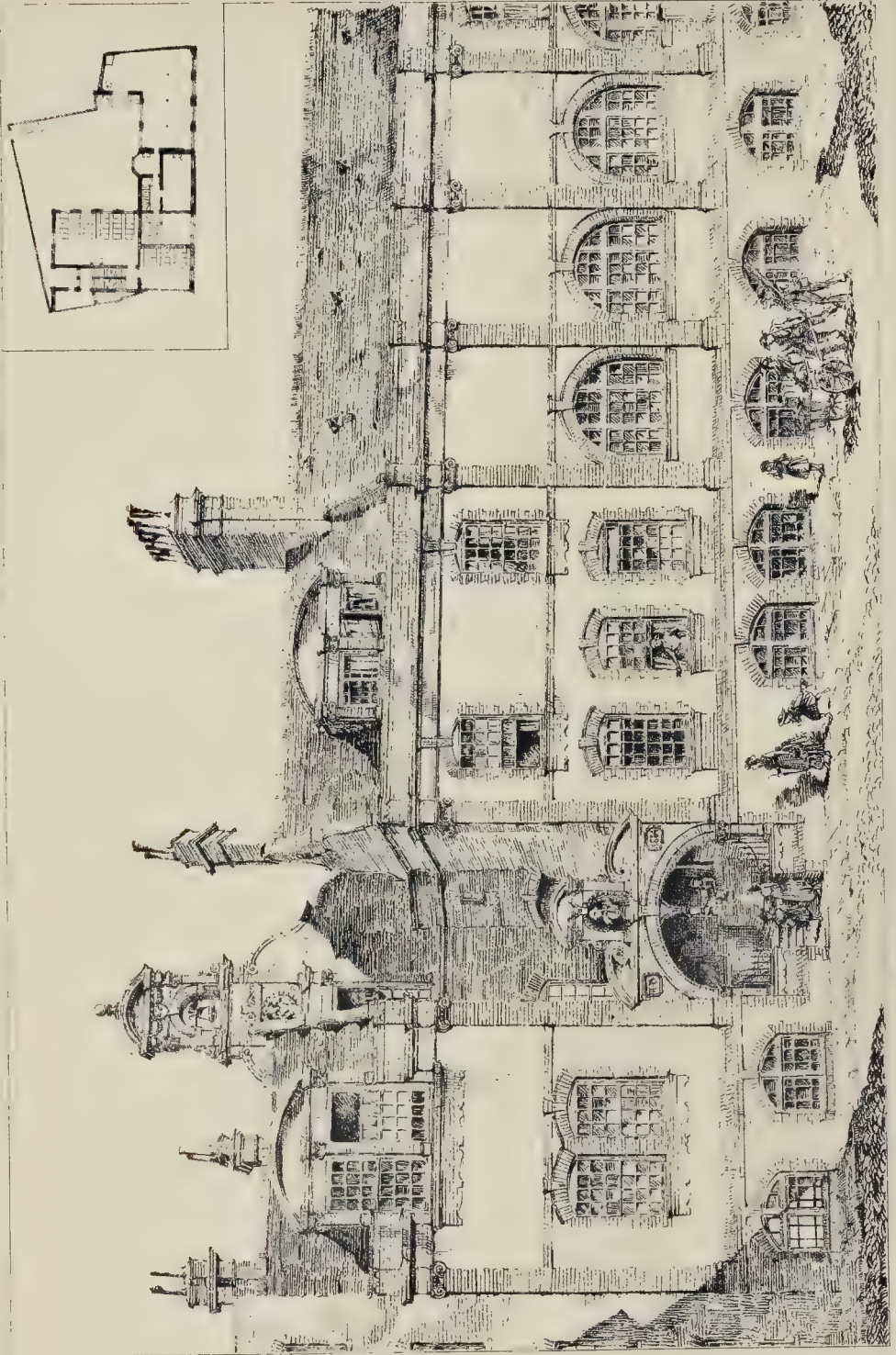
SECTION LOOKING NORTH—SCHEME A.

Scale of 10 feet 0 10 20 30 40 50 60 70 80 90 100 110 120 feet

(For plan of this Scheme see separate engraving.)







GOWER'S WALK FREE SCHOOLS, RUPERT STREET, WHITECHAPEL.

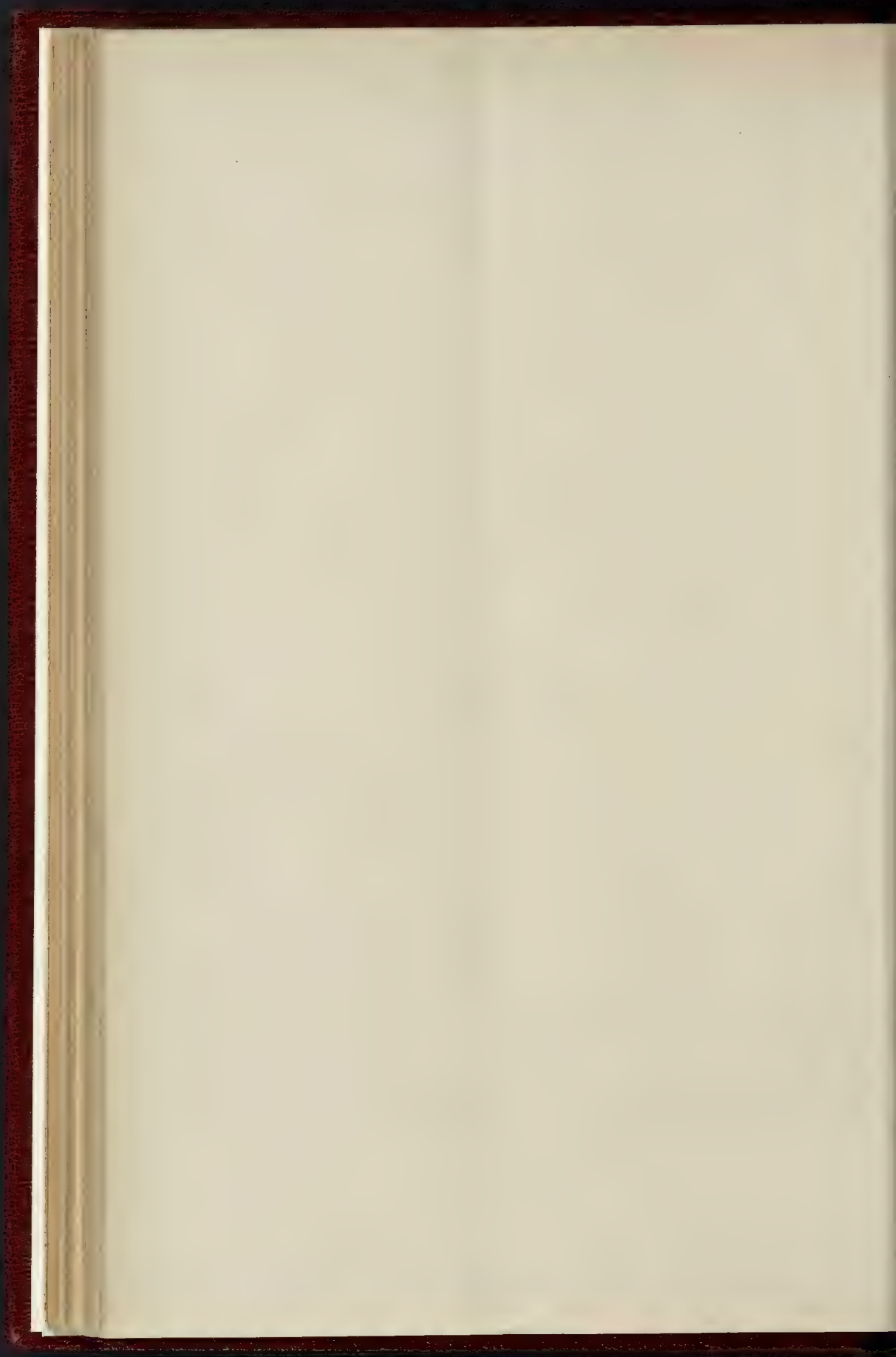




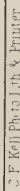
PHOTO SPRAGUE & CO. LONDON

CHURCH FOR THE BRITISH NORTH BORNEO COMPANY'S SETTLEMENT, KUDAT.

MR. W. KIDNER, F.R.I.B.A., ARCHITECT.





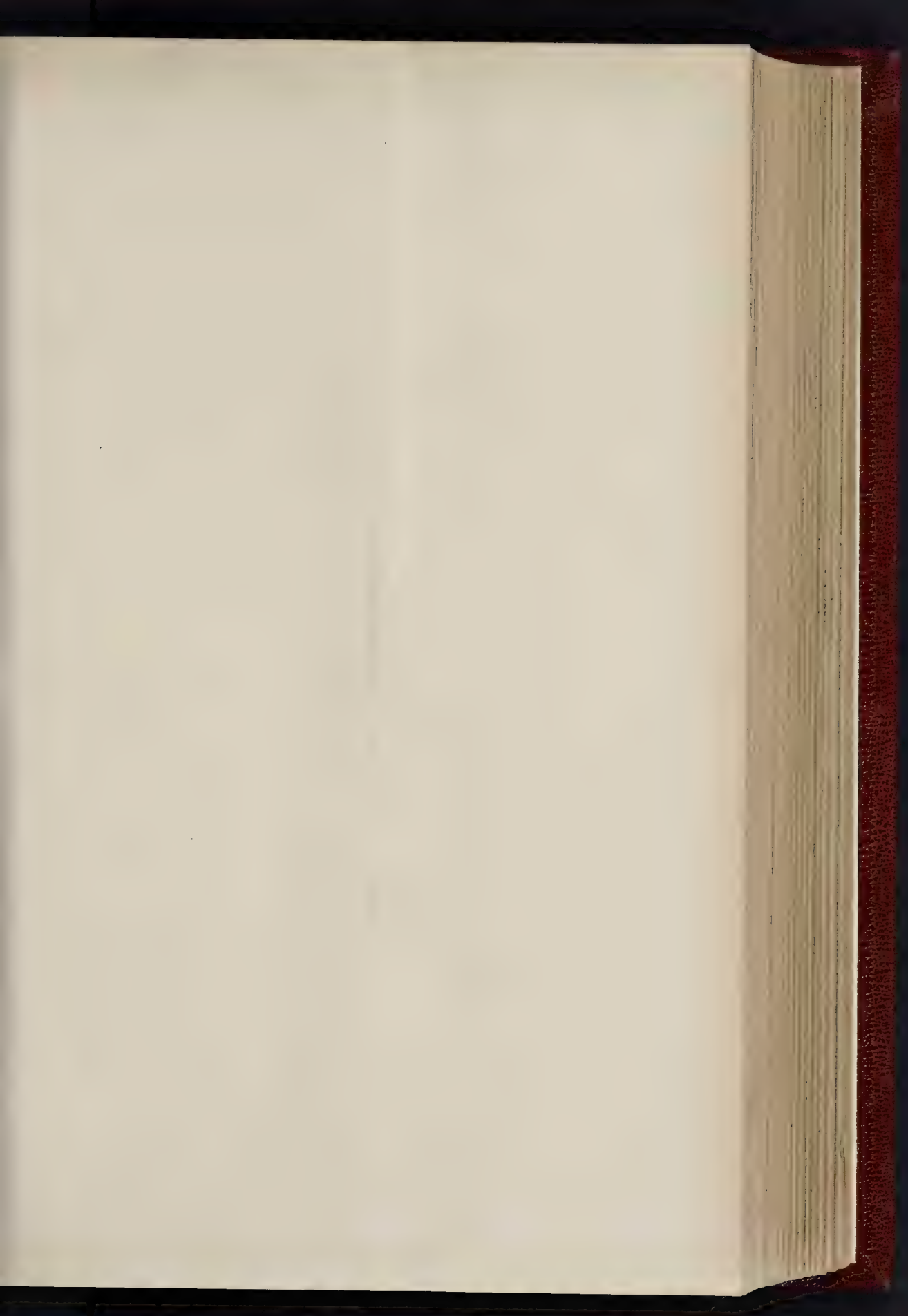


SIR C. BARRY'S PLANS FOR THE COMPLETION OF WESTMINSTER PALACE, AS MODIFIED BY MR C. BARRY.

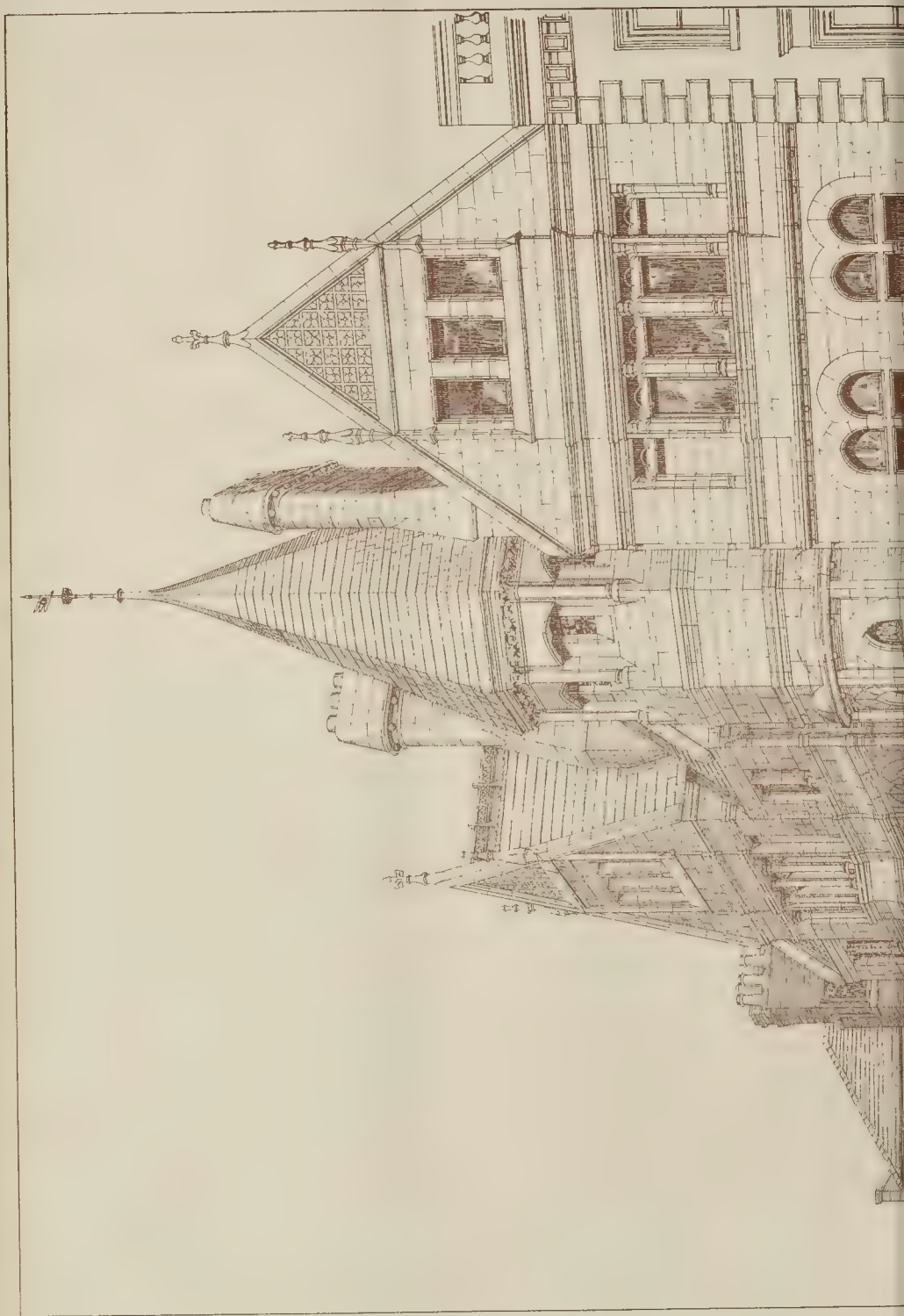
8 Castle St. Holborn, London, E.C.



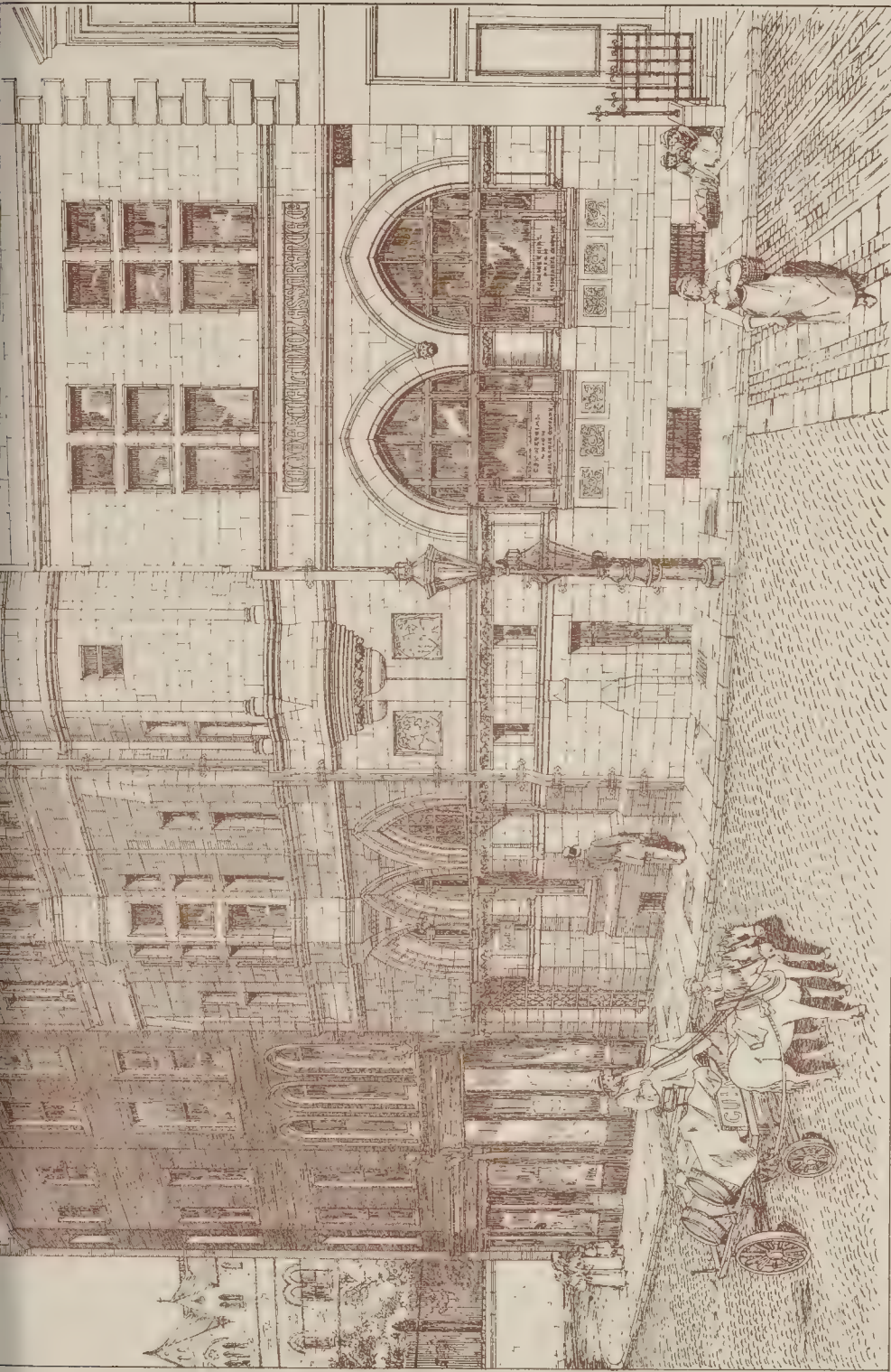




THE BUILDER. JULY 11, 1885







W. K. P. 191 to 191 & 191

BUILDINGS FOR THE COMMERCIAL UNION ASSURANCE COMPANY, COLLEGE GREEN, DUBLIN.

MESSES T. N. DEANE & SONS ARCHITECTS

W. K. P. 191 to 191 & 191







SIR C. BARRY'S PLANS FOR THE COMPLETION OF WESTMINSTER PALACE, AS MODIFIED BY MR. C. BARRY. PLAN OF SCHEME A. (For Section, see Lithographed Plate.)

## TREATMENT OF WESTMINSTER HALL.

SIR,—Referring to your comments on and conclusions from the detailed evidence now published, which was tendered to the Committee of the House of Commons, I cannot help remarking on the omission by the Committee to publish with the other plans and documents the special plan handed in by me to show the effect of carrying out my father's proposals in respect of buildings both on the west-side of Westminster Hall and for the enclosure of New Palace Yard also with buildings.

The Committee in their Report allude to the necessity of considering the proposals and plans of Sir Charles Barry, but they do not afford the Members of the House any opportunity of forming a judgment upon them, which seems to me to be somewhat unfair.

The plan I handed in to the Committee was prepared at the special request of some of its members, and it was really necessary to be given for several reasons.

1. It is needed to illustrate the evidence I gave and the estimate I also gave dividing Sir Charles Barry's proposal into two distinct portions. See p. 165 of the "Report and Evidence" (paper handed in by the Chairman, but which was given by me).

2. It will make the evidence and suggestions given by the Right Hon. Mr. Ayrton (late First Commissioner of Works) intelligible, and, as I think, convincing as regards the treatment of Westminster Hall.

3. It will dispose of the objection suggested by the Chairman that if Sir Charles Barry's plan were carried out there would be very damaging interference with light and air to the windows in the west side of Westminster Hall.

4. It would also show that not only is there no connexion between the realisation of Sir Charles Barry's plan and the removal of St. Margaret's Church, as is unfairly inferred in the report, but that while the church can remain as it is, the roadway accommodation can be made much better than at present.

5. It would have been only fair to the memory of my father to have kept on record his proposals for the completion of his great building (accepted by the nation, as Mr. Ayrton very properly says), even if those proposals are to be held in abeyance, and, still more, if they are to be permanently disregarded.

All these obvious reasons for appending my plan may perhaps explain why it was not given, as the Committee, at the instigation of its Chairman, seems to have been determined to give consideration to my father's proposals nominally only and not seriously, since a foregone conclusion had somehow to be reached, if possible, viz., the recommendation of Mr. Pearson's proposals and design.

CHARLES BARRY.

1, Westminster-chambers,  
July 6th, 1885.

P.S.—I send you herewith the plan which was prepared for the Committee (above alluded to), and which has been returned to me without comment.

## THE HISTORY OF THE FUNGUS KNOWN AS DRY ROT.

The dissolution of wood by dry-rot has been attributed to the action of *Merulius lacrymans*, which is very common in Germany in connexion with new buildings, but rarely with old.

The *Merulius lacrymans* is the common wood fungus that destroys nine-tenths of the wood with which we are acquainted. The reason of it being common to new buildings, and not to old, is that moisture, one of the constituents of its existence, is more present in new green buildings than in old dry seasoned ones. The two prime conditions of its existence are moisture and heat; if moisture is present without heat it will not grow, and hence its depredations in the winter time are unknown. If heat is present without moisture it will not grow, and hence ventilation for the passage of a current of dry air will prove fatal to its existence.

As to its original habitat, it is world-wide, for it is associated with our native woods, and with our introduced woods; it is as common to the pine and fir reaching us from Canada and the White Sea as it is in the pine from Savannah and the Southern States of America. Pro-

fessor Poleck says it does not attack the living tree. In this he is certainly in error, for we owe to its action all the hollow trees in our forests. Mature trees are subject to the breaking up of nature in the form of ring, cup, and star shakes. The tap root is destined to decay, and its place is taken by the fox or the coney, lodgment is thus afforded for germs of the *merulius*, the filaments of which ascend the fissures of the ring, cup, and star shakes, and silently work the destruction of the heart of the tree. We have seen this fungus so devolved in the shakes of trees that we could remove it like a thick layer of felt. We have seen it on the highest and driest land in England, where it has ramified through the heart-wood of a large oak tree. We saw such a tree last year that had been felled and cut into planking. On opening the wood it was found so affected that it was laid aside, one plank on another, without strips or laths. The fungus went on growing, filling up the saw quits, and cementing the planks together, and holding them as fast as if glued, so fast that the tree might never have been sawn, for the tree could be rolled on the ground as if in a solid state.

In England this growth is common to all our native woods, and oak, our hardest and most durable wood, is so much a prey to it that our scientists for centuries have given special attention to it with the view of preventing its intrusions in our naval and mercantile marine. To its action our old wooden walls fell a rare and certain prey, and it is not going too far to say that it was the greatest enemy our old wooden vessels ever had.

As to its more special association with deal and pine, that we admit, and here we are introduced to a great mystery in nature. The Baltic and Canadian firs, spruce, and pines are felled in their native forests in the winter season, and sledged to the river banks. They are floated down the rivers on the melting of the snow, and are not taken out of the water until passed through the saw-mills. The deals are cut in summer and stacked to dry. Upon being seasoned they are shipped to this and other countries; but if they are subject to heat and moisture in passage they are alive with the *merulius* or dry-rot. Upon arrival these germs can only attach themselves to the wood at the saw-mills, where the air must be laden therewith. Be this as it may, we have seen whole ship-loads alive with this fungus when the wood has been rained on during shipment, and the vessel has been long on passage.

Again, with goods that have reached our English yards in good condition, if piled too closely and they absorb the rain, the *merulius* makes its appearance in a very pronounced form, to counteract which in the early summer it is usual to re-pile and sweep the goods.

The Canadian pine is so susceptible of dissolution by the agency of this fungus that no two sides of planks can ever be allowed to touch, and must be piled apart.

If the wood remains in good condition in the store-yard until it gets into the constructive parts of buildings, the germ of this fungus will develop itself if heat and moisture are present.

We can hardly agree with those who would attribute the propagation of this fungus to the felling of timber in the spring and early summer, for the custom does not obtain in the forests of the North of Europe or in America. The wood is there all winter felled, and floated in the spring, the only time in the year when the rivers are in flood. In England the wood is all winter felled, with the exception of the oak, which is felled in the spring for the sake of the bark, only removable at this time of the year. So far as the wood is concerned, the practice cannot be defended. The effect is seen in the rapid dissolution of the sap; but whether it is detrimental to the heartwood is an open question.

To preserve by distillations of tar is sound advice,—these oils are poisonous to vegetation in any form, and hence its virtue when injected into the pores of the wood to protect the tissue from dissolution by vegetable or animal agency.

**City of London School of Music.**—The foundation-stone of the new City of London School of Music, on the Victoria Embankment, will be laid on Tuesday, the 21st inst., by Mr. Pearce Morrison, chairman of the Music Committee of the Corporation.—*City Press*.

## NEW TRAPS.

The traps which are being made under the name of the "Cerus" trap (H. Conolly & Co. Agents), two forms of which are here illustrated, though exhibiting no new principle, appear to be very well contrived for efficient working. The grease gully has a removable container for



Fig. 1.—"Cerus" Grease Gully.

dirty and grease, which is more convenient than cleaning out the cavity itself; and, like the trap, it has an air-tight cover removable for cleaning. The trap, fig. 2, aims at a rapid



Fig. 2.—"Cerus" Trap.

wash-down and wash-up; the shape of the section seems adapted to secure this.

## LIABILITIES OF OWNERS OF INSANITARY HOUSES.

SAUNDERS V. PAWLEY.

THIS was an action (heard in the Queen's Bench Division on the 1st inst. before Mr. Justice Day and a special jury) brought to recover damages for an alleged fraudulent misrepresentation as to the sanitary condition of a house at Croydon.

In March of last year the plaintiff (we quote from the *Times* report, correcting the name of the plaintiff, however) was in negotiation with the defendant with a view of becoming tenant of a house in the Auckland-road, Croydon, named Abbottswood. The case for the plaintiff was that on the 19th of that month, the defendant stated to the plaintiff that the house was in a perfect sanitary condition, and that the sanitary arrangements of the house had been carried out under the supervision of the Croydon local authority; that by reason of this statement the plaintiff was induced to agree to take the house for three years at a rent of £80. a year; and that this statement was false, and was made fraudulently. On the 20th of March the plaintiff agreed to take the house. The plaintiff, with his family, went into the house at the end of March, but the house not being completed, he went to the seaside, and on the 15th of May he returned to the house. Shortly after his return his cook, and afterwards his gardener, were taken ill, and subsequently the plaintiff's stepson was seized with illness, and on the 1st of June the plaintiff's wife was seized with purging and vomiting, which resulted in blood-poisoning, from which she died in about a fortnight after her first seizure. Upon examination it appeared that the stoppings of the joints of the soil-pipe, which was outside the house, 2 ft. 10 in. from the front door, was so faulty that sewer gas could escape through them, and that a P-trap, to which it had been intended to connect a rain-water pipe where a conservatory should have been built, had been left without water and broken so that sewer gas could escape. This trap was near the library window, in which room Mrs. Saunders often sat in the morning. It was also found that drain at the back of the house had in it some broken bricks which had stopped it up. After Mrs. Saunders' death the plaintiff removed from the house. He estimated the actual expenses to which he had been put at 2284. 10s. He further claimed damages for the loss of his wife. It appeared that she was possessed of an income of about 1,000*l.* year. She had, however, only a life interest in it. Upon receipt of her income her habit had been to pay it to her husband, who expended it in maintaining the joint establishment. At the time of her death, Mrs. Saunders was sixty years of age, and until her illness had been very healthy. The defendant, who is an architect practising in the City, was the builder of the house. He stated that his representation which he made to the plaintiff was



the sanitary arrangements of the house had been carried out under the supervision of the Croydon Local Authority, and this was the case.

The officials of the Authority were called, and admitted that they had inspected the drainage arrangements of the house upon its completion, and had not seen any objection to any of them, which they would have done if they had not been in a satisfactory condition. It was suggested on behalf of the plaintiff that when the plaintiff's furniture was being taken into the house, the soil-pipe must have given a blow which had loosened the joint.

In answer to questions put to them by his Lordship, the jury found that the defendant did make representation alleged as to the condition of the house; that it was false and fraudulent; that the plaintiff was induced by it to take the house; and that it was on account of defects in the drainage arrangements that Mrs. Saunders died. They assessed the damages sustained by the plaintiff in the loss of his wife at 2,000*l.*, and his expenses the amount claimed.

Judgment was accordingly entered for the plaintiff for 2,000*l.*

The Lordship also directed that the agreement should be rescinded.

#### DRY-ROT IN FLOORS.

SIR,—I should be glad of some information as to how to check the spread of dry-rot in a floor. The room in question is composed of 7 in. by 2½ in. joists, laid flatways on bond timber on sleeper rails, and the floor to ground about 8 ft. though there is plenty of ventilation, rot has come into the battens about half way through. Can it be effectually stopped by applying any solution coat of tar, and in doing so would it prevent the making any further progress after the application? Any suggestion will be gladly received.

INQUIRER.

#### A QUESTION OF BUILDING LAW.

SIR,—Will you kindly say what is the right interpretation of the following case, which is ruled by Public Health Act 188 & 39 Vict., c. 55, part 2, sec. 160?

"It shall not be lawful in any urban district, without the written consent of the urban authority, to put forward any house or building forming part of any street, or any part thereof beyond the front of the house or building on either side thereof, to build any addition thereto beyond the front of the house or building on either side of the same." This clause is incorporated in the By-laws of the Building Regulations of our Corporation, with the following alteration only, viz., "Local Board" in place of "Urban Authority."

The following illustration will show the ruling of the Corporation as to the meaning of the clause. An estate is laid out into building land, streets formed (not less than 16 yards wide) with no building lines shown or stipulated. A portion is sold, and the purchaser, for his own convenience, backs the front of the building some distance from the street line; our Corporation then says that, as one side building (on either side thereof) upon the house or building on either side of the building, this backs to the same frontage-line as the first one built.

Is this the correct meaning of the clause, it is a very serious question for all owners and purchasers, and, &c.

Is this not the correct meaning, would you, or one of your correspondents, give me a case that has been tried on the subject?

In answering this, you will confer a favour upon architects practising in this town.

WILLIAM LONGLEY,  
Architect, Bradford.

\* The passage referred to is, in fact, a by-law made under the authority of sec. H., 157, and as such, if read grammatically and by itself, it seems to bear the interpretation put on it by the Bradford Local Board. It may be a question, however, whether in the Act itself a few isolated houses, and properly and strictly be termed a "street." The case stated by our correspondent is one which mainly shows an unnecessary hardship to be done on some house-owners. At the same time, it may be other facts not brought to our knowledge which would be of importance in forming a judgment on the matter.

**School of Art Wood-Carving.**—We are glad to mention that the School of Art Wood-Carving in the Royal Albert Hall will be closed the 11th inst. and re-opened in the City and Guilds of London Technical Institute, in Exhibition-road, on the 13th inst. While continuing the handsome contribution towards the funds of the school, the Council of the Institute have provided it with rooms in their new building free, and have gone to some expense in making arrangements for the accommodation of a class for women.

#### PROVINCIAL NEWS.

**Nottingham.**—The Park-reservoir of the Nottingham Corporation Waterworks Department has just been re-opened for use after a very considerable extension and thorough reconstruction. Its internal dimensions are now as follow:—179 ft. 3 in. long, 140 ft. wide, and 14 ft. deep from floor to springing of the roof arches. It is estimated to contain about two and a quarter millions of gallons of water. The side walls are 4 ft. 6 in. thick at the base, and are built of hand-made bricks from the Mapperley yards of the Nottingham Patent Brick Company, on a concrete foundation, and strengthened on the outside by abutment walls of Portland cement concrete. The top or roof is formed of a series of arches built of brick, set in mortar composed of Portland cement and thoroughly-washed river sand, carried on strong wrought-iron girders, which are supported by 111 cast-iron columns, 10 in. diameter. These are bedded on hard Yorkshire stone bases and brickwork. The floor is formed with clay-puddle 15 in. deep, on which is a bed of Portland cement concrete, 9 in. thick, and finished off with Portland cement, trowelled to form a very smooth surface. The side walls also are covered in a similar manner. The whole of the top of the roof exposed to view on the outside is covered with Portland cement concrete and a double thickness of Val de Travers asphalt, and is laid with a fall from the centre towards the four sides so as to carry off the rain water quickly, which is then conveyed away by channels constructed for the purpose. Along Park-road and the Rope-walk is a boundary-wall, faced with red pressed bricks, surmounted by a bold moulded and cast coping, and an iron railing. The whole of the work has been very efficiently carried out by Mr. Thomas Smart, contractor, Trent Bridge, Nottingham, in the comparatively short time of twenty weeks, from drawings supplied by, and under the superintendence of, the Engineer to the Water Department, Mr. M. O. Tarbotton and his assistant, Mr. Wharton, the clerk of works being Mr. Phillips. Messrs. Goddard & Massey supplied the iron columns and girders used for supporting the roof, and Mr. Hughes provided the iron railing for boundary-wall. This is stated to be the third reservoir Mr. Smart has constructed for the Nottingham Corporation. In the course of the proceedings at the meeting held in the reservoir to celebrate its completion, the Engineer, Mr. Tarbotton, stated that Nottingham was the first town in England which had adopted the system of high-pressure water-supply, and it had continued without any cause of complaint for forty years. He spoke highly of the way in which Mr. Smart had executed the contract.

**Beverley.**—The annual general meeting of proprietors of land within the Beverley and Barnston drainage district was held at Beverley on the 25th ult., Mr. W. Bainton, of Beverley Park, in the chair. Mr. Tiffen, the engineer, read an account of the works, now nearly completed, which have been carried out to improve the drainage, the contract having been entered into in October, 1882, since which time 155,000 cubic yards of mud and clay have been dredged from the bed of the river and deposited on the banks. The dredging has extended over a length of twenty miles, and seventeen miles of banks have been raised and strengthened. The work has been done under plans prepared by Mr. J. Wolfe Barry, M.Inst.C.E., by Mr. Chas. Simons, of Grimsby; Mr. Tiffen, the engineer, and Mr. Evans, his surveyor, having superintended it.

**Sheffield.**—Prince Albert Victor of Wales on the 1st inst. opened the Industrial Exhibition which the Cutlers' Company have organised. The primary objects of the exhibition are the cultivation of superior workmanship in the immediate district, and the assertion of Sheffield's continued pre-eminence in the cutlery department of the metal trade, notwithstanding increased competition. It practically covers all trades carried on within the district of Hallamshire, and the exhibits are confined to articles which have been manufactured by the exhibitors' own hands. The handicraft exhibits show all stages of manufacture in a wide variety of different articles from each district. For instance, files are shown first as forgings or more shapes; then after grinding, which brings the surface even for the cutter to work upon; and lastly, in a finished condition. Other processes are illustrated in a similar manner. There are altogether eight different sections in the Exhibition, the first of

which embraces the steel, file, saw, and edge-tool trades generally; the second the electroplating and Britannia metal trades; the third, cutlery in general; the fourth, engineers' and machine tools; the fifth, fender, fire-iron, stove, grate, and general ironfounding trades; and the sixth, special prizes for any specimens of handicraft not included in the schedule. The gross value of the prizes offered is 750*l.*, divided into 330 prizes.

**Didlington.**—Didlington Hall has, during the last two years, undergone considerable alterations and additions, conspicuous amongst the new works being a large museum or gallery, for the purpose of holding Mr. Amherst's collection of antiquities and curiosities. A few days ago a substantial dinner was given, to celebrate the roof raising, to the workmen employed on the works. About 160 sat down to a bountiful repast in the new room, suitably fitted up with a temporary floor and tables, and presided over by the worthy squire, the architect, Mr. Norman Shaw, being seated on his right, and the contractor, Mr. William Hubbard, on his left. Mr. Hubbard, in proposing the health of Mr. Amherst, stated that some few years ago, when work was very scarce, and a great number of men in the neighbouring villages had nothing to do, Mr. Amherst laid out a scheme for excavating a large area of ground, and forming a lake, in which is laid out geographically and to scale, the island of Cyprus and surrounding islands, and again, last year, he had about 30 acres of ground trenched and planted by manual labour during the winter and spring. These and many other acts of kindness, both in cases of sickness and distress, showed how desirous Mr. Amherst was of securing the health and comfort of his poorer neighbours. The chairman responded, and explained that for several years he had contemplated making alterations and additions to the hall, but had experienced great difficulty in arranging a plan. After consulting several architects it was his good fortune to meet with Mr. Norman Shaw, an architect of the highest eminence, who had been able to meet the requirements of the house. He was, therefore, most happy to propose the health of Mr. Norman Shaw, who had so ably planned these alterations and additions. Mr. Shaw, in acknowledging the compliment paid him, thanked Mr. Amherst and all present, and stated that he was entirely satisfied with the manner in which his instructions and plans had been carried out. He should, therefore, without further delay, propose the "Health of the contractor, Mr. Wm. Hubbard," but must add how rare it was at the present day to find a builder with such determination to act honestly, and that the work done at Didlington was equal to any he had ever seen. Mr. Hubbard, in responding, was afraid Mr. Shaw had given him too much credit, but even the most difficult portions of the work, and all must admit there were great difficulties to encounter, were made comparatively easy by the details and drawings supplied to him by the architect.

**Arlesley.**—Portland Cement Works of considerable extent have recently been erected at Arlesley siding upon the Great Northern Railway by the Arlesley Lime and Portland Cement Company. We are informed that the position of the property, which has been developed for some years as a lime manufactory, is advantageous for the production of cement, owing to the proximity of grey chalk and gault clay to the railway. The present extension of the works has cost upwards of £20,000.

**The Baths of Bath.**—Encouraged by the success that has attended their efforts to improve the accommodation for invalids resorting to Bath for bathing purposes, the Corporation of that city have determined to enter upon further improvements. With that view the City Architect, Mr. C. E. Davies, has recently paid a visit to some of the most esteemed European baths in order to observe the most recent improvements, so that they may be applied to the new and enlarged system of baths that the Corporation intend to erect. Quite a new spirit seems to have fallen on the Corporation, and now that the city is placed within a two and a-half hours' journey from London, with a bathing establishment rivaling any in Europe, together with the improvements recently effected in the town itself, we may hope to see Bath restored to a position equal to that she held at the end of the eighteenth century.—*Lancet*.

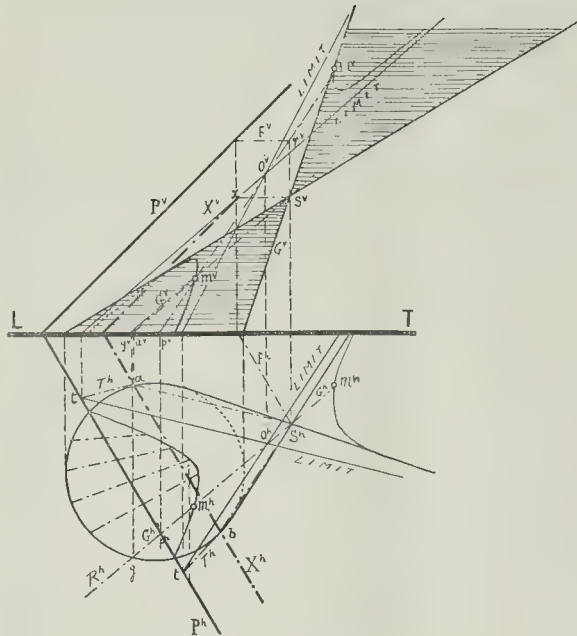


Fig. 120.

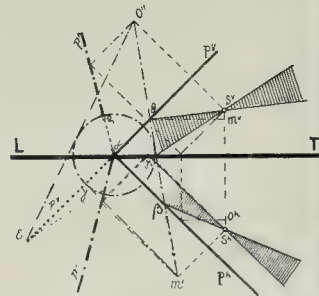


Fig. 121.

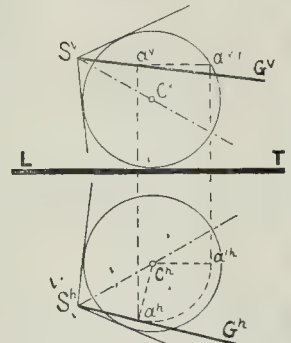


Fig. 122.

### The Student's Column.

#### DESCRIPTIVE GEOMETRY.—PART II.

VII.

Important observation for drawing the curves of the sections.

**I**T can be proved by algebraical calculation that the projections of ellipses, hyperbolas, and parabolas are either straight lines, or again ellipses, hyperbolas, and parabolas. It can be proved also in the same way that in developing a cone, the sections become again elliptical curves, hyperbolas, and parabolas, according to what they were before developing.

Find direct the projections of the hyperbolic section of any cone by a plane P not perpendicular to the elevation.

We cut both the cone and the plane P by a series of vertical planes, such as the plane R passing through the apex S of the cone. These planes will cut the cone along the generators G; on the other hand, if, by the means of an horizontal line F of the plane P, we find r the point where the projecting line SS' cuts the plane P, we shall have in r a point where all the intersections of the plane P will pass. We know their traces p, we can deduce their elevations p'' s', and at their respective intersections with the generators of the cone we get points m of the section required.

To find the limits we must remember that they are the intersections of the planes tangent to the cone along the generators parallel to the plane P. The horizontal line S<sub>∞</sub> through S allows us to draw the traces of a plane X which passes through the apex of the cone and is parallel to the plane P. Where the trace X<sup>a</sup> meets the base of the cone we have the feet a and b of the generators that are parallel to the plane P. Through a and b we draw the traces T<sup>a</sup> of the planes tangent to the cone, and the points t, where they meet the trace P<sup>a</sup>, are points of the limits. The projections of the limits themselves will be parallel to the projections of the generators a s and b s, for both the limits and these generators are intersections of parallel planes by a third plane (see fig. 120).

Draw a cone by the means of its apex S and its circular base of radius a p placed in a given plane P.

We find the point m where a vertical line passing through S cuts the plane P. When we lay down the plane P on the plan, by turning it down round its trace P<sup>h</sup> we find m<sup>h</sup> the position of m on the turned down plane as well as the circular base of the cone. From m<sup>h</sup> we draw the tangents m<sup>h</sup> β and m<sup>h</sup> γ to the base of the cone; they are the intersections of the plane P by vertical planes tangent to the cone and passing through S; in other words, they are the intersections of the plane P by the planes which give us the horizontal projections of the outside generators of the cone. When we move back the plane P to its original position m<sup>h</sup> β and m<sup>h</sup> γ become S<sup>h</sup> β and S<sup>h</sup> γ<sup>h</sup>. We make a similar operation with a point O of the plane P situated on a line passing through S and perpendicular to the elevation, and turning down the plane P round its vertical trace we get O<sup>h</sup>; then draw the tangents O<sup>h</sup> ε and O<sup>h</sup> θ, and turning back the plane P to its original position get S<sup>h</sup> ε and S<sup>h</sup> θ as outline of the cone on the elevation. (See fig. 121.)

Draw a right cone in any position.

Such a cone circumscribes spheres, and therefore we need only draw one of those spheres and the projections of the apex of the cone.

It is very easy to draw any generator G, for we know that any horizontal section of the sphere will touch some generator of the cone; therefore, if the projection G<sup>h</sup> of the generator be given, and from c<sup>h</sup> we take a perpendicular to G<sup>h</sup>, the point a<sup>h</sup> will be the plan of the point of contact of the generator G and the cone. By a horizontal rotation of the sphere we get a<sup>h</sup> and find a<sup>h</sup>, and deduce therefrom both a<sup>h</sup> and G<sup>h</sup>, so that we have both projections of the generator G. (See fig. 122.)

#### CHURCH-BUILDING NEWS.

**Marldon (near Torquay).—**Funds are being raised for the restoration of the parish church of St. John the Baptist, Marldon, situated about five miles from Torquay, and two miles from Paignton. Marldon Church has not, during the last fifty years, until recently, undergone repairs of any magnitude, and it is stated that the necessity has now arisen of making a thorough restoration. To cover the cost of all that is proposed to be done, more than 1,500l. is required. The work in hand up to the present time has necessitated an expenditure of nearly 800l. The design for the restoration have been prepared by Mr. R. Medley Falford, of Exeter, and the contractor is Mr. P. Blowey, of Plymouth.

**Plymouth (Devon).—**The parish church of St. Andrew, Plymouth, which has been under restoration for about ten months, is now approaching completion. During the progress of the work several interesting discoveries have been made. First, a sedilia, on the south side of the chancel with three seats. The cusped openings are carried on circular shafts, with moulded capitals and bases. The whole is of a local stone much resembling the Hatherleigh, and is of Early English date. The mouldings of arches, &c. had been much hacked away, no doubt during the time when the church was last "improved," when the moulded string-course of Polyphasia stone which ran all round the chancel wall back, no doubt to give "a nice unbroken appearance" to the plastered walls. The string has now been replaced. The level of the seats was little above the floor level, and seats of oak will be put in above the stone one to raise the level. The sedilia has been restored in Hatherleigh stone by Mr. Petherick of that town. Near the south chancel, a priests' doorway, was discovered, in a mutilated state, a large example of a "low-side" "lepers" window. The roof is now completely opened up, and a new oak ceiling and floor added. New stonework has also been put in the windows where missing or decayed, and the old nave arcade and clearstory windows have been cleaned and repaired. Owing to want

**Water Supply, Pontefract.**—Mr. George Hodsan, C.E., of Loughborough, has been retained by the Corporation of Pontefract to report upon their existing waterworks and propose a scheme for obtaining water from a new source.



|                                                   |     |
|---------------------------------------------------|-----|
| Highgate, Archway-road—Ground-rents, 12l., rever- |     |
| sion in 89 years .....                            | 290 |



|                                                                        |        |
|------------------------------------------------------------------------|--------|
| By T. B. WESTACOTT.                                                    |        |
| King's-cross—214 to 228 even, York-road, 65 years, ground-rent 92/ 3s. | £2,205 |
| By NORTON, TRIST, WATNEY, & Co.                                        |        |
| Warrington, near.—A plot of freehold land, 2a. 1r. 4p.                 | 190    |
| By MARSH, MILNER, & LANGTON.                                           |        |
| Shepherd's Bush—180 to 166 even, Starch Green-road, freehold           | 3,710  |
| Two policies for 400l., each life aged 57 years                        | 311    |
| JULY 8.                                                                |        |
| JONES, LANG, & Co.                                                     |        |
| Pekham—36, Moncrieff-road, 75 years, ground-rent 44/ 10s.              | 280    |
| 48, 49, and 50, Moncrieff-road, 76 years, ground-rent 15/.             | 705    |
| Pimlico—Stabling in Dorset Mews, 58 years, ground-rent 11/.            | 290    |
| By T. D. WATERHEAD.                                                    |        |
| Commercial-road, E.—Ground-rent of 64/ 5s, term 25 years               | 665    |
| Brixton—45, Barington-road, 37 years, ground-rent 7/.                  | 615    |
| HUMBER, SON, & FLINT.                                                  |        |
| Southend-on-Sea—A plot of freehold land, 1½ acre                       | 1,010  |

### Miscellaneous.

**Tramways, Barrow-in-Furness.**—The first section of the Barrow-in-Furness Tramways was officially inspected by Major-General Hutchinson, R.E., of the Board of Trade, on the 3rd inst. The line, which has been well laid on the Abbey-road, not far from Furness Abbey, and passes along Abbey-road, Duker-street, Strand, Salthouse, and Rose roads, and terminates at Rose, the total length being about four miles. The wide streets and roads of Barrow render the town particularly well adapted for tramways. The greater length of street through which the tramway is laid is 80 ft. in width, a portion of the same, about half a mile in length, having just been completed by the Corporation. The tramway consists of a single line, with passing-places 3 chains in length at about every quarter of a mile. The gauge is 4 ft. The rails are Gowans', manufactured by the Barrow Steel Company, weighing 84 lb. to the yard, and the paving is laid with Welsh setts except on one or two steep gradients. The general construction of the line has been carried out by the Barrow Tramways Company in accordance with the specification prepared for the Barrow Corporation by Mr. Fox, C.E., the Borough Engineer, which determines the gauge, the rails to be used, the quality and method of paving, and general mode of construction. Mr. Vawser, C.E., of Manchester, has acted as engineer of the lines for the company, and Mr. Fritchard, C.E., of Birmingham, of the rolling stock and depots. Mr. Fell, of Leamington, was the contractor. Steam is to be the motive power, the engines being manufactured by Messrs. Kitson, of Leeds.

**New Baptist Chapel at St. Alban's.**—A new chapel, belonging to the Baptist denomination, was opened in this city on Tuesday last. It is of red brick with stone dressings, and is carried out in the Early French Gothic style. The chapel, including the apse and baptistery building, is 94 ft. long by 37 ft. wide and 42 ft. high internally. There is an obvious departure from the ordinary arrangements of Dissenting places of worship in the wide centre aisle, with the pulpit and reading desk at the sides, instead of in the middle, and the raised apse with choir seats round it and the organ at the side. Another new feature is the open marble baptistery, with a handsome alabaster rail at the back of the apse in a separate octagonal building raised again from the apse floor. Below the chapel is a large and lofty schoolroom, and attached to it and to a chapel-keeper's house adjoining are fifteen classrooms, all completely fitted and furnished for their various purposes. The marble baptistery and the marble in dados, columns, and friezes, were supplied by Mr. James Houghton; the mosaic floors of the apse and baptistery by the Campbell Tile Company; a stained-glass memorial window by Messrs. A. L. Moore & Co.; and the organ by Messrs. Bevington. The chapel has sittings for 630 persons, and is surmounted by a fleche, 80 ft. high. The whole has been carried out by Mr. T. Turner, of Watford, under the superintendence of Messrs. Glover & Salter, architects, at a cost of about 7,000l.

**Sheffield.**—In the parish church of Sheffield has just been placed another stained-glass window from the studio of Mr. W. F. Dixon, London. The window was erected by subscription to the memory of Mr. Arthur Thomas, and illustrates the parable of the Talents and other kindred subjects.

**The Niagara Falls Park.**—The Legislature of New York State did a good public act when it authorized the formation of a park at Niagara Falls, by which all the grounds and waters necessary for the preservation and public access to those great wonders of nature are secured to the people in perpetuity. The sum of one million and a half dollars has been appropriated by the State to secure the purchase of private property. Lands equal to a little more than 100 acres have already been bought. The grounds and buildings on both sides west and south of the hydraulic canal have also been taken by the Park Commissioners. The lines extend to the main channel of the river and middle of Horsehoe Falls, being the boundary line between Canada and the United States, and the purchase takes in Goat Island and all the little islets, with their various mills, streets, and passage ways. By the terms of the Act the whole tract is to be restored as far as possible to its original state of nature, and when this is accomplished, the trees grown, and all the improvements perfected, the attractions of Niagara will be increased a thousand-fold. It will probably be news to a good many people in this country to learn that the original inception of this admirable project is due to Lord Dufferin when he was Governor-General of Canada in 1878. His plan was that the Canadians on their side, and the Americans on theirs, should undertake to beautify and preserve the approaches to the Falls. His proposal was most cordially appreciated by the Governor of New York, Lucius Robinson, and the grand project is now in process of being realised. But it has involved much hard work on the part of private individuals to overcome the hostile influences that were arrayed against the work, especially from the owners of property.—*Iron.*

**Cost of Government Buildings at Washington.**—The cost of the principal public buildings in Washington is officially stated as follows:—The United States Capitol nearly 3,200,000l.; State, War, and Navy departments, 1,525,785l.; Treasury, 1,431,694l.; Patent Office (Interior Department), 649,155l.; the Post-office Department building, 430,200l.; Insane Asylum, 302,622l.; Washington National Monument, 220,000l.; Deaf and Dumb Institute, 150,200l.; the Executive Mansion, 147,116l.; the Botanical Gardens, 144,562l.; Smithsonian Institute, 98,530l.; United States Marine Barracks, 67,927l.; building used by the Bureau of Engraving and Printing of the Treasury Department, 73,366l.; Agricultural Department, 100,365l.; Government Printing Office, 50,200l.; National Museum, 50,000l.; United States Naval Observatory, 51,053l.; Arsenal, 54,065l.; Court-house, 55,030l.; Naval Hospital, 23,207l.; Department of Justice, 39,556l.; Army Medical Museum, 17,000l.; Executive Stables, 5,700l. It is calculated that the new Museum building will cost 40,000l. The Pension Office, which is only about half finished, has already cost more than the original estimate. It will be completed in about four years' time. In addition to the above buildings the Government has upwards of fifty which are rented, amongst those being the Money-order Branch of the Post-office Department, and likewise the Pension Office used by the United States Geological Survey.

**Association of Municipal Engineers and Surveyors.**—With reference to our report of this meeting on p. 36 of our last, we are asked to mention that Mr. Midgley read a paper and exhibited models and drawings of his disinfecting drain-ventilator, which is now being tried in the City of London and elsewhere. This was not, as we understand, included amongst the "crude projects" of whose introduction to the meeting Mr. McKie complained. On the contrary, we are told that a vote of thanks was given to Mr. Midgley for bringing his invention before the meeting.

**"Two Seaside Resorts."**—We observe that the leading article in our number for June 27 has been reprinted almost in *extenso* in the *Bournemouth Observer* of July 1st. Next time the editor of that print pays us the compliment of reproducing our remarks, he will perhaps be good enough to acknowledge the source of the articles which he thinks proper to appropriate.

**Gift of a Park to Govan.**—On the 27th ult. the Earl of Rosebery handed over to the Provost of Govan a public park of forty acres, purchased and laid out by Mrs. Elder, widow of Mr. John Elder, founder of the Clyde firm of shipbuilders. The total cost has been 50,000l.

**Henry's Mote, Pembroke-shire.**—The Bishop of St. David's opened Henry's Mote Chapel after a very complete restoration, on Friday, 3rd inst., the work including reseating seats to accommodate sixty additional persons, north porch and south vestry have been added the chancel rebuilt, and new roofs covered with Whitland Abbey slates have been placed on nave, south transept, and chancel,—the little being wagon-boarded and the former open to the ridge and plastered between the rafters having arched principals. New bell gable, north doorway, and windows throughout, Douling stone,—the latter filled with cathed rolled glazing in patterns, supplied by Mr. J. Gay, of Bristol,—have been provided. The seats and seats are of varnished pitch pine on wooden platforms. The wrought-iron alt standards and door fittings were supplied by Mr. Brown, of Birmingham, and the heating apparatus by Mr. Porritt, of Bolton. The Norman font and credence table have been cleaned and refixed. The stone carving has been done by Mr. Herridge, of Cardiff; and floors tiled by Webb's Worcester Tiles Company,—those in the chancel and sacrum being highly glazed. The architect employed is Mr. E. H. Lingen Barker; and the builder Mr. John Lewis, of Musland, Pembroke-shire.

**The Birkbeck Building Society.**—The thirty-fourth annual meeting of the Birkbeck Building Society was held on the 2nd inst. in the theatre, 29 and 30, Southampton buildings, Chancery-lane. The report, adopted unanimously by the meeting, shows that the Society's operations are of considerable magnitude. It states that the receipts during the year ending 31st of March last amounted to 7,261,244l.,—an increase of nearly half a million over last year,—making a total for the commencement of the Society of 84,610,610l. The deposits from members and others were 6,201,551l. and the payments on shares were 212,910l. The gross profits on the year were 136,067l., of which 132,148l. have been applied to the payment of interest to shareholders and depositors, and defraying expenses of management, leaving a net profit of 14,919l. making, it is stated, with the balance brought from last year, a sum of 178,098l. in excess liabilities. The balance-sheet shows a sum of 2,907,552l. of surplus funds, which are temporarily invested in Consols and other securities.

**Barrow School Memorials.**—A series of memorial tablets has been erected in Harrow School Chapel to the memories of famous Harrovians, most of whom have died in service of their country. Last week, on the eve of the "Speech Day," tablets were erected to General Earle, C.B., C.S.I., Colonel Burdett Major Boyd, Captain Edward Leveson Jago, Lieutenant Richardson, &c. They are placed on the south side of the chapel, and are wrought in alabaster, with bands of very elaborate marble mosaic, and coloured marble inscriptions with gilt letters, and are the work of Henry Terry, of the Lambeth-road.

**The Statue of the late Lord Frederick Cavendish** at Barrow-in-Furness was unveiled last week by Earl Spencer. We gave a view of the work (of which Mr. A. Bruce Joy is sculptor) in the *Builder* for October 4, 1884.

### PRICES CURRENT OF MATERIALS.

|                                            | TIMBER.       | 2. | s. | d. | 2.    |
|--------------------------------------------|---------------|----|----|----|-------|
| Greenheart, B.G.                           | .....ton      | 6  | 10 | 0  | 7 10  |
| Teak, E.I.                                 | .....load     | 12 | 10 | 0  | 15 10 |
| Siquia, U.S.                               | .....ft. cube | 0  | 2  | 0  | 2     |
| Ash, Canada                                | .....load     | 0  | 0  | 0  | 0     |
| Birch                                      | .....load     | 3  | 0  | 0  | 4 10  |
| Elm                                        | .....load     | 3  | 10 | 0  | 5 0   |
| Oak                                        | .....load     | 1  | 10 | 0  | 4 10  |
| Canada                                     | .....load     | 3  | 0  | 0  | 5 0   |
| Pine                                       | .....load     | 3  | 0  | 0  | 7 0   |
| .....red                                   | .....load     | 3  | 15 | 0  | 4 0   |
| .....yellow                                | .....load     | 3  | 15 | 0  | 4 0   |
| Lath, Danatic                              | .....fathom   | 5  | 0  | 0  | 6 0   |
| St. Petersburg                             | .....load     | 5  | 0  | 0  | 7 0   |
| Valencol, Riga                             | .....load     | 3  | 0  | 0  | 4 0   |
| Duals, Finland, 2nd and 1st.               | .....100      | 8  | 0  | 0  | 9 0   |
| " 4th and 3rd                              | .....load     | 6  | 10 | 0  | 7 0   |
| Riga                                       | .....load     | 10 | 0  | 0  | 11 0  |
| St. Petersburg, 1st and 2nd.               | .....load     | 8  | 0  | 0  | 9 0   |
| " 2nd                                      | .....load     | 8  | 0  | 0  | 9 0   |
| " white                                    | .....load     | 7  | 0  | 0  | 11 0  |
| Sweden                                     | .....load     | 7  | 0  | 0  | 17 0  |
| White Sea                                  | .....load     | 8  | 10 | 0  | 19 0  |
| Canada, Pine 1st                           | .....load     | 18 | 0  | 0  | 32 10 |
| " 2nd                                      | .....load     | 12 | 0  | 0  | 18 10 |
| " 3rd                                      | .....load     | 7  | 0  | 0  | 12 0  |
| " Spruce 1st                               | .....load     | 9  | 0  | 0  | 12 0  |
| " 3rd and 2nd                              | .....load     | 6  | 10 | 0  | 8 0   |
| New Brunswick, &c.                         | .....load     | 5  | 0  | 0  | 7 10  |
| Battens, all kinds                         | .....load     | 4  | 0  | 0  | 13 0  |
| Flooring Boards, sq. 1 in.—Prepared, first | .....load     | 0  | 0  | 0  | 0     |
| Second                                     | .....load     | 0  | 6  | 0  | 0     |
| Other qualities                            | .....load     | 0  | 5  | 0  | 0     |



| TIMBER (continued).    |                 |           |       | METALS (continued).    |        |         |         |
|------------------------|-----------------|-----------|-------|------------------------|--------|---------|---------|
| Chas. ....             | foot            | 0 0 3 1/2 | 0 0 4 | Spruce .....           | ton    | 13 10 0 | 13 12 6 |
| durant, &c. ....       | 0 0 3 1/2       | 0 0 4     |       | Swedish, special ..... | ton    | 13 5 0  | 13 7 6  |
| ralian .....           | 0 0 3 1/2       | 0 0 3 1/2 |       | Ordinary brands .....  | ton    | 13 5 0  | 13 7 6  |
| ay, Cuba .....         | 0 0 5 0 7 1/2   |           |       | Tin .....              |        |         |         |
| Domingo cargo av. .... | 0 0 5 1/2       | 0 0 8 1/2 |       | Straits .....          | 04 5 0 | 04 10 0 |         |
| ona .....              | 0 0 4 0 0 6 1/2 |           |       | Australian .....       | 04 0 0 | 04 10 0 |         |
| aco .....              | 0 0 4 1/2       | 0 0 6 1/2 |       | English ingots .....   | 03 0 0 | 04 0 0  |         |
| durant .....           | 0 0 4 1/2       | 0 0 6 1/2 |       |                        |        |         |         |
| Rio .....              | 0 0 7 17 0 0    |           |       | TELETYPE .....         | box    | 13 6 0  | 13 8 0  |
| St. Domingo .....      | 0 0 8 0 1 0     |           |       | IX coke .....          | 21 0 0 | 25 0 0  |         |
| St. Domingo .....      | 0 0 8 0 1 0     |           |       | IX ditto .....         | 17 0 0 | 20 0 0  |         |
| St. Domingo .....      | 0 0 8 0 1 0     |           |       | IX charcoal .....      | 28 0 0 | 27 0 0  |         |
| St. Domingo .....      | 0 0 8 0 1 0     |           |       | IX ditto .....         | 28 0 0 | 27 0 0  |         |

| METALS.                     |     |           |           | OILS.                        |         |         |  |
|-----------------------------|-----|-----------|-----------|------------------------------|---------|---------|--|
| ah, cks, and ingt. ....     | ton | 47 10 0   | 48 10 0   | Linseed .....                | 21 15 0 | 22 0 0  |  |
| selected .....              | ton | 48 10 0   | 49 0 0    | Cocunut, Cochiti .....       | 27 10 0 | 28 0 0  |  |
| selected .....              | ton | 55 10 0   | 56 0 0    | Ceylon .....                 | 27 10 0 | 27 15 0 |  |
| Indis .....                 | ton | 52 10 0   | 53 0 0    | Copra .....                  | 25 10 0 | 26 10 0 |  |
| ralian, fine cash .....     | ton | 54 10 0   | 55 0 0    | Palm, Lagos .....            | 30 0 0  | 0 0 0   |  |
| bars .....                  | ton | 44 2 6    | 44 10 0   | Palm-put Kernel .....        | 26 10 0 | 0 0 0   |  |
| Pig in Scotland .....       | ton | 7 10 0    | 8 0 0     | Rapeseed, English pale ..... | 26 0 0  | 0 0 0   |  |
| Welsh, in London .....      | ton | 5 0 0     | 5 7 6     | " brown .....                | 24 0 0  | 0 0 0   |  |
| " in Wales .....            | ton | 4 12 6    | 4 17 6    | Cottonseed, refined .....    | 21 0 0  | 22 10 0 |  |
| Staffordshire, London ..... | ton | 8 0 0     | 7 0 0     | Tallow and Oleine .....      | 25 0 0  | 45 0 0  |  |
| single, in London .....     | ton | 7 0 0     | 8 0 0     | Lubricating, U.S. .....      | 9 0 0   | 15 0 0  |  |
| roads .....                 | ton | 6 0 0     | 7 0 0     | " Refined .....              | 8 0 0   | 15 0 0  |  |
| Metals .....                | lb. | 0 0 4 1/2 | 0 0 4 1/2 | TURPENTINE .....             |         |         |  |
| Pig, Spanish .....          | ton | 0 0 0     | 0 0 0     | American, in cks. ....       | 28 0 0  | 29 3 0  |  |
| ah, com. brands .....       | ton | 12 10 0   | 0 0 0     | Tar - Stockholm .....        | 22 0 0  | 22 6 0  |  |
|                             |     |           |           | Archangel .....              | 14 0 0  | 14 6 0  |  |

## CONTRACTS.

Epitome of Advertisements in this Number.

| Nature of Work, or Materials.             | By whom required.           | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|-------------------------------------------|-----------------------------|-----------------------------------|--------------------------|-------|
| General Granite .....                     | West Ham Local Bd.          | Lewis Angell .....                | July 14th                | xxvi. |
| Gar-Paving, &c., Works .....              | Leisham Bd. of Wks.         | Official .....                    | do.                      | xxvi. |
| g, Colouring, &c. ....                    | War Department .....        | do.                               | July 15th                | do.   |
| on Picking & Broken Querns Granite .....  | Vestry, Mile End .....      | J. M. Knight .....                | do.                      | xxvi. |
| of Mill, & additions .....                | Midland Railway Co. ....    | A. A. Langley .....               | July 16th                | ii.   |
| Severs, &c., Upper Norwood .....          | Beulah Park Estate .....    | W. N. Dunn .....                  | do.                      | xxvi. |
| ing, and Repair of Roads .....            | Mortlake Highway Bd. ....   | J. Medworth .....                 | July 18th                | xxvi. |
| y and Pipe Sewer .....                    | Thos. Burberry .....        | Jas. Gibson .....                 | do.                      | ii.   |
| Works .....                               | Colne and Marsden L. B.     | H. Hancock .....                  | July 20th                | xxvi. |
| mentary Buildings, &c. ....               | Chelmsford Local Bd. ....   | O. Reeves .....                   | do.                      | ii.   |
| ions to Closets, &c., Repairs, and .....  | Wandsworth Bd. of Wks.      | Official .....                    | July 21st                | ii.   |
| king-up Roads .....                       | Brentford Local Board ..... | Official .....                    | do.                      | xxvi. |
| rk .....                                  | Hackney Board of Wks.       | J. Lovegrove .....                | July 22nd                | do.   |
| ng, &c., of Bridge .....                  | Greenwich Bd. of Wks.       | Official .....                    | do.                      | ii.   |
| verage Works, &c. ....                    | Vestry of St. Marybone      | do.                               | July 23rd                | ii.   |
| wer, Engine-House, &c. ....               | Barking Town Local Bd.      | B. S. Brundell and .....          | do.                      | ii.   |
|                                           | C. I. Dawson .....          | Official .....                    | do.                      | ii.   |
| to, &c., and Laying-out of Cemetery ..... | Cheehunt Burial Board ..... | De Pape .....                     | July 26th                | ii.   |
| Works Extension .....                     | Com. of H.M. Works .....    | Official .....                    | July 27th                | ii.   |
| nt-Office, Halifax .....                  | Met. Asylums Board .....    | A. & C. Harston .....             | do.                      | xxvi. |
| g, &c., Works, Darent, Kent. ....         | Guardians, St. Matthew.     | do.                               | July 28th                | ii.   |
| Alterations, Improvements, &c. ....       | Bethnal Green .....         | do.                               | do.                      | xxvi. |
| ry Shaft, Sheds, &c., for connexion ..... | Southampton Corporatn       | W. B. G. Bennett .....            | do.                      | xxvi. |
| as Refusals Destructor .....              | Cranbrook U. R. S. A. ....  | W. Nott .....                     | do.                      | xxvi. |
| Works, Hawkhurst .....                    | Rock Freehold Land Soc.     | Official .....                    | July 30th                | ii.   |
| on Bridge .....                           | Brighton Town Council ..... | P. C. Lockwood .....              | July 30th                | xxvi. |
| Ground, Preston Park .....                | Oxford Local Board .....    | W. H. White .....                 | August 1st               | ii.   |
| ley Drainage .....                        |                             |                                   |                          |       |

## TENDERS.

|                                                                                                  |             |
|--------------------------------------------------------------------------------------------------|-------------|
| New Board school, Upper Kennington-lane, S.E., London School Board. Mr. T. J. Bailey, architect. | £16,234 0 0 |
| ry & Co. ....                                                                                    | 16,180 0 0  |
| ry & Co. ....                                                                                    | 16,180 0 0  |
| Servicer & Co. ....                                                                              | 15,945 0 0  |
| g & Randall .....                                                                                | 15,824 0 0  |
| g & Reading .....                                                                                | 15,800 0 0  |
| le & Applion .....                                                                               | 14,791 0 0  |
| Shepherd .....                                                                                   | 15,717 0 0  |
| C. Howell & Son .....                                                                            | 15,680 0 0  |
| g, Nightingale .....                                                                             | 15,327 0 0  |
| ney High & Son .....                                                                             | 15,262 0 0  |
| ver & Son .....                                                                                  | 15,243 0 0  |
| olloway .....                                                                                    | 15,180 0 0  |
| hart .....                                                                                       | 15,100 0 0  |
| loway Bros. ....                                                                                 | 15,027 0 0  |
| cyce .....                                                                                       | 14,937 0 0  |
| cy .....                                                                                         | 14,770 0 0  |
| olloway .....                                                                                    | 14,638 0 0  |
| entry .....                                                                                      | 14,634 0 0  |
| ell .....                                                                                        | 14,628 0 0  |
| Wall .....                                                                                       | 14,573 0 0  |
| Dowds .....                                                                                      | 14,568 0 0  |
| orton & Latta .....                                                                              | 14,548 0 0  |
| l Bros. ....                                                                                     | 14,493 0 0  |
| errard .....                                                                                     | 14,430 0 0  |
| Oldrey .....                                                                                     | 14,217 0 0  |
| upon & Co. ....                                                                                  | 14,178 0 0  |
| neral repairs to the Royal Medical Benevolent .....                                              | £390 0 0    |
| Epcom. Mr. J. B. Harding, surveyor .....                                                         | 330 0 0     |
| day .....                                                                                        | 325 0 0     |
| er .....                                                                                         | 285 0 0     |
| ell & White .....                                                                                | 285 0 0     |
| ck .....                                                                                         | 270 0 0     |
| Brass & Son .....                                                                                | 250 2 8     |
| hes .....                                                                                        | 250 0 0     |
| H. Batchelor .....                                                                               | 247 0 0     |
| inton .....                                                                                      | 236 10 0    |
| re erection of new premises, 258, Edgware-road .....                                             | £4,574 0 0  |
| Chapel-street. Mr. N. S. Joseph, architect .....                                                 | 4,717 0 0   |
| ame & Sons .....                                                                                 | 4,700 0 0   |
| ack .....                                                                                        | 4,652 0 0   |
| ener & Co. ....                                                                                  | 4,652 0 0   |
| for external repairs and alterations to bars at .....                                            |             |
| Arms Tavern, Devonshire-street, Mile End. Mr. .....                                              |             |
| varmore, architect and surveyor .....                                                            | £395 0 0    |
| and & Thompson .....                                                                             |             |

For pulling down and rebuilding the Rodney's Head public-house, Rodney-street, Pentonville, including bar-fittings, for Mr. J. Wild. Mr. J. Laws, architect, Fallow-road, South Hampstead. Quantities supplied:—  
 Marr..... £2,940 0 0  
 Toms ..... 2,697 0 0  
 Beal ..... 2,650 0 0  
 Jackson & Todd ..... 2,425 0 0  
 A. G. Allard (accepted) ..... 2,410 0 0

For the erection of the Church of St. Mary, Stamford Brook. Mr. Chas. J. Gladman, architect. Quantities supplied:—  
 T. Huxley ..... £7,950 0 0  
 Humphreys ..... 7,915 0 0  
 Stimpson & Co. .... 6,340 0 0  
 Goddard & Son ..... 5,950 0 0  
 Dove Bros. .... 5,775 0 0  
 Dorey ..... 5,660 0 0

For taking down and rebuilding warehouse on site of No. 183, Aldersgate-street, for Mr. Woolf Hyman. Mr. J. Douglas Mathews, architect. Quantities by Mr. John S. Quilter:—  
 Conder..... £4,100 0 0  
 Mills..... 4,040 0 0  
 Dove Bros. .... 3,963 0 0  
 Nightingale ..... 3,833 0 0  
 Brass ..... 3,863 0 0  
 Stimpson & Co. .... 3,883 0 0  
 Grover & Son ..... 3,478 0 0  
 Ashby & Horner ..... 3,468 0 0  
 Kilby & Gayford ..... 3,383 0 0

For rebuilding premises at No. 246, Upper-street, Islington, for Mr. H. B. Harding. Mr. E. Harrison, architect. Quantities by Mr. B. W. Swinestead:—  
 Dove Bros. .... £2,715 0 0  
 Deans & Sons ..... 2,580 0 0  
 Smith ..... 2,463 0 0  
 Coombs ..... 2,467 0 0  
 Stimpson & Co. .... 2,390 0 0  
 Hayes ..... 2,210 0 0  
 Ward & Lambie ..... 2,137 0 0

For alterations to the premises known as Burlington Buildings, Redon-street, Legent-street, W., in adapting same for residential chambers, for Mr. Edward Easton. Mr. D. Cubitt Nicholls, architect. Quantities by Mr. H. P. Foster:—  
 Titman..... £5,470 0 0  
 R. Hunt ..... 5,369 0 0  
 Conder ..... 5,246 0 0  
 Grover & Son ..... 5,167 0 0  
 Stimpson & Co. .... 4,765 0 0  
 Geuty ..... 4,630 0 0

For erecting two warehouses on the site of No. 59, Wilson-street, and Nos. 2 and 3, East-street, Finsbury, for Mr. David de Pinna. Mr. John Groom, architect. Quantities by Mr. Mark W. King:—  
 J. T. Chappell ..... £2,077 0 0  
 Dove Bros. .... 3,975 0 0  
 Holloway ..... 3,842 0 0  
 Mortar ..... 3,685 0 0  
 Stimpson & Co. .... 3,560 0 0  
 Maddock ..... 3,539 0 0  
 Greenwood ..... 3,600 0 0  
 Saby ..... 3,465 0 0

For the erection of four houses in Turnham Green-terrace, Messrs. Wylson & Long, architects:—  
 W. Langridge & Son ..... £3,543 0 0  
 S. Hunt ..... 3,175 0 0  
 H. Whitman ..... 3,110 0 0  
 W. Collier ..... 3,000 0 0  
 W. Blackburn ..... 2,996 0 0  
 C. Rogers ..... 2,855 0 0  
 S. Belham & Co. .... 2,643 0 0  
 J. Goodwin ..... 1,988 0 0

Accepted for new house, Buckland, Surrey. Mr. W. G. Bartlett, architect, New Broad-street:—  
 H. Batchelor ..... £1,943 0 0

Accepted for lodge at Leigh, Surrey, for Mr. F. Charrington. Mr. F. C. Lees, architect, 44, Great Marlborough-street:—  
 H. Batchelor ..... £330 0 0

Accepted for Lich Gate, Leatherhead Church, Surrey:—  
 H. Batchelor ..... £135 0 0

For the completion of eight unfinished houses on east side of Gladys-road, Kilburn, for the executors of the late Mr. William Newton. Mr. Richard Hanson, architect:—  
 Richens & Mount ..... £2,875 0 0  
 S. Dainton ..... 2,481 0 0  
 Oldrey ..... 2,476 0 0  
 J. Gregory ..... 1,836 0 0  
 C. Cheahir ..... 1,668 0 0  
 J. Allen & Sons ..... 1,660 0 0  
 [Architect's estimate, 1,670.]

For the completion of five unfinished houses on the west side of Gladys-road, Kilburn, for Mr. Samuel Jones. Mr. Richard D. Hanson, architect:—  
 Richens & Mount ..... £1,720 0 0  
 S. Dainton ..... 1,568 0 0  
 Oldrey ..... 1,694 0 0  
 John Allen & Sons ..... 1,650 0 0  
 Charles Cheshir ..... 1,170 0 0  
 T. Byford (too late) ..... 1,350 0 0  
 [Architect's estimate, 1,160.]

For the erection of warehouses, &c., in Smithfield, for Mr. Isaac Beer. Mr. A. Clawton, architect. Quantities by Messrs. Sandall, Corderoy, & Selby:—  
 Adamson & Son ..... £3,480 0 0  
 Atterton & Latta ..... 6,400 0 0  
 Higgs & Hill ..... 6,383 0 0  
 E. Lawrence ..... 6,253 0 0  
 J. & J. Greenwood ..... 6,246 0 0  
 B. J. Scott (accepted) ..... 6,183 0 0

Accepted for an additional warehouse to Messrs. W. J. Bush & Co.'s premises, Hackney. Mr. J. Hamilton, architect:—  
 S. J. Scott ..... £785 0 0

Accepted for the erection of business premises at Parkman. Quantities by Mr. Henry Luegova:—  
 S. J. Scott ..... £1,905 0 0

For the erection of six girls' homes and other works in connection therewith at the Bethnal Green Schools at Leytonstone, for the Guardians of Bethnal Green. Messrs. A. & C. Harston, architects, 15, Leadenhall-street.

| Quantities supplied.               |         |     |
|------------------------------------|---------|-----|
| Hudman & Worsley                   | £13,764 | 3 8 |
| C. H. Stewart                      | 13,180  | 0 0 |
| England & Thompson                 | 11,830  | 0 0 |
| C. Proctor                         | 11,820  | 0 0 |
| J. Garrad                          | 11,759  | 0 0 |
| Ward & Lambie                      | 11,658  | 0 0 |
| W. Martin                          | 11,538  | 0 0 |
| Thomasson & Son                    | 11,490  | 0 0 |
| G. Dobson                          | 11,420  | 0 0 |
| J. Holland                         | 11,371  | 0 0 |
| Greger                             | 11,337  | 0 0 |
| J. H. Johnson                      | 11,180  | 0 0 |
| Kirk Bros.                         | 10,680  | 0 0 |
| Jackson & Todd,* 129, Hackney-road | 10,495  | 0 0 |

\* Accepted.

For the erection of a shelter roof at the Eastern Ambulance Station, Brookly's-walk, Homerton, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, architects, 15, Leadenhall-street. Quantities supplied—

|                               |      |     |
|-------------------------------|------|-----|
| Woodall, Marley & Co.         | £239 | 0 0 |
| Dixson, Bernersley            | 575  | 0 0 |
| Holmes & Co., Huddersfield    | 587  | 0 0 |
| J. G. Joselyne,* 123, Borough | 470  | 0 0 |

\* Accepted.

For the construction of Priory-road culvert, for the Homsey Local Board. Mr. T. de Courcy Meade, engineer and surveyor—

|                                 |        |     |
|---------------------------------|--------|-----|
| Fields & Jones, New Cross       | £3,715 | 0 0 |
| Aspinall & Son, Hoxton          | 2,878  | 0 0 |
| Nowell & Robson, Kensington     | 2,742  | 0 0 |
| Mowlem & Co., Westminster       | 2,691  | 0 0 |
| Pizzey, Homsey                  | 2,459  | 0 0 |
| Walker, Upper Holloway          | 2,465  | 0 0 |
| Killingback, Camden Town        | 2,400  | 0 0 |
| Hale & Son, Paddington          | 2,394  | 0 0 |
| Jackman & Son, Finsbury Park    | 2,365  | 0 0 |
| Tongue, Plumstead               | 2,340  | 0 0 |
| Williamson, Green-lanes         | 2,311  | 0 0 |
| Nicholls, Wood Green            | 2,289  | 0 0 |
| Adams, Moorfields-street        | 2,245  | 0 0 |
| Cooke & Co., Battersea          | 2,105  | 0 0 |
| Marshall, Brighton              | 2,093  | 0 0 |
| Dennmore, Crouch End (accepted) | 2,016  | 0 0 |
| Wilkinson Bros., Finsbury Park  | 1,997  | 0 0 |

For the erection of boys' elementary schools at Paignton, Devon, for the School Board. Mr. W. G. Chidrey, architect, Paignton. Quantities by Mr. Charles Pinn, Exeter—

|                            |        |     |
|----------------------------|--------|-----|
| Stephens & Bastow, Bristol | £3,750 | 0 0 |
| W. Gibson, Exeter          | 3,693  | 0 0 |
| A. Poole, Ilminster        | 3,440  | 0 0 |
| Ranston & Mumford, Torquay | 3,037  | 0 0 |
| H. Webber, Paignton        | 2,979  | 0 0 |
| C. & R. E. Drew, Paignton  | 2,920  | 0 0 |
| S. Webber, Paignton        | 2,900  | 0 0 |
| W. J. Hatcher, Dawlish     | 2,890  | 0 0 |
| N. Rundle, Kingsbridge     | 2,814  | 0 0 |

\* Accepted conditionally.

Accepted for sanitary work, including new bath-room and other alterations at No. 60, Lowndes-square, S.W., for Mr. Thomas Lloyd. Mr. Mark H. Judge, architect—

|              |      |     |
|--------------|------|-----|
| Toten & Sons | £299 | 7 6 |
|--------------|------|-----|

For additions and alterations at No. 12, Half Moon-street, Mayfair, W. for Mr. Reeves. Mr. D. Cubitt Nicholls, architect—

|                          |      |      |
|--------------------------|------|------|
| Bulman & Dales           | £918 | 0 0  |
| G. H. & A. Bywaters      | 576  | 0 0  |
| Wetherill, Lee, & Martin | 593  | 15 6 |

For painting and repairs to the Workhouse, Homerton, for the Guardians of the City of London Union—

|                   |        |     |
|-------------------|--------|-----|
| T. A. Woodrough   | £2,220 | 0 0 |
| Duplock Bros      | 1,475  | 0 0 |
| W. Brass & Co.    | 1,350  | 0 0 |
| J. Outwater & Son | 1,350  | 0 0 |
| A. Chard          | 1,326  | 0 0 |
| Pack Bros         | 1,320  | 0 0 |
| W. Wythe          | 1,231  | 0 0 |
| W. G. Lark & Son  | 1,174  | 0 0 |
| J. & H. Cooke     | 1,100  | 0 0 |
| C. F. Kearley     | 1,073  | 0 0 |
| J. Camp           | 1,069  | 0 0 |
| E. Proctor        | 1,030  | 0 0 |
| Neave & Neave     | 957    | 0 0 |
| F. & F. J. Wood   | 883    | 0 0 |
| Dicksee & Dicksee | 879    | 0 0 |
| W. McCulloch      | 872    | 0 0 |
| J. Simpson & Son  | 593    | 0 0 |

For alterations at Carr's Hotel, 265, Strand, for Mr. Charles Lever. Mr. Thomas Milbourn, architect and surveyor—

|                       | No. 1. | No. 2. |
|-----------------------|--------|--------|
| Prater                | £75    | 2305 0 |
| Salmon                | 788    | 620 0  |
| Sanders & Sons        | 769    | 847 10 |
| Palman & Fotheringham | 738    | 543 0  |
| Hunt                  | 697    | 543 0  |
| Macey & Sons          | 685    | 587 0  |
| Drew & Cadman         | 684    | 525 0  |

\* Received too late.

For the erection of two terrace houses, being Nos. 5 and 6, Baring-terrace, St. Leonards, Exeter, and rebuilding front of No. 4 of same terrace. Mr. Charles Pinn, architect, Exeter. Quantities supplied—

|                |        |      |
|----------------|--------|------|
| Phillips       | £1,160 | 12 6 |
| Scadding & Son | 975    | 0 0  |
| Stephens       | 941    | 0 0  |
| Moss & Son     | 895    | 0 0  |
| Gibson         | 870    | 0 0  |
| Pinnell        | 847    | 18 0 |
| Sizer Bros.    | 770    | 0 0  |
| Holmes*        | 680    | 0 0  |

\* Withdrawn.

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our Office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

#### TO CORRESPONDENTS.

G. S. (we should say that he could recover, but it is really a question of law)—C. W. (we have long ago been obliged to decline answering questions of that kind. See permanent notice to that effect below).—P. W. H.—W. M. C.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Notes.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHERS, and not to the Editor.

#### PUBLISHER'S NOTICES.

THE INDEX and TITLE-PAGE for Volume XLVIII. (January to June, 1885) are given, as a Supplement, with the present Number.

A COLOURED TITLE-PAGE may be had, gratis, on personal application at the Office.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each, also.

READING-CASES (Cloth), with Strings, to hold a Month's Numbers, price 2s. each; also.

THE FORTY-EIGHTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence, will be ready shortly.

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Advertisements for the current week (or less) must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWING, TRIPPING, &c., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

**SPECIAL.**—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE ADVERTISING must reach the Office before TEN o'clock on WEDNESDAY morning.

PERSONS advertising in "The Builder," may have Replies addressed to the Office, 46, Catherine-street, Covent-garden, W.C. free of charge. Letters will be forwarded if addressed in envelopes are sent, together with sufficient stamps to cover the postage.

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"THE BUILDER" is supplied weekly from the Office to the proprietors of any part of the United Kingdom at the rate of 18s. per annum. To all parts of Europe and America 25s. per annum. India, China, Ceylon, &c. 30s. per annum. Remittances to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

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LIVERPOOL:

GLASGOW:

356 to 362, EUSTON ROAD.

6 and 8, HATTON GARDEN.

335, ARGYLE STREET.



# The Builder.

Vol. XLIX. No. 225.

SATURDAY, JULY 18, 1885.

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### The Spanish-Place Chapel Competition.

THE nine designs submitted in a limited competition for the new R. C. Chapel, proposed to be erected in place of the small church in Spanish-place, Manchester-square, were on view on last Saturday and Monday at the Convent, No. 9, Lower Seymour-street. The architects who were invited, the invitation being restricted to such as were members of the Roman Catholic communion, were Messrs. Herbert Gribble; Goldie, Child, & Goldie; Pugin & Pugin; Dunn & Hansom; Leonard Stokes; W. H. Pownall; J. Kelly; C. G. Wray; and A. E. Purdie. No premiums were offered, and we rather regret to observe that the conditions were fenced with a proviso that the promoters of the work did not bind themselves to accept the work or employ the talents of any one of the competing architects. This was, perhaps, only a formal safeguarding, but it looks rather shabby in a case where no remuneration of any kind was offered; and under the circumstances we must congratulate the Rev. Fathers on having been so well served by their lay brethren, for certainly no trouble has been spared in getting up most of the designs, which are of a high average of merit.

It may be mentioned that the church in Spanish-place, dedicated to St. Jago, the patron saint of Spain, was originally a private chapel attached to the Spanish Embassy, and the new church is about to be built partly by funds contributed by the King of Spain. A tribune is to be reserved for the Spanish Ambassador in the new building.

The new church is to seat 2,000 persons and to be raised on a basement story, with a presbytery attached, and to be in the Early English style "as practised in the twelfth and thirteenth centuries." The basement is specified to contain a confraternity-room, committee-rooms, store-rooms, and fireproof-rooms for heating apparatus. In regard to the church, the sanctuary is to be 30 ft. in length or depth, to be well lighted, and to be treated as the most important portion of the interior (this we should have thought went without saying); the altar step or predella to be 6 ft. above the nave floor. An organ-gallery is to be provided on one side of the interior, with space for sixty singers; there are to be five altars besides the high altar, and a baptistery, and eight confessionals, which are to be so arranged as not to project into the general area of the

building. There are to be two main entrances, one from George-street and one from South-street, besides another smaller entrance from South-street, and two sacristies with basements under them. The outside measurement of the site is 158 ft. by 80 ft., and the stipulated cost not to exceed 20,000*l.*, exclusive of basement story and tower spire; a somewhat odd way of putting it, since, though the tower and spire may be deferred till funds are forthcoming, the basement obviously cannot. The site is irregular in form, and somewhat awkward to treat; and it may be observed that all the competitors, except Messrs. Dunn & Hansom, have reversed the usual orientation, and placed what is ritualistically the east end at the western end of the site. The reason for this, we understand, is that the property adjoining the western boundary, which is part of the Portland estate, is not likely ever to be purchasable or negotiable, while that at the eastern end may be acquired at some future date; and as a church cannot well be lengthened from the sanctuary end, but may be easily lengthened from the nave end, it was thought best to place the nave in contiguity with the point of least resistance to further extension.

Taking the designs in the order in which they were hung, that by Mr. Pownall shows a three-aisled plan, with recessed chapels mostly on the north side and confessionals on the south; the main entrance and tower over at the south-east angle, the position in which most of the competitors have placed this feature. The style is very plain Early Geometrical; the interior is shown in a well-executed pen perspective, and is solid in effect, but not of the most refined order of detail. The sanctuary does not seem to fulfil the conditions of being well lighted, and the organ is too much "cornered" for effect, a matter constantly overlooked by church architects. The design is a fair working out of the problem, but not more.

It may be observed that the site widens from the east to the west end (we are using "east" and "west" throughout as the points of the compass, not in the ritual sense), so that both flanks of the building cannot be parallel to the street boundaries. The majority of the competitors have placed the building with its north flank parallel with and adjoining South-street on the north side, leaving the south side towards George-street as the one to play with in the way of projections; the porch and tower filling up a portion of the space between the street and the main building at one end, and the presbytery or clergy house filling up the wider space left at the other end. The comparatively shallow sanctuary taking the place of the larger chancel now in use in the Anglican

Church, most of the plans partake more or less of the basilica form with an apse at the sanctuary end.

Messrs. Goldie, Child, & Goldie's design is five-aisled, a disposition to which the rather broad proportions of the site somewhat naturally lead; indeed, it is evident that the shortness of the site in comparison with its width has hampered all the competitors a little in the matter of architectural proportion, though it has led to one or two effective devices for overcoming this difficulty of dealing with a church the importance of which demands that it should be lofty, while the measurements prevent its being proportionately long. The confessionals are arranged between internal buttresses against the north and south walls of the eastern portion of the nave, which externally spreads a little wider than the western portion. The organ is got much better forward and into the church than in the last-named design. The style is of a very pure Early English type, well worked out in detail; the interior is shown in a very fine coloured perspective; Purbeck marble shafts are largely employed in the piers and as vaulting shafts. Externally the authors have availed themselves of the five-aisled arrangement for piling up a crowd of flying buttresses in a double tier, and thus giving a mountainous effect to the structure, which they have endeavoured further to supplement by a considerable use of large turrets with lofty conical finials; the two sets supporting the angles of the tower and spire, above and below the springing of the spire, make a little too much of this kind of outline. The transept gables are effectively treated with sculpture and diaper ornament in the interspaces. The stairs to the triforium are well placed close to the George-street entrance, in a small projecting apse of their own. The confessionals internally are placed beneath low segmental arches opening towards the nave, between the main piers. The exterior indication of the confessionals, in the way of lighting, is various and characteristic in some of the designs; in the one we are now mentioning it is done by little gablet lights on the edge of the lean-to roof which covers them. This is better than the narrow wall-slits used in one or two of the designs, which have too utilitarian an appearance. The design could hardly be carried out as shown for the 20,000*l.* stipulated.

Mr. Herbert Gribble sends a fine set of drawings of a church in purely English Gothic style, a little later and more ornate in the matter of tracery than some others. His is a three-aisled plan, with confessionals between internal buttresses, as before. The sanctuary is square-ended externally and internally on the ground-floor, but becomes an octagon apse



above, with the canted sides carried on squinch arches. The organ-chamber is too much cornered, the sanctuary could not be said to be particularly well lighted, and the baptistery seems rather small and cramped for effect, though it may be large enough practically. Otherwise, this is a remarkably fine design; the interior, shown in a very fine pen-drawing, is lofty in effect, and refined in detail; the spire and tower show much grace of composition and richness of effect. The designer has in this case boldly turned the tower so as to stand square with the George-street boundary, and at an angle with the church, with unusual but not unpicturesque effect. The treatment of the buttresses, which are broad and solid, but broken by niches with statues in the middle stage, is very effective. The confessionals are externally lighted by small trefoil-cusped windows. If not very original, this design, for architectural beauty and completeness, stands very high.

Mr. Kelly's design has the reverse merits; it is decidedly original and clever, but not altogether beautiful. He is one of the competitors who has attempted special treatment suited to a short and broad site, and on a building mainly Gothic in detail (though not quite "as practised in the twelfth and thirteenth centuries") he has engrained a segmental central dome, the whole disposition being founded on Byzantine lines. The plan is three-aisled, with an abnormally wide centre aisle, but the arcade is interrupted by the large piers for the arches which carry the pendentives and the central dome. The sanctuary is a large semicircular apse with an ambulatory and arcade round it, carried on cylindrical piers. The baptistery, which, as in all the designs but one, is at the east end facing the sanctuary, is nearly circular and cut off a good deal from the church. The confessionals and chapels are not sufficiently amalgamated with the architectural design; they do not form an integral part of it on the plan; it is more as if certain spaces on the wall were arbitrarily called chapels and confessionals: this architecturally is an incompleteness. The organ and choir are cramped for space and far too high up for effect. The turrets flanking the dome, and the lofty wire-drawn tower and spire, are anything but satisfactory; the latter looks better in the perspective view than the tower drawn on the elevation could possibly look. The interior is shown in a somewhat powerful but rather splashy pen-drawing, with the dome shown as no dome looking from the floor of the church ever could be seen. This, however, is a failing common to nearly all draughtsmen who essay to make drawings of dome interiors; they will show the dome, regardless of the possibilities of angles of vision; and we never saw a set of competition drawings of domed interiors in which all the domes did not look as if they were endeavouring to crawl down the wall on to the floor. With many defects of detail, however, this design has the great merit of original treatment, arising out of the circumstances of the site.

Mr. Leonard Stokes's design also shows special treatment on plan for a wide site. The nave commences as a five-aisled one, but expands into a central area somewhat after the manner of St. Stephen's, Walbrook, only that the supporting piers are arranged on a hexagon instead of an octagon. The sanctuary end is tri-apsed (internally), with semi-octagonal apses, the two side ones forming chapels. Contrary to the arrangement of most of the other plans, the tower is placed at the north-west angle, towards South-street; and the main entrance from George-street is placed at the centre of the south side, with two external porches giving access to a semicircular arcaded vestibule, whence an inner door leads into the church at the point where its south wall forms a tangent to the semicircle. This is a very pretty bit of architectural effect. There is a separate entrance and cloister leading to the baptistery, at the east end, where most of the others have placed their main porch. The central space is treated not as a cupola, but as a kind of transept with arches thrown across the angles. The main roof-line is unbroken, and the central treatment only indicated by

the fenestration; we should have preferred to see it marked in some way in the roofing. The organ and singing gallery occupy the whole width of one side of this central space, a very good position acoustically, as the sound is not shut off by any intervening walls and piers. The confessionals are placed between internal buttresses, and marked externally by small couplet windows. The design is apparently intended for execution mainly in brickwork externally, and is simple and severe in style. The tower has a massive and almost unbroken lower stage, with a stage of large and high lancet windows in triplets above, and high lucarnes at the base of the spire. The interior, which is shown in an exceedingly fine pen-drawing, is lofty in effect, and the triforium gallery, instead of being over the main arcade, which would have thrown it too high, is represented by a gallery crossing the middle height of the main piers, in the manner found in a good many German churches, as also at Southwell. It is not a genuine triforium, in fact, but is more useful for any practical purpose to which it may be put, and does not interfere with the general effect of the interior,—indeed, it is of constructional value in giving lateral support to the lofty and not very massive piers. The treatment of the vaulting over the centre area is unusual and very graceful in effect. As a whole, this is a very fine design shown in an admirable set of drawings.

Mr. Wray sends a design of a three-aisled church of a somewhat ordinary Gothic type, with an attempt at originality in the treatment of the spire, which rises off a large open stage with very inadequate-looking piers; the architect has intended something piquant, but not very successfully. The roof is of timber (nearly all the others have groined vaulting), with a segmental section at the actual ceiling, and large trussed and foliated brackets below, which we fear must be called rather "gimcrack" in style. A very finely-coloured interior view is shown.

Mr. E. A. Purdie's design also is one that has not much to recommend it in comparison with the best of the others; it is what may be termed regulation Gothic, correct and with no offence against taste, but not exhibiting any very special merit. The plan is three-aisled, and the sanctuary a rather small semi-octagon apse; the baptistery also is rather small, and the organ space very much cramped. The design shows a massive square tower with apex pinnacles and no spire.

Messrs. Pugin & Pugin are true to their family architectural traditions, and go in for lofty effect, internally especially, where very lofty arches and slender piers fly upwards to culminate in an open-timber roof designed also so as to accentuate height as much as possible. The sanctuary end is triapsed, the apses being semi-octagon, but the central one breaks into the sixteen-sided figure above. The general style is somewhat later than that adopted by most of the competitors, and almost purely English; the clearstory has triple lancets, the triforium coupled windows, each in two lights with Early Geometric tracery. The roof being timber no flying buttresses are required, but the aspiring and pyramidal effect of the exterior is sufficiently realised without them. The whole shows thorough knowledge of Gothic feeling, and is a fine design, a little deficient in breadth and power.

Messrs. Dunn & Hansom send a very original and clever design, differing very much from all the rest. They alone put the sanctuary at the east end of the site, preferring ritualistic practice, we presume, to practical considerations; and they have concocted a very clever and unusual ground-plan, with a five-apsed or *chevet* arrangement,—at least, something approaching a *chevet*,—at the east end, so contrived and treated as to look as if arising naturally out of the shape of the site, the apses or chapels being external features at the points where they can be seen, internal only where their effect would be lost from outside. The plan is five-aisled, but, in reality, is very near a square in its main proportions, and has a central tower and lantern carried on crossing piers, for the centre portion is really a transept.

The designers appear to lose a certain amount of floor-space area, however, for practical accommodation, and the *chevet* arrangement is partially reflected at the west end, where one of these quarter apses at the angle,—an exact repetition of the one in the corresponding position at the opposite end of the church,—is made to do duty as a baptistery; certainly not a happy idea either ritually or architecturally. The organ is placed at one side of the crossing or transept, in a very central and open position. The perspective views of exterior and interior, in pencil, and rather slightly drawn, are very good, and show some admirable bits of effect, and the octagon lantern to the tower is charming. The design has some practical defects, but it is one of the most original and pleasing of the whole in many ways, and is highly creditable to its authors.

Since the above comments were written, the decision of Mr. Fergusson, who acted as architectural adviser in the competition, has been communicated to us. It runs as follows:—

"Every one that examines, even in the most cursory manner, the nine sets of drawings sent in competition for the new church in Spanish-place, must, I think, be struck with admiration at the high standard of average excellence which has been attained in their production. There is not one among them which, if carried into execution, would not result in the production of an appropriate and dignified parish church, suitable to the locality; and all display an amount of thought applied to the subject, and a familiarity in designing in the style indicated, which are most creditable to their authors; nor is there one of them which does not exhibit some feature of excellence of design, in some part, which is particularly fascinating, and which if possible every one would like to see carried into execution."

The great amount of thought, combined with the skill and ability displayed in all the nine, renders the office of selecting one for execution a task of considerable difficulty and anxiety; but after the most earnest attention I can bestow on the subject, I have no hesitation in selecting that by Messrs. Goldie, Child, & Goldie as the one that fulfils the purposes for which the competition was instituted more completely than any of the others. With certain changes and modifications which can easily be introduced before the working drawings are completed, the result I feel convinced will be the production of a church with all concerned in its erection will have every reason to be perfectly satisfied."

Cardinal Manning has approved the decision, which we presume will be acted upon. Without seeing the whole collection in quite so *couleur-de-rose* a light as Mr. Fergusson does, who must be more easily satisfied about Gothic, as shown in some of the designs, than we should be, we quite agree that there is a high and very equal standard of merit in the majority of them, and that the choice cannot be regarded as otherwise than a reasonable one, though there may be individual differences of opinion about it.

#### CROOKS AND CROZIERES.

BY FREDERICK GEORGE LEE, D.D., F.S.A.

*The Crook or Pastoral Staff.*

**T**HIS is the official staff of office of an archbishop, bishop, abbot, or abbesse, formerly bestowed at consecration, or benediction, and is commonly formed on the model of a curved shepherd's crook,—the prelate or abbot being regarded as the shepherd of his diocese or fold. Anciently the pastoral staff was termed (1) *Baculus pastoralis*, (2) *ferula*, (3) *pedum*, (4) *cambuca*, or (5) *cambiva*, and (6) *baculus episcopalis*.

So early as the sixth century St. Isidore of Seville, in his treatise on "The Ecclesiastical Offices," wrote thus,—"*A staff is bestowed on a bishop at the time of his consecration, that he may, as this symbol suggests, both govern and correct the flock committed to his charge, and likewise support the infirmities of the weak.*" St. Cæsarius of Arles, who flourished A.D. 502, is said to have used the pastoral staff on all public official occasions; and his

\* "Episcopo, dum consecratur, datur Baculus, ut ejus pectus sibi subditum plebem vel regat, vel corrigat, vel infirmos infirmorum sustineat."—*Isidorus Hispalensis De Dign. Offic.*, cap. 8.





Fig. 1.



Fig. 2.



Fig. 3.

"was of wood,\* in shape like unto the crook of a mere shepherd." At least, so Hittorpius, as quoted by Henry Wharton, the antiquary, maintains. St. Fillan's, still existing, is of the same type.† For fourteen centuries or more the staff has usually taken this form; though originally, being, in the earlier periods, borrowed possibly from the rod of Moses, the official staff of the Hebrew judges, or, it may have been, from the sceptre of the king,—the regal symbol of authority to rule and to correct,—it was probably a mere hand or walking-staff, with a knob or small ball at its top, and a *ferula* at its point. Such is actually the traditional staff of St. Peter, which is said to be preserved at Naples. Occasionally the head of the staff was subsequently shaped like the Greek letter Tau, making what is known as the "Tau-cross." An example of this shape in carved ivory, with rude heads of animals, and interlaced work at the ends of the arms of the cross, and with a figure of our Lord seated giving the blessing, may be seen at Limburg.‡ Another still remains in the old Benedictine Abbey of Deutz, traditionally believed to have been that of St. Herbert, archbishop of Cologne. It is of ivory, the ornamentation being Byzantine work of the tenth century. A crucifixion with Mary and John, with the sun and moon above, are found on one side of the head, and our Lord seated in glory on the other. At the end of the arms of the "Tau Cross" are conventional lions' heads, with interwoven bands and archaic acanthus flowers. An inscription runs thus:—*Reliquia Sancte Marie et Sancti Christophori.*§ A friend informs me that at Peterborough, Durham, and St. Paul's, London, the old inventories contained what were probably descriptions of this ancient kind of pastoral staff.

Another example of the Tau cross (showing its use in Scotland in early times) may still be seen represented in the hand of a bishop in a sculptured figure towards the

base and near the entrance to the remarkable round tower of the cathedral church of Brechin (see fig. 1). This entrance, short and narrow, under a bold semicircular arch, consists of four large constructural carved stones, edged with a rude pellet ornament, the one at the head with a Byzantine crucifix (the figure apparently draped and crowned), carved at its apex, and the two perpendicular stones with projecting carvings of two prelates, one on either side. That on the right side, wearing a kind of tippet or surplice, holds a short pastoral crook; that on the left, vested in eucharistic vestments, bears the Tau cross-headed staff (see illustration). On either side of the lower horizontal stone, which is quite plain, though similarly edged with a pellet ornament, are representations of two wolves, couchant, facing each other, much weather-worn. Some specimens of similar Tau-cross pastoral staves are also found represented in old sculptured tympanums in the South of Ireland; while examples still exist in well-worn sculptures at Rockcliffe, Cumberland; on the churchyard cross of Great Bedwin, Wiltshire; at Trewoof, Cornwall; and at Landewednack, in the same county. There were anciently a Tau-cross staff and Book of the Gospels visible on a grave-stone in the choir of St. Antholinus's Church, Manaccan, as the late Rev. Dr. George Oliver, of Exeter, who described and secured a sketch of it,\* put on record; but it is now lost. That valuable sketch is reproduced in fig. 2.

Several interesting examples of pastoral staves of the Mediaeval period are preserved in England. That of William of Wykeham at New College, Oxford, has often been described and illustrated. The pastoral staff of Bishop Fox, of Corpus Christi College, Oxford, of scarcely less interest, both from an antiquarian and archaeological standing-point, is less known, but is also of singular beauty and merit, both in design and execution. Here the best art in detail is evident throughout, while the general effect is excellent. The accompanying sketch (fig. 3) gives an idea of its general character.

In York Minster the silver pastoral staff of Dr. James Smith, born at Winchester, Roman Catholic Bishop of Callipolis *in partibus infidelium*, is still preserved. He was vicar apostolic of the northern district from 1688 to 1712, with a stipend of 1,000*l.* a year paid out of the royal exchequer. The staff in question, 7 ft. in length, with figures of the Blessed

Virgin and Child in the head, with the arms of the donor, Queen Catherine of Braganza, and with those of the bishop himself on shields, evidently of Spanish workmanship, was seized by force at one of the bishop's episcopal visitations by Thomas Osborne, Earl of Danby, who subsequently, *i.e.*, in 1694, became Duke of Leeds, who presented the staff to Thomas Lamplough, archbishop of York, a most reverend receiver of stolen goods.\*

There is an oak pastoral staff, from Mr. Butterfield's design,—somewhat rude and clumsy, however, attached to the stall of the Bishop of Oxford in the private chapel of Cuddesdon College, while seventeen of the Anglican bishops† and four of those of the Protestant Episcopal Church in Scotland‡ are said to have either procured or accepted similar staves of office, all of different merit as regards design and execution, but some of considerable intrinsic value and of great artistic beauty. The Colonial bishops, in many cases, have likewise adopted the Pastoral staff. That of the Bishop of Dorchester, O.C.R., from an ancient model of great simplicity and beauty, is of ebony and silver, with the arms of the see.

A modern staff, for Bishop Tozer, designed by Mr. R. J. Withers, deserves a detailed description and high commendation. It is constructed of ebony, ivory, and silver,—its height being 5 ft. 9 in. The crook is of ivory, being an irregular octagon in section about 10 in. long by 5½ in. wide, gradually diminishing in size from the commencement and ending on a flowing leaf, in the eye of which is a six-foiled conventional flower of hammered silver, with two faces and a carbuncle in each. On the faces of the crook are twenty-seven other carbuncles, while along its crest stiff-leaved foliage of beaten silver is placed. The whole of the silver, either hammered or engraved, is parcel gilt.

There are many ancient specimens of different types to be seen in our own public museums and exhibitions. The examples at the British Museum, ranging from the tenth to the sixteenth century, would enable a student of Church archaeology to learn their peculiar antiquarian characteristics. The private collection of Lord Zouch of Haryngworth likewise contains some exceedingly beautiful examples; while there are specimens (some, however, mere detached heads and fragments) of singular interest, both in the South Kensington Museum,§ in the Museum of the Royal Irish Society in Dublin, and among the collections of the Society of Antiquaries of Scotland in Edinburgh.

The destruction of such ornaments during the Tudor changes was so vast and disastrous, that the examples preserved are all the more valuable. Abroad specimens are numerous, but those of early work, and singular merit, are generally known to archaeologists, while many of the most interesting have been described and represented.

In the treasury of Cologne Cathedral, a pastoral staff of the fifteenth century, not unlike, both in general design and detail, those of Fox and Wykeham at Oxford, is preserved. In its head it has a figure of a prelate in mitre and cope kneeling before the Virgin

\* The "Episcopal Succession," &c. By W. Marile: Brady. Vol. iii., p. 247. 1877.

† These staves are not now given to the bishops by the officiating metropolitan, who consecrates them during the ceremony of consecration, for this expressive rite was abolished under the Tudors; but the staves, when subscribed for and procured, are subsequently presented by some distinguished layman. The Earl of Cors, Master of the Queen's Buckhounds, recently presented a staff to Lord Arthur Hervey, Bishop of Bath and Wells. The late Bishop Christopher Wordsworth, of Lincoln, wrote thus twenty-two years ago:—"Might not they [the Tudor Reformers] have left the episcopal mitre? and especially the episcopal crozier, that beautiful, affecting, and expressive symbol of the love and care of the faithful shepherd in feeding and tending the flock of Christ?"—"Journal of a Tour in Italy," by Christopher Wordsworth, D.D. In two volumes, p. 52. London: 1865.

‡ In a portrait of Dr. H. W. Jernyn, Bishop of Brechin, in the Royal Academy this year, he is represented in the mere domestic dress of a prelate, and with the staff in his right hand. This, of course, is an error, for the staff should be always borne in the left hand, so that the right hand may be free with which to give the blessing. Moreover, a staff implies a corresponding mitre and cope, and should not be assumed with the ordinary domestic dress of rochet, mantle (or chimera), scarf, and bands.

§ Some of these have been illustrated in the official publications, treatises, and handbooks.

\* *Lignos erat S. Barchardi baculus, etai Wircoburgensis ecclesie longo esset opulentissima. Unde commendandus ejus modestie anam arripuit Vite S. Barchardi Scripser.*—*De Baculo*, P. A. Krazzer. 1786.

† For three illustrations of St. Fillan's pastoral staff, with a crook, see "Scotland in Early Christian Times," by Joseph Anderson.

‡ See "Glossary of Liturgical and Ecclesiastical Terms," by P. G. Lea, p. 272, where it is depicted. London: 1877.

§ On an ancient specimen referred to by the Rev. Dr. Canon Rock, the following expressive sentence was engraved:—"Dum tritus ferit, misericordia recordari," with the words "Homo" and "Pere" as completing and giving point to the injunction.

¶ Item, baculus ejusdem cum canibus cornea, conatus interius vineam circumplectentem leonem de cupro lastrato.—"Inventory of St. Paul's," transcribed by William Dugdale, and printed in his "Monasticon Anglicanum," p. 513.



and Child; and is especially rich in its intricate but beautiful tabernacle-work and crocketing running along the whole of the head of the crook.

A Flamboyant staff of silver, with *vezillum* attached, is preserved at St. Martin's Church in the same city, with figures of St. Martin and the beggar in its head.

The head of a pastoral staff of Flamboyant work remains in the Church of St. Ursula, Cologne, containing a seated figure of that saint under a canopy in its crook. The design is severe. The extreme end of the curved head and the staff itself have been lost.

As regards figures of post-Reformation prelates, that of Miles Magrath, appointed archbishop in 1570, in Cashel Cathedral, who died in December, 1622, is represented mitred, with his pastoral staff in his left hand.\* The same is the case with Archbishop Samuel Harsnett of York, who died May 25, 1631, and was buried at Hull. On a brass the staff is represented in his left hand, while he holds a Bible in his right. At the funeral obsequies of Bishop Brian Duppa of Winchester, in April, 1662, William Ryley, Lancaster Herald, carried the bishop's crook or pastoral staff;† and the same was the case at Archbishop Juxon's funeral, July 9, 1663, when Elias Ashmole bore the archiepiscopal crook, *not* the crozier.

In Lichfield Cathedral, Bishop John Hackett, who died October 28, 1670, is represented with his crook in his left hand; Robert Creighton, of Wells, who died November 21, 1672, on his monument in Wells Cathedral has his mitre and pastoral staff; Richard Sterne, Archbishop of York, who died July 18, 1683, John Dolben, who succeeded him, was Primate of England, dying April 11, 1686; as well as Thomas Lamplugh, who died May 5, 1691, and John Sharpe, February 2, 1713, each and all of York, on their monuments are represented as having mitres on their heads, and pastoral staves either in their hands or placed at length on their left shoulders. Archbishop Gilbert Sheldon of Canterbury, a great benefactor to Oxford, who died in 1677, and was buried at Croydon, on his monument likewise holds his pastoral staff; and in more recent times similar traditions have been observed and followed. There is scarcely an English cathedral in which such may not be discovered.

I now pass on to the second part of my subject, briefly treated; but mainly by dealing with facts.

#### The Crozier.

This is termed, in old Inventories, "Warden's Accounts and Church Ledgers," the "crook-staff," "crosstave," "croce," "gang-staff," "rogacion-stave," and "crokesstaff." In some cases these terms described the ordinary processional cross of the church or abbey.‡ But in chief cathedral and metropolitan churches they often had reference to the cross of jurisdiction on solemn and special occasions borne before the archbishop (or bishop, as in the case of Meath, in Ireland) as a symbol of jurisdiction, and in addition to the pastoral staff which he himself carried in his left hand. The error of confusing the pastoral or shepherd's staff and crook with the crozier, which is a cross upon a staff, and not a crook at all, is constantly made.§ But it is an error, and not less so, because uninformed persons, and mere superficial though dogmatic writers adopt and perpetuate it. In some cases, as at Lisbon, Arles, Ravenna, Cologne, Lyons, and Venice, a cross with double transverse arms was used,—technically, a "patriarchal cross,"||

—either by ancient custom or special grant from lawful authority.

Abroad such *ornamenta ecclesiastica* are very numerous, though old examples are rare. There is, for instance, an archiepiscopal crozier of silver-gilt in the Treasury of Cologne Cathedral of singular beauty and great simplicity. The staff is of a remarkable artistic character, being both of graven and of beaten work. In the centre of the cross itself is a representation of the crucifixion with Mary and John, and at the end of the four arms the evangelistic symbols. One of the inscriptions in Leonine verses is said to be of the date A.D. 1178, but this is probably the copy of an older original.

There is also another fine crozier used at archiepiscopal visitations, &c., in the sacristy of the Church of the Assumption at Cologne. It is of sixteenth-century work, with a figure of our Lord on the Cross, which has fleur-de-lis ends and symbols of the Evangelists within circles on quatrefoils. Tradition makes it the original archiepiscopal cross of Herman of Cologne. This, however, on inquiry is found to be doubtful.

The processional crucifix at St. Columba's Church in that city, very elaborately jewelled and richly crocketed with beaten work, is likewise of great artistic merit. Of the ordinary type in design, the general effect is much heightened and enhanced by its rich and appropriate details. This also, as I have been credibly informed, is reputed to be an archiepiscopal crozier.

At the funeral of Archbishop Lindsay of Armagh, his Grace's steward bore a rod of office before the corpse, the pastoral staff, signifying character and pastoral dignity, was carried by another official, the mitre by a third, and the crozier, indicating jurisdiction and authority, by a fourth,\* thus distinctly marking off the latter from the crook. An exactly similar observance was followed at the burial of Archbishop Frewen of York, in 1664, when the pastoral staff, as well as the cross-staff or crozier was borne, as also a silver mitre, by three appointed officers before the corpse.† At the funeral of Bishop Matthew Wren, of Ely, on May 11th, 1667, at Pembroke College, Cambridge, a pastoral staff of silver, with the crook gilded, was borne in the procession to the vault, together with a silver-gilt mitre, carried on a purple velvet cushion, during the burial obsequies. The same was the case at Bishop John Cosin's interment, at Bishop's Auckland, in May, 1671, when, in accordance with a custom universally restored at the restoration of King Charles II., a mitre and pastoral staff, as well as a banner and crozier,‡ a cross-staff between banner-rolls" was carried at the head of the coffin, covered with "a rich pall of purple velvet." The cross-staff was borne in addition to the crook, "Cosin being chief of the palatinate, and having judgment of life or death." The pastoral staff and mitre were likewise carried before the corpse of Sir Jonathan Trelawney, bart., some time bishop of Winchester, one of the celebrated "seven bishops" of James II.'s reign, while mitres and staves of gilt were placed over the tombs of Bishops Morley (1684) and Mews (1706), in Winchester Cathedral, and still remain. At the same time it must be admitted that, except at certain coronations, mitres and pastoral staves have been seldom or never used by English bishops. The archiepiscopal crozier, since the time of William Warham, has scarcely ever been seen. Its use was dropped by Cranmer. Matthew Parker used only a walking-staff, crowned with a knob.

At funeral ceremonies, — where ancient customs and traditions are observed, — the pastoral staff, occasionally draped in black silk or crape, should not be broken, as the staff of the kings of arms is broken; but at the close of the ceremony, *sede vacante*, should be handed

over to the clerical representative of the Episcopal chapter (exercising jurisdiction) who carries it away with its crook downwards,\* — abroad to the Vicar Capitular, — to be used at the consecration, or formal installation and enthronisation, of the succeeding bishop.

In the case of the Archbishop of Canterbury's new cross or crozier, — a beautiful piece of workmanship enough, and a munificent gift to the see, — two obvious mistakes have been made. Firstly, the so-called "crozier" is neither a metropolitan's crozier, such as former Bishops of Rochester† carried before the Primate of all England; nor is it such a pastoral staff as former archbishops themselves carried in their left hands. It is a compromise between the two, — a pastoral staff, after ancient models from the *ferula* up to the knob, but beyond that, wanting in a crook, and surmounted instead by a cross, too small for the crozier of an archbishop, and making a novel combination, altogether without precedent or authority. Secondly, the amount of money collected was quite sufficient to have provided both a cross and a pastoral staff, each of which might have been readily enough designed to have matched and corresponded with each other. For the difficulty, as Report says, was how to spend all the money collected on a single instrumentum.

#### THE EXTENSION OF INSTRUCTION IN DRAWING TO CHILDREN IN ELEMENTARY SCHOOLS.

THE Education Code for 1885 was some time since published and laid upon the table of the House of Commons. The subject came before the House on Tuesday last, when Mr. Stanhope introduced the Education Estimates. One of the newest of the charges in these Estimates is that providing for the cost of the introduction of drawing amongst the "class subjects" taught in elementary schools. These "compulsory subjects," as is well known, are the three Rs; then there are subjects examinations in which, — two or three at most, — may be taken somewhat optionally by classes *en masse*. These are the "class subjects." Besides these, there are "specific subjects," which are more or less limited to the elder children in elementary schools, and the examinations are taken by individual scholars. The courses of instruction in "class subjects" are arranged in seven standards; and the course of drawing for elementary school children for the first time in the history of national education has been accordingly treated. Two broad divisions are developed in the seven standards of drawing, viz., freehand drawing and geometrical drawing. The standards are as follow: —

Standard 1.—Drawing freehand, and with the ruler, of lines, angles, parallels, and the simplest right-lined forms, such as some of those given in Dyce's Drawing-book. (To be drawn on slates.)

Standard 2.—The same, on paper.

Standard 3.—Freehand drawing of regular forms and curved figures from the flat. Simple geometrical figures, with rulers.

Standard 4.—Freehand drawing, from the flat and from simple rectangular and circular models. Drawing to scale. Geometrical figures with instruments.

Standard 5.—The same as 4, with the addition of easy common objects. Plans and elevations of plane figures and rectangular solids in simple positions. Simple scales.

N.B. In order to interest the children, it will be advisable to teach them to draw as early as possible from actual objects, such as the doors and windows, furniture, and apparatus of the schoolroom.

Standard 6.—The same as the 5th, but of

\* "History of Ireland." By Ware. Folio, vol. i., p. 485. Dublin and London. 1764.

† "Certificates concerning Funerals," in Library of College (Arms. I., viii, 85.

‡ According to the Old Sarum rite, the processional cross, used during Lent at the Sunday procession and at bidding of bedes before High Mass, was made of wood and painted red.

§ "A crozier is a pastoral staff, two names for the same thing." — Church Times, April 10, 1885.

|| A foreign Catholic Archaeologist, the Count Contal, informed me in 1877 that, anciently (as represented in an old picture), a cross with double arms stood immediately behind the altar of the ancient and most interesting Church of Torcello, which once possessed certain metropolitan rights.

\* "History of St. Patrick's Cathedral," by Mason, p. 216, footnote. Quarto. Dublin: 1820.

† MS. note by Sir C. G. Young, Knt., of the Herald's College, Garter King of Arms, marked "Precedents."

‡ The Bishops of Durham were formerly Counts Palatine, decreeing, by their Courts (in which the King's judges sat by writ from the Bishop), legal decisions, even regarding life and death; possessing, consequently, an almost unique jurisdiction, symbolised by the crozier.

\* "Notes regarding Funeral Observances" (in which there are references to French, Flemish, Italian, and Spanish traditions and customs), by Sir George Nayler, Knt. (p. 17). (Tract without a date.)

† The Bishops of Rochester from time immemorial have been *ex officio* provincial *crozier* of the Province of Canterbury, and, on very important occasions, have borne the cross or crozier of the metropolitan before the Primate of All England.



greater difficulty; and for geometrical drawing, the same as the 5th, with sections.

**Standard 7.**—Drawing any common objects and casts of ornament in light and shade; and for geometrical drawing, the same as the 6th, but with circular solids and sections.

Up to the present time that part of the country's system of education which applies to instruction in drawing and its ramifications, leading into painting, modelling, composition, and design, have been wholly under the supervision of the Science and Art Department. Payments on results of examinations of individuals are made by this Department to elementary schools and the special classes of schools of science and art organised throughout the country by local committees; but, under the new order, the payments on results of drawing in elementary schools will almost entirely disappear from the estimates of the Science and Art Department, to be merged for the most part into those of the Education Department.

The change effected should eventually tend to greatly extend instruction in drawing in elementary schools, though the limit of all results grant (17s. 6d.) per child may at first create some obstruction to this extension. Steps, however, have been taken to mitigate this obstruction, and the limitation of 17s. 6d. is not to be allowed to press too hardly upon any schools where the amount of grant per child reaches the maximum, and this without payment for drawing results. Indeed, for the next year, schools have the option of earning grants, either, as at present, from the Science and Art Department, or from the Whitehall Department. In time, perhaps, the elementary drawing instruction may even be expected to be still further generalised by being grouped with compulsory writing. Although the Royal Commission on Technical Education pressed for its immediate adoption, this is probably far distant, and must, of course, be now dependent upon the progress which may be made with drawing as a "class subject."

Under the Science and Art Department there have been two grades of instruction in drawing for elementary schools,—namely, the first and second grade. The first grade may become extinct as the adoption of elementary drawing as a "class" subject proceeds; but the second grade, which includes a wider range of subjects perhaps than the seven new standards of drawing, and exacts higher degree of efficiency, will henceforth be the lower, as the third grade is the higher level of attainment which students at the special art classes and schools of art are required to reach in order that payments on results may be made in aid of these institutions.

Instruction in drawing in elementary schools was first encouraged by Government grants in 1853. During that year some 6,000 children, at about eighty national and other elementary schools, were receiving lessons in drawing. Thirty years later, 767,194 children were learning to draw at 4,500 elementary schools, and 511,300 were individually examined in one year. The importance of drawing, as a branch of general education, had all this time been growing in the minds of educationalists. Seeing, however, that barely 19 per cent. of the aggregate number of children in elementary schools were learning to draw, and that within the last two or three years there had been a falling off even in this low rate of percentage, it was clear that something more than the system fostered under the Science and Art department was wanted. Accordingly it fell to the lot of the Royal Commission upon Technical Education to collect and weigh such facts as those above stated, and the result was that the Royal Commissioners gave the position of honour in the recommendations which concluded their report to the following:—"That rudimentary drawing be incorporated with writing as a single elementary subject, and that instruction in elementary drawing be continued throughout the standards."

In the direction of this recommendation, the transfer of the encouragement of instruction in elementary school drawing from the Science and Art Department to the Education Department has, therefore, been put forward for

Parliamentary sanction. The Royal Commissioners had recommended (but without much show of knowledge as to the working of Board schools and inspectors) that the Inspectors of the Education Department, Whitehall, should be responsible for the instruction in drawing. This, however, as any one having a most casual knowledge of schools and their management must know, was a futile and impracticable recommendation. Accordingly, as is understood, the actual appraisalment of the quality of drawing done in elementary schools by children will not be transferred to Her Majesty's overworked Inspectors of Schools, and the machinery which has hitherto been used for gauging the merits will continue to be employed; in fact, the Science and Art Department will retain the exercise of a function it has pre-eminently qualified itself to regulate, namely, that of an examining body.

It would appear that in many cases, where the 17s. 6d. limit above referred to does not operate stringently, the new conditions will render payments on results of instruction in drawing rather more liberal in amount and character, and at the same time more dependent upon continuous work than heretofore. As a rule, the elementary schools, in preparing their children for the drawing examinations, have, as far as they could, minimised the period of instruction and preparation. The virtue of the teaching has been spasmodic rather than normal, and in this way the work really done was not of such lasting value as it deserved to be. Children were instructed individually, and not, as will be the case in the future, by schools. The new order of things recognises the spirit of Adam Smith's opinion, that "there is scarce a common trade which does not afford some opportunities of applying to it the principles of geometry and mechanics, and which would not, therefore, gradually exercise and improve the common people in those principles the necessary introduction to the most sublime as well as the most useful sciences." And no such opportunity occurs for a practical exposition of this elementary principle, which may be so wide-reaching in its effect as that presented in the arrangements for teaching the millions of children in our Board and National schools.

#### ETCHINGS OF OLD LONDON.



WE have deferred for an unconscionable time doing justice to the fine portfolio of etchings published by Mr. Ernest George under this title,\* and which form a collection interesting both archaeologically and artistically; not indeed in equal degree, for we hold the artistic interest of such work as of a higher nature than the archaeological. The record of the facts of an old building, historically, may be given as well with inferior artistic means and in a more commonplace manner; indeed, there are various methods of conveying it more accurately than etching can generally accomplish. But etching lends itself peculiarly well to the task of giving the poetry and picturesqueness of these ancient structures. It tells us not merely what was the construction and the detail of this or that old building,—sometimes it may not give us these facts at all clearly,—but it represents what was the mental value of the object to our associations and our sense of artistic effect and expression.

The author remarks in his preface that it was not his aim to give "views" of London, or to set forth its public or leading buildings, but to furnish a few examples of the old houses that remain, telling how the street or river-side appeared in former days. "Those who see the overhanging stories of Staple Inn, Holborn, or the picturesquely-broken line of buildings in Wych-street (even while we write being pulled down), are apt to speak of these as being 'quite Continental.' It should be remembered that this mode of building was English as truly as it was French

\* "Etchings of Old London." By Ernest George, with descriptive letter-press by the author. London: The Fine Art Society. 1884.

or German; but in England we have been busier than our neighbours in restoring or destroying the works of our forefathers." Perhaps it might be added that we have attained to a clearer perception, or are attaining thereunto, as to the importance of substantial and sanitary building in towns. But the argument is rather beside the mark, after all. We, at all events, do not take up a collection of etchings of this kind so much for the sake of seeing what has passed away, or what is soon to perish, as to enjoy the poetry of light and shade to which many of these buildings lend themselves much better, certainly, than most modern and more utilitarian structures: a poetry which no doubt is heightened by the sense of old associations which clings around them, and blends itself, consciously or unconsciously, with the pleasure derivable from the artistic balance and suggestiveness of the picture.

The author complains that since he planned the idea, some years ago, of a collection of memorial sketches of Old London, he has in that time seen about one-third of his twenty subjects destroyed. This is not the case, at any rate, with the subject of the etching of which we have given in this number as good a facsimile as another method can give of etching,—"London Bridge"; although it was in some danger of being aesthetically destroyed some few years ago. The bridge foreshortened, with the Monument and St. Magnus's Tower in the distance, makes a very fine composition, but we do not think either the process of etching or the author's style is quite so successful in giving the really fine elements of a structure like London Bridge as it is with more ancient and what are usually called picturesque structures. The great sweep of the arches, and their width, are not conveyed in this view, partly perhaps because there is not so much change of tone towards the middle distance as a water-colour medium, for instance, would enable the artist to command. "Old Battersea Bridge," on the other hand, is a subject after the etcher's own heart, and is treated with great force and effect in a very powerful etching. "Putney Bridge" is not included in the list of etchings, though the author, of course, appreciates what may be called its "etchability," and observes that passing either of these two bridges, "it is always some satisfaction to find these wooden relics of the past still extant." We presume Mr. George is not a boating-man, and goes over these dear old bridges, and not under them. If he did, he would realise the fact that they are not only highly inconvenient in blocking the waterway, but that at certain stages of a strong tide they are not a little dangerous, and ought to be cleared away as soon as possible. Nor is it the case that Putney Bridge is to be "supplanted by an iron rival"; the new bridge is a very fine granite one, with no iron about it except what is being temporarily used as centering.

Among the other etchings one of the most picturesque and effective is that of "Paul Pindar's House" in Bishopsgate-street,—a bit of poor old street front building such as modernising Acts put effectually out of our reach. Here, however, it is the same as with the timber bridges; the style of house which looks so picturesque is not one to be encouraged, on practical grounds, in a crowded city; and it behoves the modern architect to think whether he cannot be poetic in more stable and sanitary materials, though in a different kind of manner, perhaps. "Wych Street," again, makes a very effective etching, but it suggests the sanitary reformer at once; indeed, the etching rather, we think, exaggerates its former dilapidated appearance. There is a stage in the history of streets when it is an obvious duty that they should be etched,—and then taken down. The "Harbour-Master" Inn at Limehouse is still more picturesque, and does not affect one's sanitary conscience so much, since it has the river breezes to purify it (if breezes from a sewage-laden river can have this salutary effect), and is not closely faced by other buildings of a similar description. The fat-sided barges lolling lazily on the water are drawn with a



loving hand. "Crown Court, Pall Mall," is one of the close corners of the picturesque, and a dirty old hole it is, occasionally but unwillingly used as a short cut; but it looks well in an etching. Now that we have so good a record of it from Mr. George's needle, let that be pulled down too, and daylight and fresh air be let in. It has been etched away with it. "Bartholomew Close," looking "full of dead men's bones and of all uncleanness," is another effective view, and shows pathetically also the strange and enduring persistency of the London tree, which will not "flourish" exactly, but retain a sort of patient existence, amid the most uncongenial surroundings. "St. John's Gate, Clerkenwell," we regard with other eyes, and share the author's wish that it may not follow the fate of Temple Bar. "Mill Bank, Westminster," is one of the most effective of all as a picture, with the water and wharf and posts, and the boats with their black reflections, in the foreground; and the artist has got a very fine demi-tint effect over the towers of the Houses of Parliament in the middle distance. Another admirable water-side subject is "Shadwell"; and this again we enjoy without wishing it swept away. Habitations, it will be observed, as they approach the water side, in any neighbourhood where there is a depot or a resort of shipping, take more and more the character of ships, in their shapes and construction; and things look in place there which we should condemn in the streets of a crowded city. "Oxford Market," for instance, is charming in an etching; it is quite humorous, and has a dim suggestion about it of Indians and wigwags; but we cannot regret its removal.

To the antiquary, of course, our expressions will appear those of the Philistine. We cannot help that. There is a time in the life of old buildings when they sink into second childhood, and should be gently put out of the way and decently interred, not kept alive like so many struldbrugs, clinging aimlessly to an existence in which they are no longer of any use. But we would certainly wish Mr. Ernest George to make etchings of them first, and we cordially appreciate those he has already made.

#### NOTES.

**T**HE vote for carrying out Mr. Pearson's Westminster Hall scheme, or at least the vote for the funds necessary for it, was carried on Wednesday night by a larger majority than we had expected. That it would be carried we had very little doubt, having regard to the Parliamentary influence brought to bear in favour of it, and the widespread misapprehension in regard to the whole meaning of architecture, and the confusion of mind between that subject and archaeology which exists at the present moment. We have never made it our special principle to support the side that is likely to win, and with the pretty clear expectation that the majority of the committee would succeed in getting their way, we have at least endeavoured to bring some useful truths before them and the public. Our views received, in the debate on Wednesday, independent and very able support from the strong practical sense of Mr. Leonard Courtney, whose speech was an agreeable surprise amid a great deal of perfectly irrelevant talk. Mr. Cavendish Bentinck called attention to the absurdity of placing flights of stairs projecting into the area of Westminster Hall, about which the promoters of the scheme seem to feel quite easy. We expect that when the work comes to be carried out, a good many people who are now indifferent will have their eyes opened to the fact that they have sanctioned a monument of architectural folly. To the erection of Mr. Pearson's design on grounds of mere appearance we do not so much object, though we do not think it by any means the best thing that could be done. Our objection to the scheme is because it is opposed to practical common sense, which has been the basis of all real architecture, but which seems to be considered an entirely secondary matter now.

**T**HE opposition to the passing of the Regent's Canal and Railways Bill in the House of Lords, which numbered thirty-seven non-contenters against forty-four contents, including the Prime Minister, illustrates the manner in which a rule, excellent in itself, may at times be wisely suspended. To pay interest on a public work in course of construction is, in fact, to take money out of one pocket in order to put it into another. It is a measure difficult to justify; and, in fact, only to be supported on the ground that the investing public so far insist on the payment, that they will not subscribe to important undertakings if such an arrangement is refused. How heavily this mode of payment may load an enterprise is shown in the case of the Suez Canal, of which interest during construction, including sinking-fund, has increased the capital cost by no less than 33,000*l.* per mile. On the other hand, when employment is so much needed, and when the only barrier against the opening of a busy demand for labour, for a work of acknowledged utility, is the standing order that prevents investors from making their own terms, there will probably be but little sympathy with Lords Brabourne, Selborne, Balfour of Burleigh, and Wemyss, in their economic puritanism. Lord Bramwell's remark that, if interest was to be paid out of capital, it should be plainly stated in the prospectus of an undertaking that such was the case, is more to the point; and, indeed, goes far towards a fair solution of a difficult question. It ought to be known that for every 2,130*l.* spent in the construction of the English railways a man is permanently employed, and that for every 4*l.* paid as interest, 4*l.* is paid for labour and materials, per annum. It is one thing to check over-speculation, and another to render practically impossible useful and remunerative public works.

**I**T seems that we are now veering round to the idea of an artistic monument to Gordon, although it was at first said that any such monument would be unsuitable. A monument to such a man ought to be of the highest class, both in importance and in genius, or it were better to let it alone. A great competition might elicit something, as it did in the case of the Wellington Monument, but we fear there can be no such luck as the discovery of another Stevens. The site of Trafalgar-square, which has been talked of, will not do. Its central position is already occupied by the Nelson Monument, and there is no place for anything worthy of the occasion where it will not appear in subordination to that unhappy erection. It is perfectly certain that Gordon himself would have neither cared for, nor even liked, the idea of a monument in this sense; and, if anything of the kind is to be done, it cannot be too grand, severe, and simple; anything pretentious would be a kind of sacrilege. St. Paul's seems to be the most suitable site; certainly better than Trafalgar-square.

**T**HE rather risky operation of moving a tall chimney was successfully performed recently in the tannery yard of Mr. James Riley, Salem, Massachusetts. The chimney is 90 ft. high, and measures at its base 6 ft. 6 in. in diameter, that at the top being only 1 ft. 6 in. less. It weighs about 130 tons, and contains 70,000 bricks. The first part of the operation was to build a foundation, which was to form the principal part of the "carriage," out of heavy beams 9 in. by 10 in., and to place it in readiness for the chimney to rest upon when the bottom of its brick base was removed. The next work was to construct supports or braces extending up the sides a distance of 23 ft. They were erected at the back and front obliquely, and fastened at the top with iron rods, which held them in securely. The beams at the bottom were also fastened securely with iron. The outside carriage was thus formed, slanting from the side of the chimney down to the timbers which formed the rest at the bottom. As an additional support, another "carriage" was built on the inside of the outer one in a similar manner, extending up the sides of the chimney, a distance of 16 ft. The workmen then began to make an opening

in the base of the chimney, through which four large beams were passed at each side, giving a support, under which thirty-four jacks were placed. The brick structure was then slowly raised, with the carriage supporting, giving an opportunity for securely arranging the platform and rollers on which the chimney was to be moved. A platform or staging was constructed to form the site for the new location. This staging was then made perfectly level, and the task of moving commenced. This was accomplished in the ordinary manner of moving a building on rollers, by two windlasses and a large number of rollers were employed, so as to prevent any jar. The chimney was moved slowly but surely towards its new site, where it was finally settled. The journey was but short,—only 100 ft.,—but the moving was attended with much labour and a certain amount of danger; for, had the bricks tower settled 3 in., or become to that extent out of the perpendicular, an immediate collapse would probably have followed. Six men and two horses were required to do the work.

**T**HE burning question of the treatment of old buildings has turned up again in Parliament in reference to Edinburgh Castle, about which a debate or conversation occurred in the House of Lords on Monday night, in which Lord Balfour of Burleigh, the Marquis of Lothian, Earl Wemyss, and Viscount Bury took part. It is difficult to gather what any of the speakers really want. Lord Balfour of Burleigh had heard that the Government intended to make some alterations in Edinburgh Castle, and his remarks amounted to a recommendation that they should let it alone. The Marquis of Lothian, in a more practical spirit, spoke of the unsuitability of the old Parliament House as a hospital, and the inconvenience of having a building for stores on the top of the Castle Rock, the stores having to be carried up there before distribution. This appears to be common sense, and the argument points to the desirability of forming such utilitarian structures elsewhere. The Earl of Wemyss referred to the plans made by Mr. Billings "thirty years ago" for restoring the Castle, which, he thought, would have proved a great advantage to Edinburgh, and "an ornament to the Castle." Apparently Earl Wemyss wishes to see Edinburgh Castle made a "sham antique," as certain wiseacres have made the Tower of London. If he makes inquiries he will find that "thirty years" have made considerable difference in the manner of regarding such restoration work, among people who think at all. Viscount Bury said that the only real addition contemplated was to make a small alteration in the proposed roof of the Argyll Tower, and to put that ancient structure in a safe condition; and, apparently, it is intended to remove a haystore and a guard-room, which are at present in the middle of the parade ground. The whole sum proposed to be spent was only 1,200*l.* or 1,300*l.* If we are to understand this statement as embodying the precise truth, an unnecessary fuss seems to have been made, but we can understand Scotchmen being rather jealous of any interference with Edinburgh Castle.

**T**HE committee presided over by Lord Henniker, which was formed to conduct the opposition to the Railway Rates and Charges Bills, was last week constituted a permanent committee to watch over the interests of trade and agriculture, so far as affected by railway and canal legislation, and the rates charged by the companies. It is to be made fully representative of trade and agriculture, and to be called the Railway Rates Committee, and as it already includes many prominent M.P.s, it will be a powerful and influential body. When the railway companies decided to withdraw their Bills (the particular object for which the committee was formed being thereby accomplished), it was very uncertain whether it would not be forthwith dissolved; and it seems very probable that the result of the "terminals" case commented upon in our "Notes" of the 4th inst. had something to do with the prolonged existence of the committee. For at the



meeting at which the question was decided it was resolved that it was expedient to raise a guarantee fund to meet the costs of obtaining a final decision on the question of terminals. All this is very encouraging for the trader, who has never before had so much assistance to rely upon in those conflicts with the railway companies which are unhappily so frequent. We should not like it to be thought that we are overlooking the services rendered by the Railway and Canal Traders' Association, and other similar bodies, whose object is to assist traders generally in questions between them and the railway and canal companies, and who take every opportunity to procure needful amendments of the law. But the existence of a powerful body watching the Parliamentary tactics of the companies is an additional safeguard for the trading community, and really for the public at large. The railway companies are not easily overcome, but the surveillance (so to speak) to which they are now subject must have a beneficial effect both as regards their practice and legislation.

THE evidence given before the Parliamentary Committee on Irish Industries continues to show an alarming state of absolute waste and throwing away of national resources, which is perfectly inexplicable in these days of scientific research and unemployed capital. Professor Galloway's remarks on the Irish kelp trade are particularly instructive, as showing how nice are the turning points at which a substance becomes profitable to manufacture, or the reverse. The Irish and Scotch kelp industries were killed, or nearly so, some few years ago by the discovery of potash salts in Germany and Austria, which contained more bromine, it being understood that bromine and iodine are the two most valuable constituents that can be extracted from the kelp. The ordinary process of treating kelp is simply to burn it, but by so doing there is a loss of about one-half of bromine and iodine in the ash; whereas, if the sea-weed was only charred instead of being burned, all this could be saved, and the tables turned on the German product. The necessity for this improvement in the process is greater, seeing that iodine fetches 14s. per pound, and that there are only 14lb. of it in the ton of kelp. The Professor also considered that, if it paid to purchase the potash salts, such as chloride of potassium, for the manufacture of saltpetre, it would be still more advantageous to produce the saltpetre side by side with the kelp industry. Seeing how largely the potash salts are utilised, and what a great demand there is for the bromides and iodides in medicine and the arts, particularly photography, this single industry would be sufficient to give employment to the whole north-west coast of Ireland.

HITHERTO water-colour painting has received but scant recognition from the Royal Scottish Academy. Scottish artists till recently seldom used water-colour except as a ready means for sketching broad and general effects, and when so using it have treated it more after the manner of oil painting,—by an admixture of body colour,—than by the more legitimate method of washings of transparent colour, by which means only the true beauty and brilliancy of the medium are brought out. They seem also to have looked with an air of disdain at the delicacy of finish and careful manipulation which this manner of painting demands. The water-colour drawings in the annual exhibitions of Royal Scottish Academy have invariably been few in number, and of these the most noteworthy examples have come from the south of the Tweed. Artists are usually men of liberal, often radical, proclivities, but when associated into an Academy they are apt to become wonderfully conservative; but they are amenable to outside influences, and it seems that such have been brought to bear upon the Scottish Academy so as to induce that body to sanction a Summer Exhibition in the Galleries on the Mound devoted to paintings in water-colour, and drawings in black and white. The Exhibition, which was opened on Saturday, the

11th inst., contains many beautiful productions, and will compare favourably with similar exhibitions in the metropolis.

IN works produced by the pen, pencil, crayon, or hair-pencil, we often find a fitting preparation for more ambitious attempts in oil; as the first impressions of the artist, they possess a freshness and charm which we do not find in his more finished and elaborated productions. He is then in close contact with nature unflinched by other sources of inspiration, and he frequently exhibits, with frankness, the means by which he arrives at results. A remarkable evidence of this proclivity appears in a very pretty water-colour drawing by Sir Noel Paton which occupies the place of honour in the great room. The subject is Inveruglas, a Highland dell down which meanders a brook overshadowed by moss-grown trees, one of those moist nooks full of luxuriant verdure, lovely to look upon, but dangerous to linger in. The artist has rendered the mosses which clothe the trunks of the trees with the utmost minuteness, not only in the foreground, where they could easily be deciphered by the naked eye, but also in the middle distance as they recede from the sphere of vision; and even in the distance the leaves are minutely detailed, although not so positive in colour as those in the foreground. It is very pretty work, but it is not true to nature, as it appears to the ordinary observer, nor yet is there any attempt to idealise the scene. It is nature seen through an artificial medium, and this Sir Noel Paton confesses by painting an opera-glass lying upon a grassy bank in the foreground with a pencil beside it. This drawing appears to have been utilised by Sir Noel Paton in his highly-elaborated fairy scenes, where such painting is allowable, as it may be readily conceded that the elfin folk are possessed of vision differing from that of ordinary mortals.

THE blank return, for the first half-year of 1885, to the original shareholders of the Manchester, Sheffield, and Lincolnshire Railway, is a fact of evil omen for the railway dividends about to be declared. No dividend is paid on the ordinary stock of this line, which amounts to about 5,400,000l., and the payments on the guaranteed, preferential, and debenture stock, and on loans, are only kept up by drawing on the reserve fund. The Manchester, Sheffield, and Lincolnshire Railway has cost upwards of 65,000l. per mile. The June dividend has generally been less than that for December, and in 1880 it was nil. In 1878 only 25 per cent. of its receipts were from passenger traffic, while 20 per cent. was derived from the carriage of minerals. The gross earnings in that year were in the satisfactory proportion of 10·2 per cent. on gross capital, and as the co-efficient of working expenses was only 49·6, the net return was a little over 5 per cent. The corresponding figures for the present year are not yet published; but the fact announced bears testimony to a great falling off since the last year of which the returns have been analysed in "The Index to our Railway System." The reports of the three competing lines from London to the North will be awaited with some anxiety.

ONE of the most paying of all branches of scientific knowledge is that of entomology, which has become exceedingly general of late years, thanks to the Royal Agricultural Society as a body and Miss Ormerod individually. Those who are interested in the preservation or consumption of timber will find it to their account to cultivate their powers of observation, and to study those insects (and there are many of them) that commit havoc among our trees. The current number of *Forestry* calls attention to the damage done to the woods at Novar in Ross-shire by the pine weevil (*Hyllobius abietis*), which particularly affects parcels of wood that have been cut and thrown loosely together, eating the bark and sucking the sap from the sawn bark. The beetles are usually found on ground from which a crop of old fir has been previously removed, the roots being seen to be perforated with holes caused by the working

of the maggots between June and the end of autumn. Draining and burning the ground after the crop is cleared, are the most efficient remedies, followed up by fresh planting with strong two-year transplanted trees. Incidentally, it is worth mention that the ox-warble fly costs the country, and more particularly the tanning and farming interests, an annual loss, estimated at between two and seven millions sterling.

THE fitting-in of a missing link in the railway communication between London and the Isle of Wight is an undertaking of which the completion is promised within the course of the present month. At the present time the whole of the goods traffic to the island is subjected to the double expense of embarkation and disembarkation, for the water-passage of between ten and eleven miles. This cost of handling is enough to pay the expense of a long railway run. To remedy this, the Isle of Wight Marine Transit Company has been formed; and piers and other works have been constructed at Langstone and Brading harbours, between which a steamer that can carry fourteen trucks will ply backwards and forwards, making the passage in an hour and a half. The Firth of Forth is already crossed in the same way between Granton and Burntisland by a steam ferry. In all those cases where a comparatively short sea-passage is interposed in a railway run, the real difficulty that opposes the introduction of the steam ferry is to be found in the construction of harbours. The ferry boat ought to be large enough to receive a train, with as little breaking-up as possible. There was a suggestion that the *Great Eastern* should be used for the passage of the Channel, a portion of the express trains being run on board, so that a passenger could go from Paris to London without leaving the carriage. Want of harbour accommodation is understood to be the only reason why this, or some similar method, has not been applied to this important line. The Isle of Wight Transit Company will, if successful, prove a pioneer in a very useful kind of enterprise.

URGED by strong complaints as to the offensive smells emanating from the sewer ventilators or manholes, the Chiswick Local Board are making laudable efforts to introduce the most improved and effective methods to abate this nuisance, more or less incident to all drainage schemes. After having tried the insertion of baskets of charcoal into the ventilators, the erection of shafts up the sides of the houses, and the regular flushing of the sewers by the hose-pipe, all at considerable cost, and with only partial success, the Chiswick Local Board have just signed a contract with Mr. Trehearne, Hammersmith and Chiswick, for the construction of fifty flushing-wells and the providing and fixing of fifty flushing syphons, at a cost of 1,275l. It is stipulated that the apparatus to be used by the contractor is Doulton's patent automatic flushing syphon for keeping the main sewers and drains free from obstruction. The surveyor of the parish, Mr. Ramsden, has calculated that, by the adoption of these syphons, he will make a saving of nearly 200l. per annum over the plan of flushing the sewers by hand and with hose-pipe. It need scarcely be mentioned that the principle of operation of the automatic syphon is that the chamber fills slowly by water from the water-supply main, and empties suddenly automatically, the rapid periodical flow of water cleansing the sewer.

THE resolution which will be proposed at the half-yearly meeting of the Metropolitan Railway, on Tuesday next, that the two underground lines should be amalgamated, is one which is as much in the interests of the public as of the shareholders. The mutual jealousy of the chairmen of the two companies, the interminable litigation, and the complete want of harmony between the two lines, have been a public scandal and inconvenience. There can, therefore, be no question that were the Metropolitan and the District Railways to be placed under one management, the public would certainly benefit by it. It is equally



clear also that the cost of the double management, and the cessation of the ill-will between the two companies, would materially benefit the shareholders in both these lines. This movement on the part of the shareholders, succeeding, as it does, a similar one on the part of the shareholders in the Brighton line, indicates clearly enough that this hitherto long-suffering body is beginning to be aroused to look after its interests, and that henceforth the personal rule which has characterised the ways of certain railway directors will receive a wholesome check. It is certain that Sir Edward Watkin and his Board will oppose the resolution which we have mentioned, and the result of the contest between railway imperialism and railway democracy will be of general public interest.

#### MINEHEAD CHURCH.

THERE are still left in the country districts of England quiet and pleasant little towns, which seem to exist only for the purpose of emphasising the quotation, "The world forgetting, by the world forgot"; and Somersetshire can, in all probability, show a greater number of them than any other county. The reason of this is obvious, viz., that they are devoid of those manufacturing resources which always attract population, and have to depend upon the same agricultural employment that has served many successive generations. But Somersetshire towns and villages possess special attractions apart from their loveliness and old-world character; for they are famous for their churches, many of which are of great size and beauty, while nearly all are worth a careful examination. One of these churches, that of Minehead, is now undergoing considerable alterations and reconstruction.

Minehead is a quaint scattered little town of considerable antiquity, situated on the Bristol Channel some ten miles from the Devonshire border, and sheltered on the north-west by a high wooded hill, known as Greensleigh, or North Head. Magnificently placed about half-way up is the Old Town, consisting of the church in question, and a group of picturesque cottages, every one of which is a study to the artist. In the open valley below is the lower town, or modern Minehead, while a third section, known as Quay Town, is occupied by the little harbour and quay, and the sailor population generally. Few churches stand so nobly as Minehead, with its grand view over the Severn sea and the Welsh coast, with, nearer home, the ranges of Exmoor and the Quantocks; and it is no wonder, therefore, that its fine Perpendicular tower is a central point in the scenery of the neighbourhood. The church, which holds about five hundred people, has a broad nave of eight bays, with a north aisle, at the end of which is a chantry chapel (used as a vestry), with its original oak roof. At the west end is a tower of three stages, having a recessed doorway with shallow mouldings. It was found to be in excellent repair, although advantage was taken by the architect to remove the wooden mullions of the west tower window, and replace them by stone tracery, in keeping with the Perpendicular east windows. The copings of the battlements have also been renewed. The most important part of the renovation was required in the outer walls of both nave and aisle which were sadly out of position. Indeed, they had only been kept together by heavy supporting buttresses of great thickness, notwithstanding which the south wall had bulged outwards considerably, while the north wall and the piers separating the nave from the aisle were at least 18 in. out of the perpendicular. With the exception of three small external buttresses at the east end, all the others have been removed, thus allowing the restoration of the south porch to its original dimensions. Internally, the northward leaning of the piers, which are octangular and perfectly plain, without any moulding, necessitated their entire rebuilding. A wooden partition formerly shut off the tower from the body of the church, and in front of this was a gallery. This latter has been taken away, allowing the fine proportions of the tower arch to be visible, and considerably increasing the comfort of the sitting space, although the actual number of seats has also been somewhat curtailed. The font has also been shifted from north to south, and the organ

removed from the gallery to the north aisle by the vestry. Of course, all the hideous old pews have been weeded out, and the chancel itself is now quite free, with the exception of a few choir-stalls. A new roof of pitch-pine has been added throughout, with the exception of the chantry chapel, the oak ceiling of which is untouched. The glory of Minehead Church is the oak rood-loft and screen, of very beautiful and delicate workmanship. The loft is entered by a newel staircase, lighted by a square-headed traceried window. Looking at its elaborate carving, and comparing it with the rather unusual plainness of the interior of the church, one can scarcely help fancying that it must have been an importation, probably from the Abbey of Cleeve, which is only about five miles distant. Such borrowings at the time of the Dissolution were very common, and the notion is strengthened by the fact that there still remains in the lower town a very interesting old house (now part of the tannery), but bearing traces in its fine old oak doorway and windows of an ecclesiastical origin. Although nobody seems to know its history, it is not improbable that it was a grange or country farm belonging to the priors of Cleeve, where the worthy fathers combined business with pleasure, and whence they recruited the larder of the abbey. The fine monument and recumbent effigy of Henry de Bracton, a notable lawyer of the fifteenth century, has not been in any way interfered with during the alterations; but the alabaster full-size statue of Queen Anne, which was presented to the church by Sir Joshua Banks, a former member for Minehead in the good old days when a borough could be bought and paid for in hard cash, has been removed, and is to find its resting-place in the new Town-hall. Both in appearance and association it will benefit the latter far better than it has ever done the church. The architect for the restoration of Minehead Church is Mr. St. Aubyn, whose plans have been admirably carried out by Mr. J. Langdon. Both these gentlemen are engaged on the Town-hall, which is of Tudor style, and is to cost 3,000l. It will be a great ornament to the little town, which is in great want of a place of assembly.

#### Illustrations.

##### CABINET, ITALIAN RENAISSANCE.

THIS sumptuous piece of decorative furniture is at present in the possession of a private owner in London, who purchased it in 1881 from the collection of Signor Arietti in Venice. The present owner knows nothing of its history.

The ground material of the work is ebony, the elaborate inlay mostly ivory, and at the centres of the panels stones of various colours are inserted. The shafts are of lapis lazuli, with gilding on the caps. The whole stands about 7 ft. or 8 ft. in height. It is in admirable preservation, and is a very fine example of work of probably the full Renaissance period in Italy.

Our illustration of the cabinet is engraved by Mr. J. D. Cooper, from a photograph taken for the purpose by Mr. Bedford Lemere.

##### PARISH CHURCH, SLOUGH.

THIS church was one of those so often met with built about fifty years since. It was in an imitation of the Norman style carried out in stock brickwork. The plan was a parallelogram, which at this period was the favourite form for churches.

The building has now given place to the one of which the interior is here illustrated, at least as far as the eastern part is concerned. The west end remains for the present, and forms a part of the nave of the church. It is hoped that this state of things may not be allowed to continue many years. The new part consists of one ordinary bay of the nave, transepts, and a spacious chancel, with aisles, vestry, &c. It is all carried out in red brick varied with flint and banded with bricks of smaller dimensions, which have a good effect.

The chief feature internally is the chancel screen, which gives much character to the building.

The contractor was Mr. Fassnidge, of Uxbridge. The cost so far has been a little over 10,000l. J. OLDFIELD SCOTT.

#### SCULPTURE.

THE two busts which we give this week come respectively from the *Salon* and from the Royal Academy Exhibition. "Une Fille d'Ève," by J. Richeto, from this year's *Salon*, is reproduced from a photograph; the bust entitled "Maidenhood," now exhibited at the Royal Academy, Mr. H. H. Armistead, R.A., is reproduced from a pencil drawing on toned paper, kindly made for us by the artist. As representations of ideal expression in two female heads, the one coquettish and *spirituelle*, the other grave and severe, they afford an interesting and characteristic contrast.

#### LONDON BRIDGE: FROM AN ETCHING BY MR. ERNEST GEORGE.

WE refer elsewhere in this number to Mr. Ernest George's fine portfolio of etchings of Old London; the present illustration is the most successful of one or two experiments which we have made in photo-lithographing from these etchings, with the permission of the author.

A special difficulty in photographing from etchings lies, in the first place, in the half tints which are so delicate in the original, but tend to come out darker in the photolithograph; and secondly in the fact that the more powerful effects of etching result in a ridge-and-furrow surface on the plate, which is more or less transferred to the paper in printing; and these lines in relief cast their own shadows, imperceptible to the eye, but which the photographic plate finds out. In the present case these obstacles have been surmounted, and the lithograph represents the quality of the original work pretty fairly, without, of course, the inimitable tone of copper etching.

#### BATH-ROOM, GLEDHOW HALL.

THE special feature in this room is that, as far as possible, the entire surface of the walls and ceiling is covered with glazed porcelain slabs to insure the utmost degree of cleanliness. The wall and ceiling lining is of Burmar tofa faience. The bath is of porcelain by Messrs. Cliff & Co.; and the woodwork of the doors and windows of mahogany and walnut. The drawing, of course, can give no idea of the scheme of colour, which is very elaborately carried out, the scale ranging from deep rich browns to pale greens and vellum tints.

The architects from whose designs the work has been carried out are Messrs. Chorley & Cunnon, of 15, Park-row, Leeds.

#### COMPETITIONS.

**Baptist Memorial Church, Paisley.**—Too late for examination this week we have received the report of the professional referees, Mr. James Sellers, President of the Glasgow Institute of Architects, on the designs submitted in this competition, which were reviewed in the *Builder* on the 4th of July, p. 9. The author of design No. 4, Mr. Hippolyte Blanc, of Edinburgh, has been appointed architect.

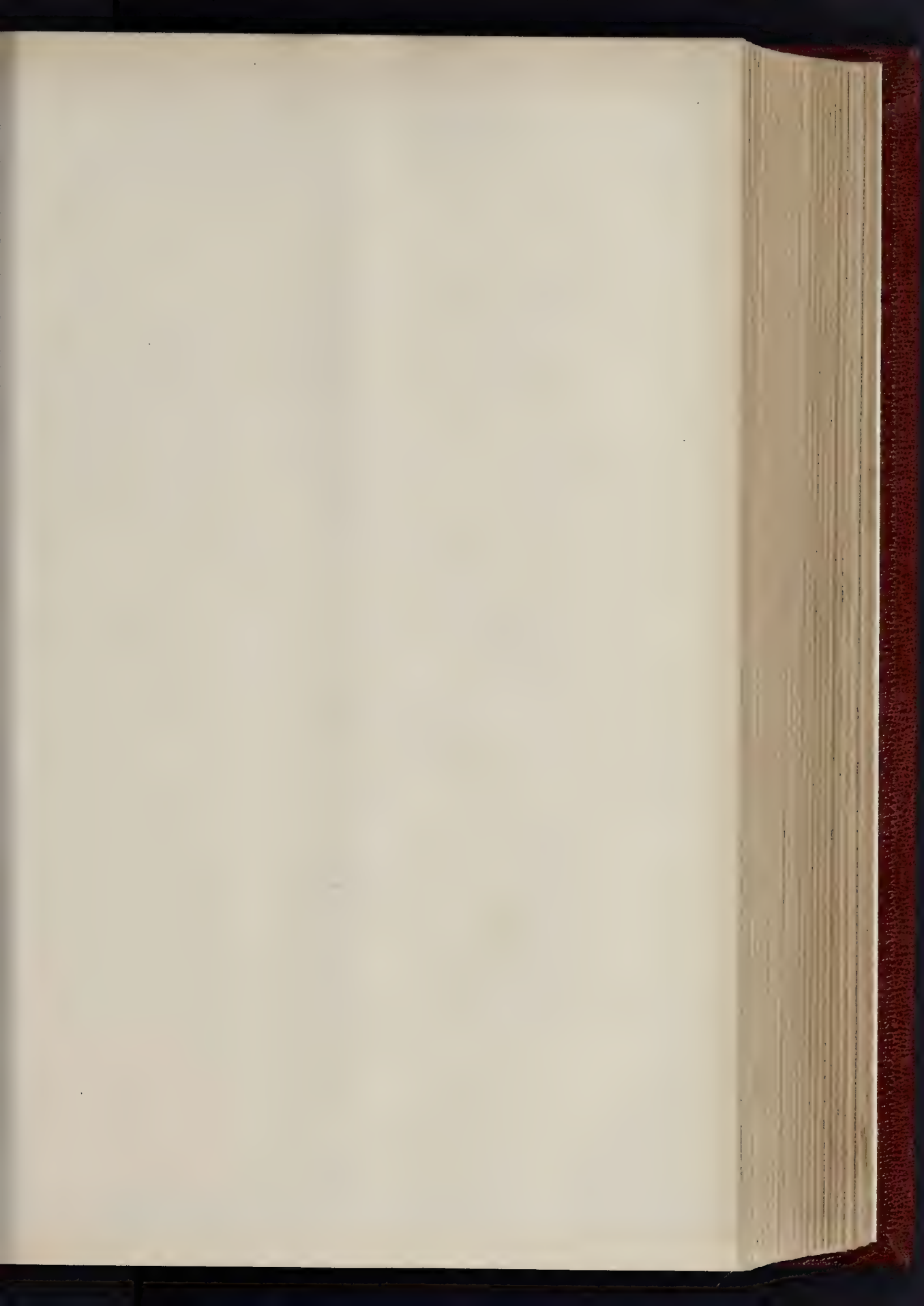
**Wimborne Free Library.**—The plans prepared by Messrs. Potts, Sulman, & Henning, have been accepted.

**Highbury Presbyterian Church.**—In a limited competition for this building, about to be erected at the top of Highbury-hill, the plans sent in by Messrs. Potts, Sulman, & Henning, have been accepted.

**Board Schools, Northfleet.**—We are informed that the Northfleet School Board have accepted the plans for proposed schools sent in by Mr. Albert L. Guy, of Lewisham, in open competition.

**Cheltenham Grammar School.**—The Honorary Secretary has received about seventy packages and packing-cases. They will be opened and the drawings hung as soon as possible. But competitors are reminded "that it will take a considerable time for twelve gentlemen, some of whom reside at a distance, to examine probably more than 400 drawings and 4,000 folios of reports. After this there must be formal meetings, and if a professional assessor should be then called in, further time will be required. It is, therefore, thought an award must hardly be expected before September, but an announcement will be made by advertisement as soon as possible."





THE BUILDER, JULY 18, 1895.



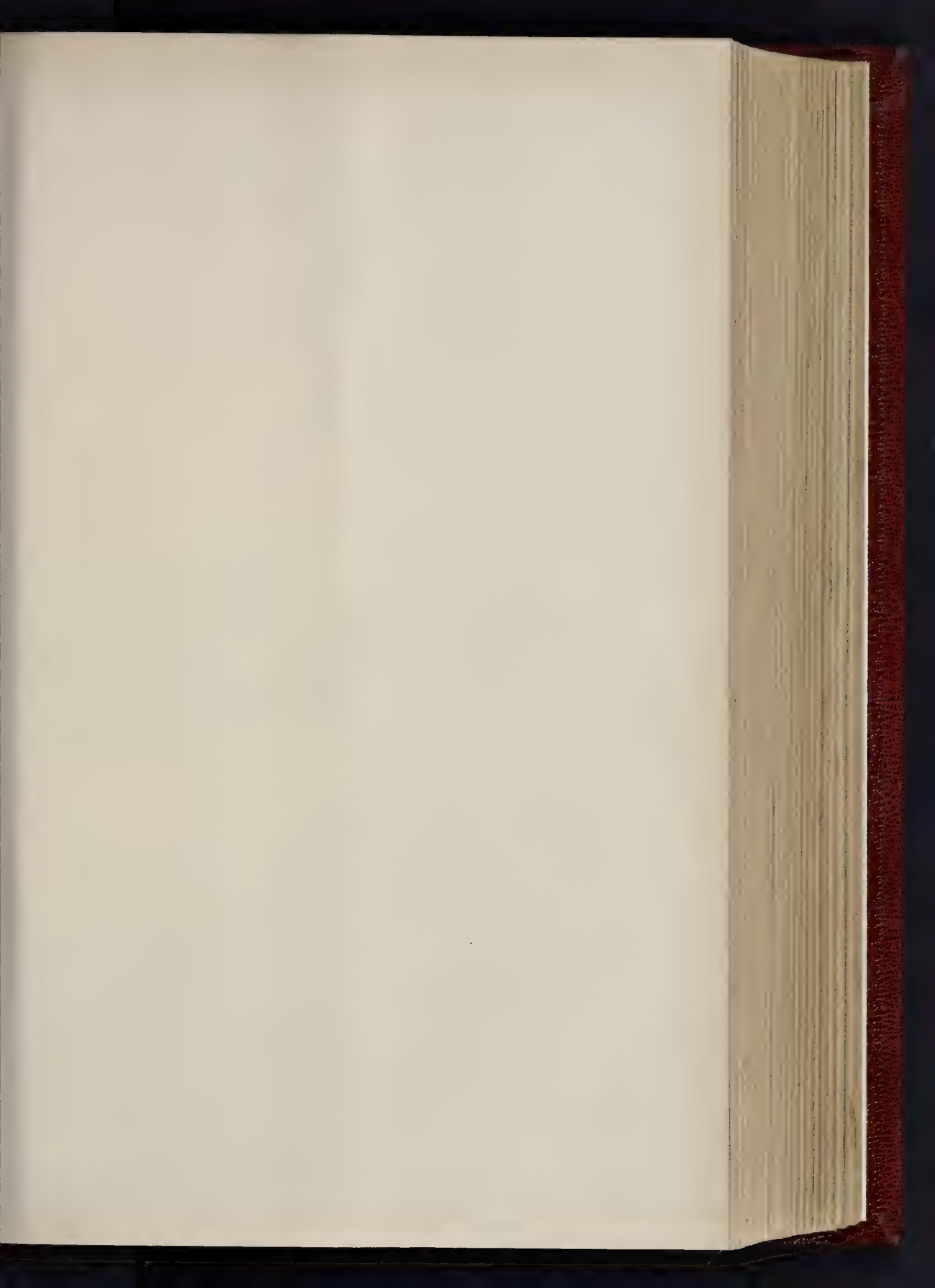




INLAID CABINET: ITALIAN RENAISSANCE.





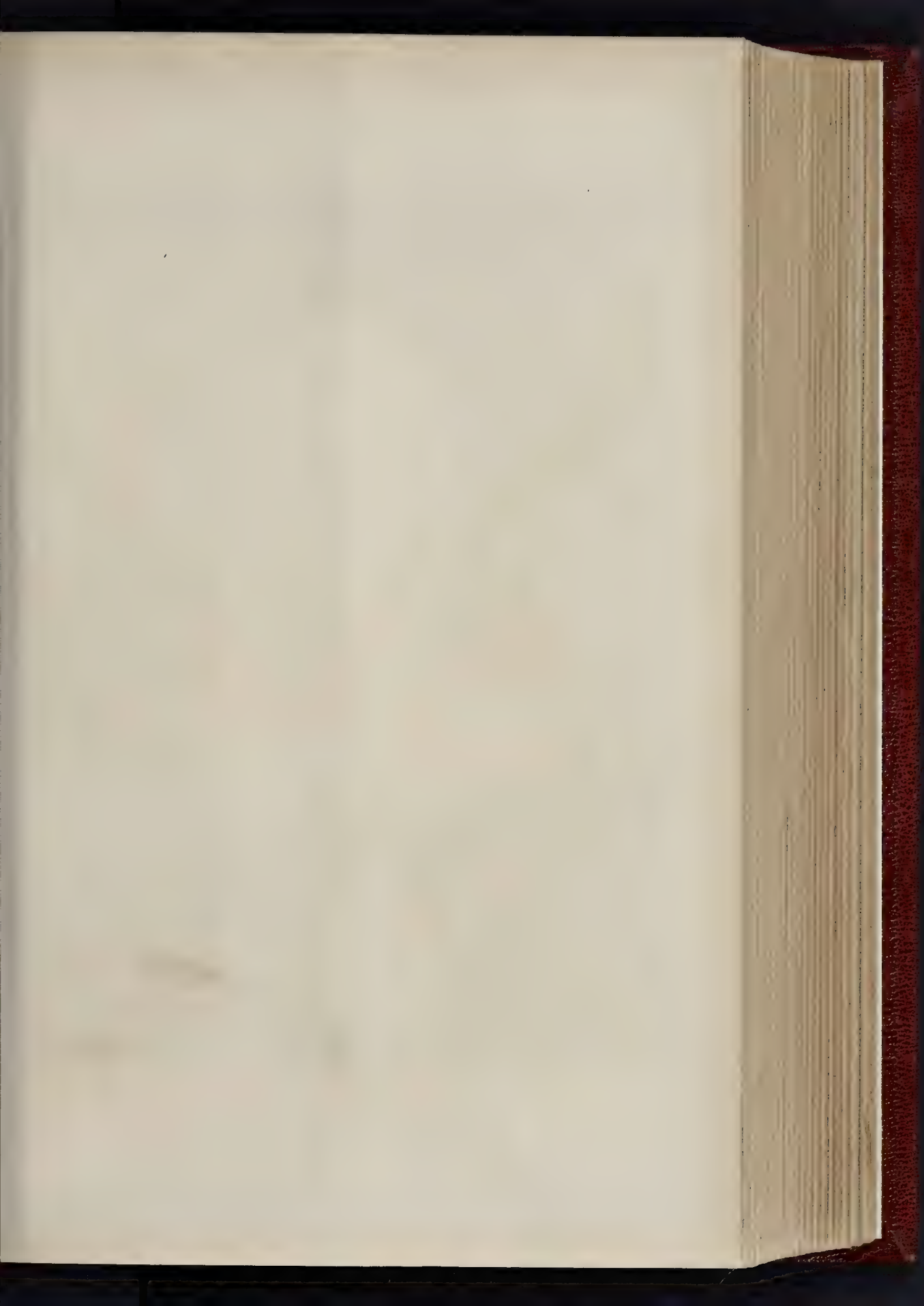




LONDON BRIDGE.

*Reproduced from an Etching by MR. ERNEST GEORGE.*







INK PHOTO SPRAGUE & CO LONDON

SCULPTURE AT THE PARIS *Salon*,  
"UNE FILLE D'EVE" M. ETCHETO. SCULPTOR.





"INK PHOTO" SPRAGUE & CO. LONDON

SCULPTURE AT THE ROYAL ACADEMY  
"MAIDENHOOD." MR. H. H. ARMSTEAD, R.A., SCULPTOR.

Reproduced from a Sketch by the Artist.







**GLEDHOW HALL. LEEDS.**

*J. Kitson Junr Esq*

**BATH-ROOM IN BURMANTOFT FAIENCE.**

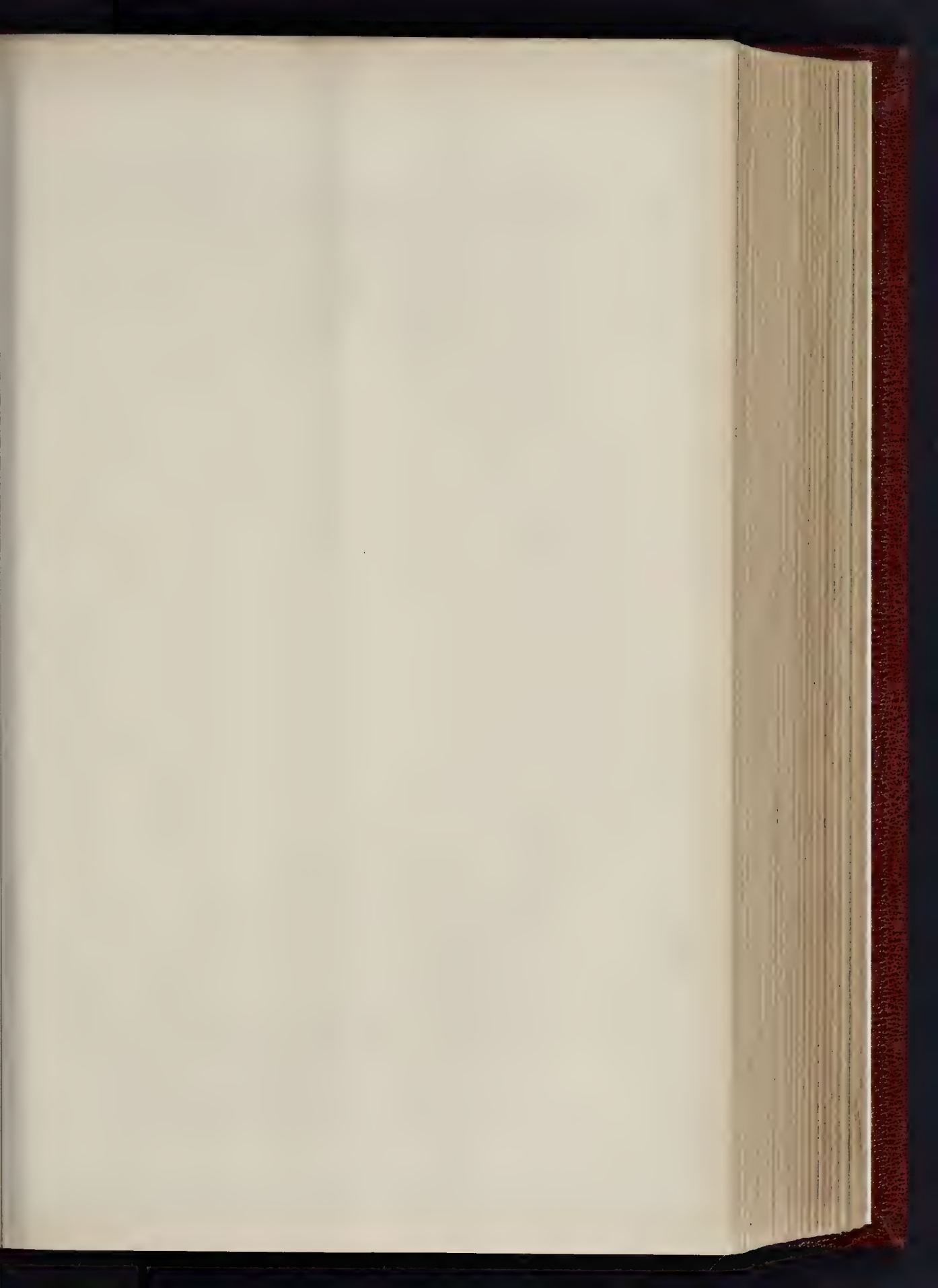
*Messrs Chorley and Cannon,  
Architects.*

W.D. & H.O. W. Photo Litho

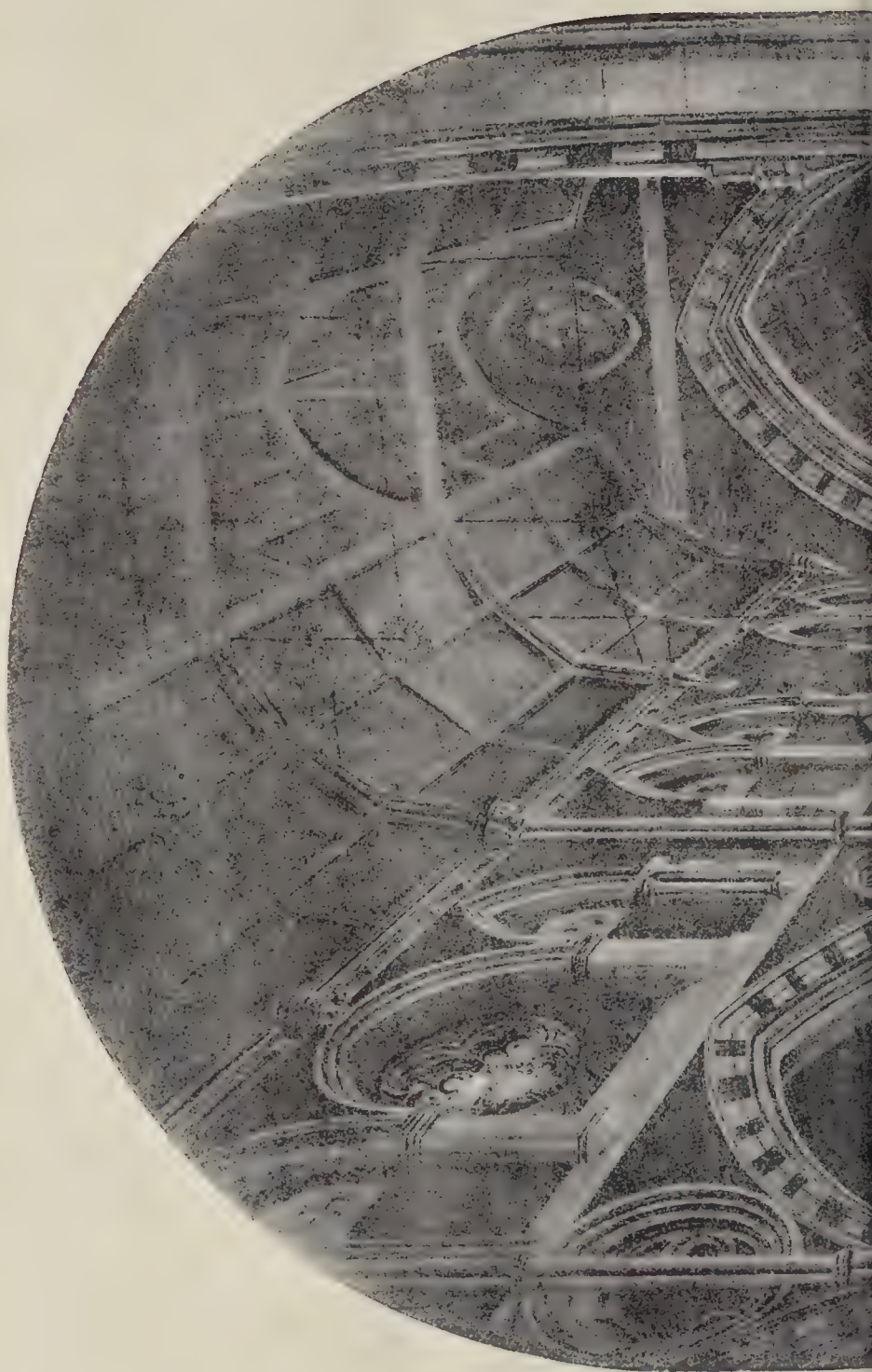
Chorley & Cannon, W.D.



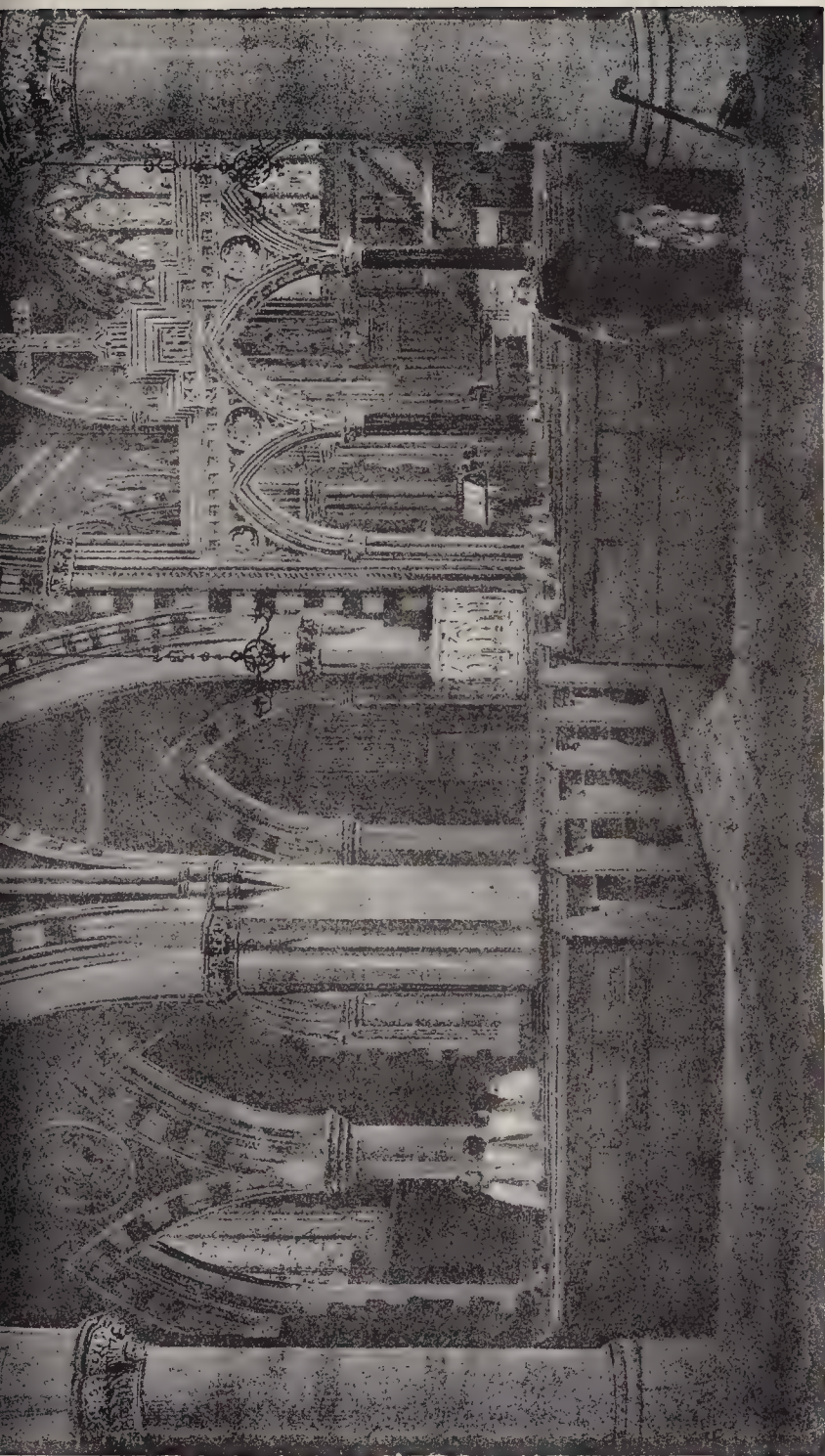




THE BUILDER, JULY 18, 1885.







THE PHOTOGRAPHIC CO. LTD. LONDON

INTERIOR OF THE NEW PARISH CHURCH, SLOUGH  
Mr J. Oldrid Scott, F.R.I.B.A. ARCHITECT





# THE INVENTIONS EXHIBITION. PUMPING MACHINERY.

PUMPING MACHINERY has, during the last twenty-five years, made substantial progress, and may be said to have attained a considerable degree of perfection. The display at South Kensington, which is intended to illustrate this progress, it cannot be denied, falls in a large measure to do so, the exhibits being neither numerous nor complete, several types of pumps being entirely unrepresented. What are shown, however, are in most cases favourable specimens of their kind, and sufficiently numerous to repay a visit for their inspection.

Messrs. Tangye Bros., Limited, of Birmingham, exhibit some half-dozen pumps, which include one of Jeffries's improved direct-acting centrifugal pumping engines. The improvement consists in arranging the suction to enter on one side of the disc: consequently the water is not split up, as is the case with most pumps of this type, and the friction of the water passing through the pump is therefore reduced. The centre of the pump disc is moved, so that no side-thrust is given to the spindle.

A compound condensing steam pumping engine is also shown here, the high and low pressure cylinders and condenser are all arranged on one piston-rod, which works direct to a double ram pump. This pump is fitted with outside valve-boxes, which are easily accessible for cleaning or repairs,—a very important point when pumps are used for raising pure water. We also noticed a modified form of "special" ram pump. This is arranged to work vertically, and is well adapted for boiler feeding. The engine valves on this pump are removed slide-valves,—a plan that has much to commend it for this duty, and one that is of late being considerably extended.

A Jeffries's Patent Ram Pump and Boiler Feeder is amongst the other exhibits. The chief feature of this is the arrangement of the cross-head, with the connecting-rod working inside. The rod is made hollow, and through it the oil for lubricating the crank pin is allowed to pass. The sliding cross-head is cast in one piece, and has a larger bearing surface than is usual. The working parts are protected from dust,—an important matter, but one often neglected,—by sliding cover.

A new departure in the duty of pumps is exhibited by Messrs. Whitley Partners, Leeds. It is intended for pumping oil for lubricating surfaces of steamship propellers, heavy machinery bearings, &c. It is proposed by the exhibitors to lubricate the surface of the propeller discs, and thus reduce the friction of the water on them when in motion. To effect this they inject, by means of their pump, a quantity of oil, under pressure, upon the centre boss of the propeller, thus lubricating the various surfaces. The idea is novel, to say the least, and should be glad to hear the results of its practical working.

A considerable display of pumping machinery is made by the Pulsometer Engineering Company, Limited, London, including examples of their well-known pulsometer pumps, "Deane" direct-acting pumping machinery, water filters,

the "Deane" vertical pump, for sinking purposes presents several features of interest in construction. It is of the double-plunger type, can be suspended from a chain if necessary, and can be raised or lowered as the depth of the water may require. It appears to have been designed to occupy as little horizontal space in the shaft as possible, and its details are very compact. We believe the chief feature of the "Deane" pump is the simplicity of its details. The main and supplemental valves used are flat slide valves, and this feature we can particularly recommend for pumps subject to rough usage, such as the one for notice. The engine is direct-acting, and is claimed by the makers that the up and down strokes of the piston being separately controlled by valves, the motion is made uniform, and the consumption of steam is thereby reduced. It can be made to swing aside a long pump-rods are used, so that they may be withdrawn without disturbing the pump. This arrangement should be very useful in awkward or confined situations. Several "Deane" pumps of the horizontal type are shown; these are of the internal plunger type, and are so arranged that one of the valves is always open, so that there is

no dead centre. A "Thames" patent filter, especially adapted for cleaning muddy water, is also exhibited. An advantage claimed for this filter is that it can be easily and rapidly cleaned,—a *sine qua non* when dealing with muddy water. The filter consists of a copper-lined cylinder, into which is fitted a perforated piston covered with wire gauze. During the operation of filtering, this piston is fixed at the top of the stroke, and keeps the medium compressed against a perforated plate in the cover, through which the clean water passes away to the discharge-pipe. To clean the filter the piston is released and moved up and down, whilst a reverse current of water is allowed to pass through the filtering medium. This stand is very elaborately decorated.

Near here Messrs. W. & C. Burgess, of Brentwood, exhibit an example of one of the most ancient forms of water-lifts in existence, viz., the "Noria," adapted for being worked either by horse, bullock, wind, or steam power. In this form of water-lift a number of iron buckets are attached to an endless chain, which is made to revolve round a drum, motion being given to the drum by toothed gearing. The chain to which the buckets are attached is lengthened as the water sinks in depth. The lifts under notice are especially speeded for bullock power, which is largely used in India and the East, and as they combine certainty of action with extreme simplicity of construction, they are to be preferred for isolated districts, where skilled labour is not attainable, to many of the more elaborate forms of pumps. The lift exhibited is stated to be capable of raising 2,000 gallons of water per hour when worked by one bullock, or 3,000 gallons per hour when worked by one horse, and is usually employed for irrigation from wells about 30 ft. deep.

Messrs. Warner & Sons, of Cripplegate, E.C., exhibit in motion a vertical steam-pump which possesses several features of interest. In this pump the exhaust steam is carried into the suction in the form of a cone, after the fashion of an injector. The suction and delivery valves are fitted with air-chambers, and the engine valves are steam moved.

A chain-pump is also shown here, and, instead of ordinary chain, long wrought-iron links are used. The buckets, or lifting discs, are hollowed and a little rounded on top, and it is claimed that with this arrangement the pump may be run at a higher speed than is usual without the water splashing. The discs are made wide on the edge to prevent an excess of water passing back. This pump has a rough-and-ready look about it and should be serviceable.

Messrs. Hathorn, Davey, & Co., of Leeds, show working models of their Horizontal Compound Differential Pumping Engines with double-acting ram-pumps. These are adapted for underground and mining work, and are especially designed for forcing water to a great height. The suction and delivery valves and valve-boxes are constructed to withstand heavy pressures, and the general details appear to combine simplicity and strength, very important points in pumps such as these, from which extremely heavy duty is required.

A considerable display of steam-pumps for various duties is made by the Worthington Pumping Engine Company, 114, Queen Victoria Street, E.C. This includes a compound direct-acting steam-pump, an ordinary direct-acting steam-pump, a pressure-pump especially adapted for driving lifts, cranes, presses, &c.; and a water meter. As these pumps,—owing chiefly to questions in the House of Commons relative to the Sudan campaign,—have lately in this country attracted a considerable amount of attention, it may be of interest to notice briefly some of the chief points in their construction. Perhaps the most important feature in the Worthington pumps is the use of the ordinary form of steam-engine slide valve, working on a flat face over the usual form of ports, and this is a feature we can thoroughly commend, as this valve is simple, durable, and trustworthy, which is sufficiently proved by the fact that, perhaps, nine-tenths of the steam-engines made are fitted with it in preference to more complex forms. The valve is worked by means of a vibrating arm which swings through the whole length of the stroke. The pump-plungers are arranged to work through a deep metallic packing ring, which is neither adjustable nor elastic, it being asserted by the maker that it is cheaper to renew the rings or plungers as

required than to have them made adjustable to wear. This is a question we cannot enter into here, but this dictum will probably not receive the assent of many engineers. With the object of relieving the working surfaces from any grit or mud which may be in the water, the pump plunger is placed some inches above the suction-valve, thus forming a small chamber into which the grit may fall; this, although apparently small, is a useful improvement. The water-ways are direct and of ample area. We must not omit to explain that the freedom from noise and vibration in these pumps is obtained by the peculiar arrangement of a duplex valve motion; this is effected by casting two cylinders and two pumps together so as to form one machine, and the working parts are so arranged that the right-hand division moves the steam valve of the left one, and vice versa. Consequently, as one or other of the steam-valves must always be open, there can be no dead point, and the pump is always ready to start when steam is admitted.

One of the pumps in motion here is constructed on the compound, or high and low pressure principle, the steam being in the first instance utilised in a small cylinder which forces the piston forward; it is then expanded in a larger cylinder, which gives the return stroke. The pressure pump, for driving hydraulic lifts, &c., is arranged with double plungers, with external adjustable packing, and has several other features of interest, but our space prevents a more extended notice. Taken altogether, it cannot be denied that the Worthington pumps are thoroughly practical in their design and construction, and possess many points worthy of commendation.

Two steam pumps, a direct-acting and a ram respectively, which possess some features of novelty, are exhibited by Mr. Joseph Bernays, Newgate-street, London; the novelty claimed consists "in the use of a connecting-rod of a length equal only to the radius of the crank, so arranged that it passes from above the crank at one end of the stroke to below the crank at the other end, whilst maintaining at every point its proper relative position to the crank. The rod thus turns completely over for each revolution of the shaft, and adding its own length to that of the crank at each end of the stroke, causes the piston travel to be four times the radius of the crank instead of twice." By this arrangement the inventor claims that side strain is avoided, and the use of cross-head guides dispensed with. The working details appear to have been well thought out, as all the chief parts likely to require adjustment or repair may be readily got at. This is a matter of importance, but one not always considered.

Messrs. Easton & Anderson, of Erith, show a duplex pump especially adapted for pumping raw juice in sugar-mills. It is arranged with steam jacketed cylinders, and the strokes are considerably longer than those usually found in pumps of this type. The general arrangement of the details of this pump is good, and valves are easily accessible for adjustment or repair. A small steam engine and pump especially designed for compressing air for ejecting torpedoes is also to be seen here. It is stated to be capable of working up to a pressure of 2,000 lb. per square inch.

A patent exhaustor and pump (Greenaway & Kitt's) is exhibited by Messrs. Horn & Son, Waterloo-road, S.E. The chief novelty in this pump is an arrangement of four slides, which are worked from a shaft mounted eccentrically in the cylinder. It is claimed for this plan that extreme regularity of action is obtained, and the exhaustor can be run at a high speed without noise. The cylinder of the exhaustor is 2 ft. 6 in. diameter by 2 ft. 3 in. long, and it is stated to be capable of passing 80,000 cubic feet of air or gas per hour. It can also be used for pumping water, tar, slurry, &c.

A Bennison's patent rotary pump is exhibited by Messrs. Waygood & Co., Bournemouth, S.E. It is claimed for this pump that the pressure is brought into an exact equilibrium on all moving parts, thus saving the loss by friction produced in rotary pumps when the pressure is allowed to act against one side of a drum and drive it against the bearings or abutment, which act as a brake. In this pump the periphery of the internal drum is divided into four spaces, the two opposite being of the same area and subject to the same pressure. The drum has four blades, which project radially from its centre at equal points, and



two of these for one quarter of a revolution are in contact with the wall of the cylinder, during which time they are exposed to the pressure on one side only, but during this time the only friction is that caused by the movement of the fluid, during the next quarter of a revolution these blades have an equal pressure on both sides. Each blade acts twice for a quarter of the distance at each revolution, consequently the four blades act for eight quarters or sweep out the water-space twice during one revolution.

A Burnett's Patent Steam Water-raiser is exhibited by Messrs. Körting Bros., 11, Pancras-lane, E.C. In this pump the water is raised by the direct action of the steam itself, pistons, &c., being dispensed with. It is claimed by the maker that as there are no moving parts, with the exception of the inlet and outlet valves, wear and tear are reduced to a minimum. This form of water-raiser is low in first cost, and as it will pump muddy or gritty water without damage to the working parts, builders and contractors may find it useful for temporary purposes, but, from our experience, for permanent work other forms are to be preferred, as the amount of steam used is undoubtedly large.

A direct-acting steam-pump is shown by Mr. T. H. Williams, 11, Queen-Victoria-street, E.C., the chief feature of which is that the main valve of the engine is arranged to receive its motion from a supplemental piston. The deep valves have interchangeable beats. The general design combines in a considerable degree compactness and strength.

In the mining section, Messrs. Hayward, Tyler, & Co., Whitecross-street, E.C., show a selection of their direct-acting steam pumps, including one with "cataract" or water-controlled self-governing valve gear. This gear is of somewhat novel construction, and is designed to prevent the pump running away, should the supply of water fail. It is suited for very high lifts. To avoid rapid and constant reversing of the piston, the length of stroke has been increased, which lessens considerably the friction of the water in the pump and the wear and tear of the valves. The general arrangement of this pump is good, and the workmanship excellent.

Several samples of Messrs. Tyler's universal pumps for general purposes are also shown. Those for high speeds are fitted with India-rubber ball valves in gun-metal seats, and those for high lifts, or for pumping hot water, with gun-metal valves. In both cases the cylinder valves are steam moved; one being arranged internally and the other externally. We prefer the latter plan.

A simple form of reversible rotary pump, adapted for pumping acids, &c., is shown by Mr. S. George, 80, Cumberland-street, S.W., and Messrs. Sharp, Stewart, & Co., of Manchester, exhibit several of their "Exhaust steam" and "Atlas" pattern injectors for boiler feeding.

#### THE WESTMINSTER HALL QUESTION.

As it affords a very good summary of the practical sense of the subject, we reproduce (from the *Times* report) the speech made by Mr. Courtney in the course of Wednesday's debate, upon which we briefly comment in another column.

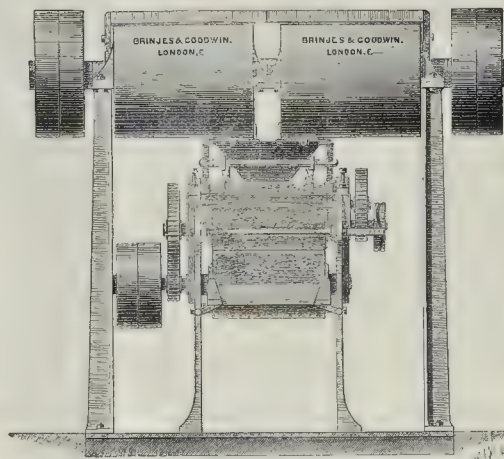
Mr. Courtney said that as he had taken a good deal of interest in that project ever since it had been conceived by the right hon. member for Reading, and as he had more or less studied the proceedings of the Select Committee and the report at which they had arrived in regard to it, he wished to impress upon the Committee the propriety of not coming to a vote approving the scheme which had been suggested by Mr. Pearson. The law courts had been got rid of, and in what followed there was no idea of any want to be supplied. The only thing submitted to Mr. Pearson was what should be done in the condition of things that had been produced and revealed. When he saw the scheme he was struck with dismay, and he resigned that feeling still. The removal of the law courts revealed a noble wall with flying buttresses. It was to have been expected that the architect would have said that, whatever we did, we should not obscure the front so presented, but that we should do what we could to strengthen what was weak, and that the front and the buttresses should be as far as possible preserved and left open to the public view. Instead of that the scheme was to hide the buttresses, to build rooms that were not wanted, or that could not meet any want, to reproduce something which never existed, and in the result to interfere with both the

outside and the inside of Westminster Hall. He hoped the present First Commissioner would hesitate to approve of this scheme, which could very well be deferred for mature consideration. No further risk of injury need be incurred, because the reduced vote would leave enough to guard against that. There was an alternative plan, which was to complete the wall within the buttresses, leaving the noble sweep of buttresses visible. No one could say what the idea of the wall and buttresses was, but one must shudder at the idea of covering them with buildings. The stairs to be provided for descending and ascending into the proposed rooms and the way of passing from the lower rooms to the upper rooms would render them practically inaccessible and useless. They would probably have the effect of darkening the interior of Westminster Hall. The proposed building at the north-west corner of the site cleared would cut off the view of the wall and the buttresses from Parliament-street, and, if the Conference-room had to be ventilated by open windows, the room would not be free from the odours of the horse-shed below. If the design was good in itself, something might be said in favour of it, but it would hide one of the finest things of the kind in Europe, and there was no value in the design itself. It was a poor thing instead of a noble thing, and nothing would be lost by refusing to adopt it now, and leaving the matter open for further consideration.

#### A COMBINED MIXING AND GRINDING APPARATUS.

At the Inventions Exhibition, Messrs. Brinjes & Goodwin, of Fieldgate-street, E., show a combined apparatus for mixing and grinding white lead and other paints. This is being worked by Messrs. Charles Turner & Sons, colour and varnish manufacturers, of Bloomsbury and Whitechapel, who are extensive users of these machines. We subjoin an illustration of the machine shown at the Exhibition, which is the third size generally made by the firm. It is capable of mixing and grinding from four to five tons of white lead per day. The operations are entirely automatic, the dry colour and oil being supplied from above to the mixers. An ingenious arrangement for measuring the proper quantity of colour is used in conjunction with these machines, although the exigencies of space do not permit of it being shown in the Exhibition. This consists of a pipe or shoot leading from the colour-bin, which is placed on a floor above. Working in this pipe are two slides, which are connected by a lever, much in the same way as the old style of gunpowder flasks. As one slide is withdrawn the other stops the supply, and so the necessary quantity is accurately measured, whilst at the same time there is no dust allowed to escape. This is a great point with such materials as white lead and other noxious powders, dust being the principal enemy to operatives in works of this kind.

The dry colour having been passed in this way to the wash-tubs or mixers, a certain quantity of oil is measured in a somewhat similar manner. There is a horizontal shaft through each mixer on which are mounted the



A Combined Mixing and Grinding Apparatus.

mixing-knives. These are of such a shape that they form a part of a worm of a screw, being in fact like the blades of a screw propeller. The tendency of the screw is to propel the paint to one end, whilst the semi-liquid material falls constantly to its normal level, thus causing a complete incorporation of the various materials. When the paint is thoroughly mixed in this way, the slide-valve at the bottom end is opened, and the material allowed to run down on to the grinding rollers. The arrangement of these is peculiar, the aim being to bring the paint to as fine and homogeneous a consistency in as short a time and with as little labour as possible. There are, as may be seen by this illustration, three rollers, which are made of granite of a special kind. The motion of these is applied through differential gearing, as shown. The bottom or grinding roller is larger than the upper two, and hence would have a greater peripheral speed even if the number of revolutions were the same, but by means of the gearing the lowest roller runs at a greater number of revolutions than the others, and thus a much more efficient grinding power is obtained. In addition to this a lateral motion by means of a cam is given to the centre roller, the pinion by which it is driven being made long for this purpose.

Roller-mills for paint-grinding have been used for many years, but hitherto the finest grinding-stones appear to have held their own. This, no doubt, has been principally due to an impression that rollers only crush; but it will be seen that the improvements introduced by this firm have the necessary attrition for thoroughly incorporating the materials and producing a perfect paint, in proof of which the makers state that there are several of their mills employed in grinding artists' colours and the extremely fine paints required for the ceramic arts. On the occasion of our visit to the machine in the Exhibition was engaged in mixing and grinding patent driers, well known to be one of the most difficult materials to deal with, which it certainly effected in a most complete manner.

On the same stand is shown one of Messrs. Brinjes & Goodwin's granite roller-mills, which are manufactured for grinding ink, chocolate soap, &c.

#### ARCHITECTURAL ASSOCIATION. EXCURSION TO ST. ALBAN'S.

The first of a proposed series of summer excursions took place last Saturday afternoon the 11th inst., to St. Alban's, when thirty-four members of this Association started from St. Pancras, and on their arrival were received by Mr. S. F. Clarkson and Mr. A. L. Forrester, who conducted them through the quaint town to St. Alban's Abbey. The town stands as our readers know, on the great north road the old Saxon Watling-street, near the site the Roman Verulamium. At the abbey Mr. Clarkson said Mr. John Chapple, who had



son advertised to take charge of the meeting, was unable to be present, and read a letter from that gentleman regretting his unavoidable absence through illness.

Mr. Clarkson then gave a long and succinct history of the Abbey, now converted into a cathedral, and rapidly pointed out its erections at different periods from the commencement, when a monastery was erected here by Offa, king of Mercia, A.D. 793, to commemorate the martyrdom of St. Alban, who suffered under the Emperor Diocletian in the year 297. The present abbey was commenced in 1077 by the Abbot Paul de Caen, and consecrated in 1115. He then traced, step by step, the progress of the work, the Early English days of John de Cella, Trumpington's alterations, the catastrophe of 1230 when the eastern arm of the Abbey fell, the rebuilding and extension of the Lady-chapel and portions of the south side of the nave in the Decorated period, and the insertion of windows and other alterations.

Having completed his general description of the abbey, in which he was assisted by plans, Mr. Clarkson escorted the members round the building to more particularly point out the different periods and details to which he had referred, and also directed attention to the extensive alterations and works executed in 1878, under the superintendence of the late Sir Gilbert Scott, just prior to the lamented decease of that architect. The finding of the 2,000 fragments of St. Alban's shrine, built into a temporary wall between the retro-choir and ante-chapel, and its reconstruction by Sir Gilbert Scott, was described and shown, as likewise the shrine of St. Amphibalus. The Lady-chapel was for three centuries used as a grammar school. Here the exquisite character of the early fourteenth-century architecture was pointed out. The slype, Duke Humphrey's monument, and Abbot Ramryge's tomb having been inspected, the visitors entered the choir, where the Norman work was shown. Here it was also pointed out how the thirteenth-century architects had cut back arcades on the face of the walls. Since the former visit of the Association, in June, 1879, when Mr. Clarkson also acted as guide and *cicerone*, a good deal of work has been executed at the abbey, particularly the western external front, upon which we had occasion to comment in the *Builder*, August 14th, 1883. Other work is still in progress internally, Messrs. Longmire & Burge being the contractors. A new reredos over the altar has been executed by Mr. Harry Hems, of Exeter, but so far as we could learn no architect has been employed as consulting or superintending chief of these extensive works.

After inspecting the old Gate-house, the members subsequently visited St. Michael's church, also under the escort of Mr. S. F. Clarkson, who here read a short descriptive history of it. This church was founded about the middle of the tenth century by Abbot Icelinus, and stands at the western extremity of the town, within the walls of Verulam. Mr. Clarkson pointed out the marble monument to Lord Bacon, several brasses, some mellowed remains of old carved bench-ends, and old painting representing the "Day of Judgment," and other details of the church. The walls and masonry of ancient Verulam are next inspected, many traces of which exist in the neighbourhood. Here Mr. Clarkson produced two plans, one showing the walls, amphitheatre, and all that was known of ancient Verulam; the other plan was a map of Pompeii, and he pointed out the remarkable similarity between the two plans, both being of the same size and shape, and the streets in each run at right angles. Having perambulated the walls at a considerable distance, the members, at the conclusion of their visit, passed a unanimous vote of thanks to Mr. Clarkson.

**Folkestone.**—Christchurch, Folkestone, has been re-opened, with the addition of a newancel, transept, and spacious organ-chamber choir-vestry, built in the Early Decorated style. The chancel has an apsidal east end, with wood-roofed roof; and the organ-chamber is vaulted with red brick and stone. The floors are laid with Maw's encaustic tiles. The basement vestry is floored with black blocks. The works have been carried out by Mr. H. M. Moody, builder, Folkestone, in designs and under the superintendence of A. R. Barker, of Buckingham-street, Strand, London, at a cost of 4,500l.



A Combination Wardrobe.

#### FLANK WALLS.

At the Wandsworth Police-court, John Wm. Waite, of Merton-road, Wandsworth, was summoned by the Metropolitan Board of Works, under 41 and 42 Vic., cap. 32, sec. 3, for unlawfully making default in setting back the external wall or front, and the external fence or boundary of the forecourts of certain houses or buildings in a road, passage, or way, connecting Southfields-road with West-hill, Wandsworth, to a distance of 10 ft. from the centre of the said road, passage, or way. Mr. Thos. Burton appeared for the Board, and Mr. Graham for the defendant.

The facts of the case were that the defendant had erected two houses fronting on Southfields-road, and flanking on to a public footpath connecting Southfields-road with West-hill, Wandsworth, without giving the statutory width of 10 ft. from the centre of the footpath.

Prof. T. Roger Smith, District Surveyor, having been called to prove these facts, and that the notice of the Board had not been complied with, Mr. Partridge held that the flank was the front for the purposes of the Act, and made an order, with costs, for the footpath to be widened within three months.—Defendant gave notice of appeal.

#### DISTRICT SURVEYORS' FEES.

THE DISTRICT SURVEYOR FOR EAST HACKNEY (NORTH) v. GREEN.

THE defendant was summoned at Worship-street Police-court, before Mr. Bushby, for fees in respect of a new house, of which he was the first occupier.

The Magistrate considered that if, as in this case, there was no occupier at the date of one month after the building was covered in, no occupier at any other time could be made liable for the District Surveyor's fees.—Summons dismissed, and two guineas costs allowed to defendant.

#### WESTMINSTER PALACE.

SIR,—The thanks of the profession are due to you for so loyally taking a side in this matter, and for taking the side of the artist who originally designed this magnificent structure. We are all proud of it,—provincials as well as Londoners,—and it ought to fare badly with that Government that emasculates the design of one of our great nineteenth-century architects. Every architectural society, as well as every individual architect feeling thus, ought to protest against the mere restoration of Westminster Hall, and insist upon the completion of a grand architectural conception.

THOMAS OLIVER, F.R.I.B.A.

Newcastle-on-Tyne, July 15.

#### DRESSING-ROOM COMBINATION FURNITURE.

SIR,—Being somewhat pressed for dressing-room accommodation, and wanting therefore to save every inch of floor space, I have had the piece of combination furniture made, of which the accompanying sketch gives a very good general idea. It has been admirably made in picked mahogany, solid throughout, from my drawings and full-size details, by Mr. J. Reid. The three small drawers under the dressing-table have been made special sizes to contain different articles of clothing. The basin has been made 19 in. in diameter; the top flange of it is fitted with an india-rubber washer, so as to insure that the water does not get between it and the marble top. The basin is fitted with a plug, and has an earthenware receiver under it for the dirty water. The sides of the washing stand portion are fitted with 4 in. square glazed tiles. Two small brackets are fitted in the angle, one for the water-bottle, and the other for a tooth-brush tray. Above the wash-stand, and well clear of head-room, there is a shelf for placing bottles, &c., on. The space underneath the longer drawers, and enclosed by a chintz curtain, is arranged,—one half for books, and the other half for travelling and other bags. As will be seen, the furniture stands on legs well clear of the floor.

FREDK. PINCHES.

#### "A QUESTION OF BUILDING LAW."

SIR,—In your issue of to-day [July 11, p. 73], Mr. Longley, architect, Bradford, raises a question which has frequently been the source of much annoyance and grumbling between owners and purchasers of land, even in this city and suburbs. I have never found it settled in any other way here than by the interpretation put on it by the Bradford Local Board. It certainly shows, as you remark, a very unnecessary hardship to be placed on some house-owners; but supposing Mr. Longley had been first in the field with his plans, and in forming the street had kept out the front of his building to the strict line, he would then have had the satisfaction of compelling others coming after him to adhere to that line. It would appear, then, that the purchaser first on the ground has the matter of forming the front entirely in his own hand, and can either keep it out to strict street-line, or set it back to suit his own convenience.

In Edinburgh we have, in some districts, streets formed with the end or flank houses brought out to the strict line of street, while the centre houses or



blocks are set back a distance of 6 ft. or so, so as to form a small plot of garden ground between the line of street proper and the front wall of the said houses so set back. To maintain the line of street in the latter case a low parapet-wall is erected with an iron railing on top, so that the pavement in front along the whole line of street is kept at a uniform width. There may be also, as you suggest, some other facts in connexion with Mr. Longley's case which he has not specified, and which would, no doubt, throw further light on the matter; but from the facts submitted I am of opinion that the Bradford Local Board have acted strictly within their rights.

GEO. PATERSON, Clerk of Works.  
Edinburgh.

#### THE NATIONAL PORTRAIT GALLERY.

SIR,—Your paragraph on the above subject in last week's issue [p. 48] might possibly tend to mislead any one, not acquainted with the facts, into the belief that our Asbestos Patent Fireproof Paint had failed to protect the Exhibition from fire. Will you permit me to point out that the fire actually occurred in the brick buildings forming the India Museum, adjoining the Exhibition, and that no part of the buildings burned had been coated with our paint; and also, the great probability that if the woodwork in the roof near the flue where the fire originated had been protected by the paint, the disastrous fire would never have occurred?

This is borne out by the fact, alluded to by Sir F. Bramwell (the Chairman of the Council of the present Exhibition), in his Presidential Address at the Institution of Civil Engineers on 13th January last, when he remarked as follows:—

"The processes, more or less successful, that have been tried are so numerous that I cannot even pretend to enumerate them. I will, however, just mention one, the Asbestos Paint, because it is used to coat the wooden structures of the Inventions Exhibition. To the employment of this I think it is not too much to say those buildings owed their escape in last year's dry summer from being consumed by a fire that broke out in an exhibitor's stand, destroying every object on that stand, but, happily, not setting the painted wood-work on fire, although it was charred below the surface. I do not pretend to say that surface application can enable wood to resist the effects of a continued exposure to fire, but it does appear that it can prevent its ready ignition."

J. ALFRED FISHER,  
General Manager and Secretary,  
United Asbestos Company.

161, Queen Victoria-street, E.C.

\*.\* The words to which our correspondent takes exception were avowedly and plainly quoted as those of Mr. Plunket, the First Commissioner of Works.—ED.

### The Student's Column.

#### DESCRIPTIVE GEOMETRY.—PART II.

VIII.

Find the intersections of two cylinders.

**W**E construct outside the figure a plane, R, parallel to the generators of the two cylinders; for this, by any point,  $r$ , in space we draw two lines parallel to the generators of the two cylinders, and through the feet of these lines we carry the trace,  $R^h$ , of the plane which contains them (we do not require the vertical trace). We know that all the planes parallel to R will cut both cylinders along their generators; therefore, if we make a series of lines parallel to  $R^h$  cutting the two bases of the cylinders, the generators which start from the points of intersection,  $g$  and  $g'$ , are contained in the same plane; this gives us the means of finding any

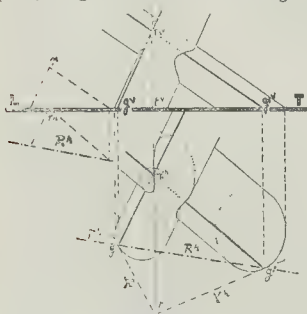


Fig. 123.

number of points,  $m$ , of the intersection of the cylinders. The tangent to the curve of intersection in the point  $m$  will belong to the planes X and Y, tangent to the cylinders in the same

point  $m$ . The tangent to the curve will therefore be the intersection of the planes X and Y; at the meeting of their traces we find the point  $t$ , which belongs to the tangent, so that  $tm^h$  is the plan of the tangent, and  $t'm^v$  is its elevation. (See fig. 123.)

To draw the intersection I of the cylinders more rapidly, it is advisable to get, first, some of its main points, such as, for instance, those on the outlines, both of the plans and the elevations of the cylinders. For the generator A, which forms the outline of the plan of the cylinder, we know that the plane tangent to it will be vertical; therefore, the tangents to the curve in the points belonging to generator A will have their plans on  $A^h$ , so we can be sure that the plan  $P^h$  of the intersection will be tangent to  $A^h$ . Similarly we know that the elevation  $P^v$  will be tangent to the outlines  $B^v$  of the cylinders; we shall do well to begin our drawing by marking the points where the intersection is tangent to the outlines, and we shall call them  $a$  or  $a'$ ,  $b$  or  $b'$ , according as they belong to the outlines of the one or the other cylinder. (See fig. 124.)

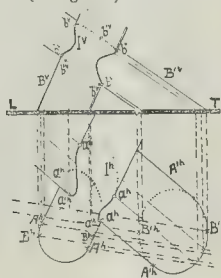


Fig. 124.

There are also other important points  $e$  which correspond to the limits of the positions  $R^h$  can take; we name these limits  $U^h$ . We find that  $R^h$  will only give us points of the intersection when it meets the bases of both cylinders, therefore all the positions we can select for  $R^h$  must be comprised between  $U^h$  and  $U^h$ , where it becomes tangent to one of the bases and cuts the other. Say  $U^h$  cuts one of the bases in  $f$  and is tangent to the other in  $f'$ , and let us name F and F' the generators which start from these points. The plane U is tangent to the second cylinder, for it contains the generator F', and  $U^h$  is tangent to the base. The generator F of the first cylinder is in the plane U, and also in a plane Y tangent to the first cylinder, and therefore we may conclude that the generator F is tangent in the point  $e$  to the curve formed by the intersection of the two cylinders. We get the points such as  $e^h$ , and note that the curve will in these points be tangent in plan to  $F^h$  and in elevation to  $F'^v$ . (See fig. 125.)

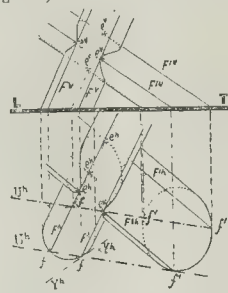


Fig. 125.

If the lines  $U^h$  are alternatively tangent to the base of each cylinder as in fig. 125, the

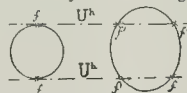


Fig. 126.

cylinders form only a partial penetration; if both the lines  $U^h$  are tangent to the base of the

same cylinder and cut the other, then we have a complete penetration. (See fig. 126.)

In the complete penetration there are two intersections of the cylindrical surfaces: the one where the smaller cylinder enters the other, the second where the cylinder comes out again. In the partial penetration there is but one continuous curve of intersection, and the cylinder may be torn asunder; for this reason the French call this intersection "une courbe d'arrachement," or tearing curve.

In the figures 123, 124, 125, we have given separate diagrams for each part of the operation of drawing the intersections, but, of course, they are to be done simultaneously on the same drawing. As this problem is of the utmost importance for setting out the groins of vaulting, we strongly advise students to make on a large scale complete drawings of the intersections of cylinders, both in the case of complete and partial penetration; then construct models of the cylinders out of drawing paper with the intersection cut out of it, larger one, which they can do by developing the surface of the cylinders. To set out all problems neatly, it is advisable after drawing the bases of the cylinders to settle at once the direction of  $R^h$ , and deduce therefrom the directions of the generators of the cylinders. We therefore reverse the operation described in fig. 123; we draw  $R^h$  and place on it the feet  $f$  and  $f'$  of two lines, which we make to meet at a point  $t$ , then we adopt for the generators of the cylinders lines parallel to these. Another precaution to take in setting out the problem is to place the bases of the cylinders sufficient distance from L U so that the plans of the intersections should be entirely below L T, otherwise the different parts of the drawing get inconveniently mixed. This done, draw a series of lines  $R^h$ , and number the intersections on the bases of the cylinders, as in fig. 127, a similarly number the points of the intersection. Considering the number of points necessary to delineate the intersections, it is advisable to use red ink to number the points of the intersection (not being able to use red ink, we shall indicate the generators by large numbers, and the points of their intersections by small numbers); but in the case of penetration of every generator of the smaller cylinder meets two generators of the bigger cylinder, it is advisable to distinguish the points of entrance and exit by putting plain numbers to the points of entrance and numbers with a dash to the points of exit. (See fig. 127.)

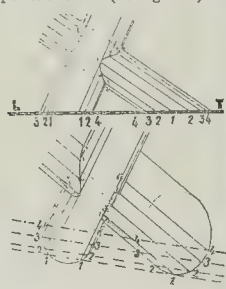


Fig. 127.

In drawing the intersections we must find out which parts thereof are seen and which are hidden. For a point of the intersection to be seen it must belong to the meeting of two generators that are seen; we shall therefore take any point of the intersection and examine whether it is seen, then draw the curve with a full line until it meets one of the outlines of the cylinders. Generators of the one cylinder may be partly hidden by the surface of the other cylinder; this can only occur where the cylinders cross one another. To find out which of the cylinders is seen on plan, we carry up a vertical line from the point where the plans of two generators meet one another, and we find out on the elevation which generator is met highest by such a line; this will be the generator seen, the other one hidden. When the penetration is only partial the points of entrance and exit should be carefully distinguished, the only difference being that at the limits  $U^h$  the entrance and exit coincide, as in fig. 127, so that the line of intersection is continuous and will join its starting point.



PROVINCIAL NEWS.

**Birmingham.**—The Gothic Arcade is now opened to the public. This is the first building of the class (at least, so far as Birmingham is concerned) where the Early Gothic style has been taken as a basis upon which to found an architectural design. The combination of white glazed bricks, ornamental tiles, and stonework in the Snow-hill front is effective in appearance. The shops in the arcade are plainer in treatment, but the style of architecture has been consistently adhered to. Mr. C. Edo is the proprietor, and Mr. J. S. Davis the architect, both of Birmingham. A large hotel in Corporation-street has just been completed. It is entitled the Chamberlain Arms. Mr. Yeoville Thomas was the architect. There are forty rooms, sitting-rooms, billiard-rooms for six, two large smoke-rooms, luggage-rooms, or cellars, private-rooms, coffee-room, 40 ft. x 25 ft., and all the other accessories of a first-class hotel. A considerable space of ground has been reserved for future extension. Mr. William Barnsley, of Birmingham, was the contractor, his estimate being 14,000l. The elevation is of a free Italian style, with granite and stone columns and pilasters, and Hopton-wood dressings. There is a considerable amount of stone carving, and terra-cotta panels have been used to a great extent. **Petersfield (Hants).**—The engineer to the local Board of Petersfield, Hants (Mr. Henry Robinson, C.E., of London), has been sinking a shaft in the neighbourhood of the town for supplying it with water. The site was chosen as to get a supply from the Hythe Beds, and old ferruginous water, which is found in the overlying Sandgate Beds. This, it is stated, has been successfully accomplished, inasmuch as a depth of between 70 ft. and 80 ft., what is described as an abundant supply of very pure soft water has been reached.

CHURCH-BUILDING NEWS.

**Luton (Kent).**—Christ Church, Luton, near Hemmeham, which has recently been erected by Messrs. Naylar & Son, of Rochester, from the plans and under the superintendence of Mr. R. Robson, F.S.A., was consecrated on the 18th inst. by the Bishop of Rochester. The church is faced on the outside with Kentish rag and Bath stone dressings, the internal face being plastered. It has a high-pitched open roof, covered with tiles, the floor being formed of wooden blocks, the same as used for the London Board schools. The seating and altar are at present omitted for want of funds. The cost up to the present has been upwards of 500l.

**Preston.**—Messrs. Jones & Willis, of Birmingham, have just made a pair of polished brass gas standards for St. George's Church, Preston, from the designs of Messrs. Garlick & Lees, the architects of the building.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

**London.**—Designs for the new R.C. Church proposed to be built at Turnham-green, to replace the present one, which is much too small for the large and growing congregation, are being prepared by Mr. Kelly, architect, of Bedford Park.

**Liverpool.**—St. Mary's R.C. Church, Liverpool, erected forty years ago from designs by Gustus Welby Pugin, has been removed from its site in Edmund-street to another in High-d-street. Mr. Peter Paul Pugin, a son of the architect of the building, has directed its removal and re-building, the work having been carried out by Messrs. Hughes & Stirling. The materials to departed priests, which have been transacted from time to time, have been transacted with the building, and in the better part which the new site ensures, are better than a set of Stations of the Cross, in statuary, carved out of Caen stone by Mr. Wall, of Altham, and fixed in massive stone frames, prominently placed; and conspicuous in the front is a new tabernacle and throne, over which is a canopy elaborately carved. The statues and other fittings of the tabernacle and altar have been executed by Messrs. F. P. Inor, McIntyre, & Co., of Liverpool. The steps by which the high altar is approached are of white Sicilian marble, and the pavement is

composed of octagonal slabs of similar stone and diamonds of black marble, while the sanctuary itself is separated from the side chapels by oak stalls and screens.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

2,368. Lime Kilns and Brick Ovens. H. Hargreaves and others.

The top of the ordinary open lime-kiln is closed by a cover of fire-clay slabs in an iron frame. The covers are mounted on wheels running on rails, so that the kilns may be readily uncovered. Flues fitted with dampers run from the top of the kilns to an oven where the waste heat from the kilns is utilised for burning bricks or similar goods. The flues convey the heated current to a space between the outer and the pocket wall, and then passing through the floor, which is built of fire-bricks laid on edge, is discharged from the well in the centre into the chimney-flue.

4,879. Cement. J. Watson.

This patent relates to the separation of flints and other hard and heavy substances from the slurry before grinding. The slurry flows over a rocking inclined plane with a projecting lip, either fixed or removable by handles. The heavy substances sink into a well at one end of the inclined plane.

6,004. Non-conducting Covering for Heat. D. Barnas.

Fibrous material such as flax waste, fire-clay, or other non-combustible material and spent tanners' bark are ground together with water to the consistency of mortar. The proportions vary according to the heat of the surface and the like, and where the strain on the composition is small an adhesive substance may be substituted for all or any part of the fibrous material.

5,594. Warm Air Fire-grate. J. Grundy.

A chamber is made behind the grate, through which air passes from an inlet in the wall under the back of the stove. A plate is fitted in the chimney round the smoke-pipe to prevent the hot air going up the chimney instead of through the ventilator, and apertures to allow the warm air to enter the room are made also under the chimney-breast.

3,763. Glazing Horticultural Buildings. C. & W. Allen.

Washers or pieces of thin metal are placed between the lower edge of the glass and the putty on which it rests, to prevent the dripping of the water which may condense on the under surface of the glass. For glazing the sides of the building leaden bars of B or H section are used, strengthened by attaching them to iron tubes with copper wire.

3,123. Fireplace. W. T. Allen.

The chimney jambs are made of wrought or cast iron, which are held securely in their places by placing an iron manplate on the top to which they are secured in any suitable way. The jambs and mantel may be ornamented according to taste.

5,075. Floors and Ceilings. H. J. Hadden.

The space between the joists is bridged over with hollow earthenware bricks, of various forms, which rest on the lower flanges of the joists, or on ledges of wood. The perforations may be longitudinal or transverse. The bricks may be moulded in position by pouring in any suitable material over a series of indiarubber tubes placed between the joists.

5,057. Flooring. A. G. Geary.

The wooden blocks of which the flooring is made are grooved at their sides; studs having heads at both ends are inserted in the grooves, and cement is run under the blocks. A layer of pitch or asphalt is interposed between the cement and the wood to resist damp.

7,783. Kilns for Bricks, Pipes, &c. C. Price.

An air-blast or fan is applied to kilns internally fired. The kilns have arched coverings, and fuel is fed in through openings on the top.

15,665. Wood Pavement. J. C. Davis.

Long lengths of wood are laid either longitudinally or transversely, and the interstices filled up with a strong cement.

APPLICATIONS FOR LETTERS PATENT.

July 3.—8,027, J. Adams, Silent Closing and Retaining Door-springs.—8,075, R. Snook, Improvements in Drill Braces.—8,085, J. Banks, Improvements in Gully or Trap Grates.—8,094, G. Andrews, Improved Balance for Hydraulic Lifts.

July 4.—8,106, D. Miller, Improvements in Cisterns for Flushing Water-closets.—8,138, H. Williams, Window-sash Fastener.—8,139, G. Redfern, Improved Process for Rendering Wood Incombustible.

July 4.—8,153, W. Thompson, Rendering Cements Hydraulic.—8,170, G. Budd, Apparatus for Ornamental Turning and Shaping.

July 7.—8,201, D. Willetts, Improvements in Spades and Shovels.—8,225, H. Paterson, Smoke-consuming Furnaces.

July 8.—8,254, W. Shorland, Weather Boards and Draught Excluders.—8,270, E. Thurkie, Elec-

tric Bell Indicators.—8,276, J. Newton, Electric Bell Indicators.—8,283, F. Jarvis, Earth Boring. July 9.—A. Rockwell and F. Davis, Improvements in Sash Fasteners.

PROVISIONAL SPECIFICATIONS ACCEPTED.

6,085, H. Lake, Protection of Wood from Moisture.—6,273, B. Boothroyd, Apparatus for Ventilating Sewers and Drains.—6,319, J. Skinner and Others, Bolts for Doors and other Fastenings.—6,510, J. Johnson, Manufacture of Decorated Glass.—6,766, W. Parry, Improved Scaffold Fastener.—7,055, H. Johnson, Combined System of Warming and Ventilating Rooms and Buildings.—7,057, W. McGill, Opening, Closing, and Fastening Sliding Windows.—7,311, G. Gazzard, Presses for Pressing Tiles.—7,526, J. Dougherty, Fastening and Securing Door-knobs to Spindles.—7,738, G. Pfeifer and M. Schutz, Apparatus for Heating Soldering Tools.—6,962, W. Chalk, Improvements in the Treatment of Granite and Granite Stone.—6,981, R. Hill, Sewage Trap and Gully.—7,339, H. Snelgrove, Fireproof Ceilings and Floors.—7,545, J. Overing and A. Tulip, Construction of Buildings of Bricks or Blocks.—7,618, J. Clegg, Wood Floorings, Match Linings, &c.—7,693, H. Conway, Valves for Regulating the Supply of Water to Cisterns.—7,732, D. Webb, Pavement Lights.—7,849, J. Finnie, Fixing Roof Gutters to Carrying Hooks.—7,861, T. Goosey, Combined Rule and Protractor.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

11,503, G. Hurdle, Construction of Bell Cranks, Pulleys, Levers, &c.—11,926, G. Cresswell, Pipes for Water-closets and Urinals.—12,425, H. Kettmann, Manufacture of Asphalts.—12,535, W. Mangnall, Improvements in Water-closets.—12,786, J. Black, Pointing Tool.—13,397, R. Goodman, Construction of Ventilator.—6,701, A. Link, Mounting Circular Saws for Cutting Piles.—12,368, J. Tottenham, Hoists for Raising Materials for Buildings in course of erection.—12,653, F. Lyte, Anti-fouling Paints for submerged Structures.—13,181, J. Rogers, Temporary Closing of Openings in Fireproof Partitions.—4,036, W. T. and C. Smith, Mathematical Drawing Instrument or Compass.—6,027, J. and T. Tulloch, Construction of Fireproof Buildings.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JULY 2.

By NICHOLS, SON, & ALDER. Gloucestershire, near Thornbury Station—"The Marlwood Grange Estate" of 373 acres, freehold ..... 218,600

JULY 6.

By G. BRINSLEY. Walworth—8 and 10, Koff-street, and 1 and 2, Triangle Cottages, freehold ..... 825 Camden-road—35, Brecknock-road, 61 years, ground-rent 9l. .... 670 By J. H. GREY & SON. Acton, Bollo Bridge-road—Devonshire House, freehold ..... 550 Mill Hill-road—Hartree Villa, freehold ..... 445 Shepherd's Bush—9, Ashchurch-gate, 78 years, ground-rent 17l. .... 425

By GRAYES & SON.

Paddington—58, First Avenue, 88 years, ground-rent 4l. 4s. .... 230

By PHILLIPS, LEA, & DAVIES.

Hackney-road, Claremont Mews—A block of freehold stabling ..... 260 Bethnal-green—9 to 15, Providence-place, long leasehold ..... 1,520 Hackney—63, Clarence-road, 57 years, ground-rent 6l. .... 360 Dalston—54 and 56, Brougham-road, 60 years, ground-rent 7l. .... 650

By WILKINSON & SON.

Brighton—18, Brunswick-terrace, freehold ..... 3,910

JULY 7.

By DARRSHAM, TOWNSON, & CO. Putney—"The residence called 'Putney House,' and 2a, 1r. 6p., freehold ..... 6,000 By CHINNOCK, GALESWORTHY, & CO. Old Bond-street—An improved rent of 400l. a year, 25 years ..... 3,710 Kingston-on-Thames—"Fern Hill Cottage," and 7a, 1r. 11p., freehold ..... 1,760

By VENTON, BULL, & COOPER.

Barnesbury—1, Wyford-street, 55 years, ground-rent 6l. .... 360 Islington—Ground-rent, 14l. 5s. a year, term 47 years ..... 125

By HARRIS, VAUGHAN, & JENKINSON.

Ashford—"The Bowers," and 34 acres, freehold ..... 680 Farningham—Freehold pasture land, 7 acres ..... 360 St. Mary Cray—"Kemp Cottage," with grounds ..... 550 Sydenham—21, 25, and 27, West-terrace, 76 years, ground-rent 18l. .... 809

By FARRBROTHER, ELLIS, CLARK, & CO.

West Kensington—15, Charleville-road, 55 years, ground-rent 18l. .... 1,390 Strand—32, Essex-street, freehold ..... 5,000 Tottenham—The freehold residence, Strathmore ... 1 to 8, Tottenham-terrace, freehold ..... 1,765 Queen-street, a plot of freehold land ..... 160 Lower Sutton, Hants—"The White House" Beer House, and 2a, 3r. 24p. .... 410 Ditchingham, Norfolk—The Manor of Farnow, with its rights, &c. .... 180 The Manor of Hedenham, Herts ..... 420

JULY 8.

By EGINGTON & SON. Reading, Berks—"The Whitley Park Estate," 55 1/2 acres, freehold ..... 71,000



|                                                                                                                                                           |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| By RICHMOND & STEVENS.<br>Grosvenor-square—14, Davies-street, 14 years,<br>ground-rent 100l. ....                                                         | £515   |
| By ALBERT WATSON.<br>Speldhurst, Kent—The lease of "Speldhurst<br>Lodge," term 99 years .....                                                             | 530    |
| By LEMMY & SMITH.<br>Halesworth, near—A small farm, containing<br>87a. 1r. 1sp. ....                                                                      | 1,980  |
| By FULFILL, HORSBY, SONS, & CASSELL.<br>Blackfriars—The Bridge Wharf and Timber Yard<br>Ground-rent of 200l. a year, reversion in 49 years<br>6,000 ..... | 7,450  |
| By DOWSETT & WOODS.<br>Hammermith, King-street—"Guelph House,"<br>copyhold .....                                                                          | 3,200  |
| 5, Pomona-place, 23 years, ground-rent 6l. ....                                                                                                           | 300    |
| By A. & A. FIELD.<br>Mile End—31, 33, and 35, Hunt-street, freehold ..                                                                                    | 1,020  |
| 4 and 5, Hunt-place, freehold ..                                                                                                                          | 450    |
| 1 and 2, Charlotte-place ..                                                                                                                               | 360    |
| 44, Spital-street, freehold ..                                                                                                                            | 640    |
| Forest Gate—5, Odessa-road, freehold ..                                                                                                                   | 310    |
| By DALL & SOX.<br>Mile End—51 and 53, Harford-street, and 118,<br>Skidmore-street, 22 years, ground-rent 4l. ....                                         | 610    |
| 55 and 57, Harford-street, 22 years, ground-<br>rent 4l. ....                                                                                             | 385    |
| Leyton—Five plots of freehold land ..                                                                                                                     | 205    |
| Mile End—1 to 6, Sampson-place, 73 years,<br>ground-rent 18l. ....                                                                                        | 475    |
| By DRYES & CO.<br>Guildford—Freehold ground-rent 80l., reversion in<br>73 years ..                                                                        | 2,110  |
| "The Bowling Green" public house, freehold ..                                                                                                             | 2,050  |
| 48 to 51, Quarry-street, freehold ..                                                                                                                      | 2,060  |
| 10 to 14, Castle-street, freehold ..                                                                                                                      | 24     |
| 6, Tun's Gate, freehold ..                                                                                                                                | 255    |
| "The Red Lion Inn," The Seasons House and<br>Theatre, and 303, High-street ..                                                                             | 3,125  |
| 60, 77, 78, 101, 102, 111, 122, and 162, High-street,<br>freehold ..                                                                                      | 6,820  |
| "The Castle Inn," freehold ..                                                                                                                             | 1,220  |
| 9 and 9, Swan-lane, and 7, Angel gate, freehold ..                                                                                                        | 560    |
| Freehold Workshop and Baking in Quarry-<br>street ..                                                                                                      | 630    |
| A freehold building site in Quarry-street ..                                                                                                              | 590    |
| Branley—Freehold enclosures of land, 62a. 3r. 13p.<br>Three enclosures of land, 6a. 1r. 20p. ....                                                         | 1,300  |
| Five freehold cottages and other buildings ..                                                                                                             | 655    |
| By H. T. CHAWLER.<br>Everbush—Downhurst and Woodland Farms,<br>104a. 1r. 38p. ....                                                                        | 2,200  |
| Womersley—Freehold house and grounds ..                                                                                                                   | 650    |
| Numerous freehold houses and cottages ..                                                                                                                  | 2,385  |
| "The Lodge," with three cottages ..                                                                                                                       | 610    |
| Cranleigh—Enclosure of freehold land, 10a. 2r. 19p.<br>Dunsford—An enclosure of land, 6a. 3r. 24p. ....                                                   | 1,395  |
| Shalford—An enclosure of land, 2a. 1r. 28p. ....                                                                                                          | 155    |
| West Clandon—An enclosure of land, 6a. 3r. 10p. ....                                                                                                      | 150    |
| By BRADSHAW & CO.<br>Whitechapel—28 and 30, Leman-street, freehold ..                                                                                     | 1,800  |
| 28, Leman-street, and 1 and 2, Duncan-street,<br>freehold ..                                                                                              | 2,850  |
| 4 to 12, Duncan-street, freehold ..                                                                                                                       | 1,480  |
| 34 and 35, Great Alie-street, freehold, and 1 and<br>2, Half Moon-passage, freehold ..                                                                    | 1,810  |
| Petersfield, near—"Steep Farm," 146a. 3r. 34p. ....                                                                                                       | 9,050  |
| By NEWBORN & HARDING.<br>Kilington—20, Canonbury Park Road, 50 years,<br>ground-rent 6l. 6s. ....                                                         | 610    |
| By PROCTOR & MORRIS.<br>Tottenham—1 and 2, Leigh Villas, freehold ..                                                                                      | 600    |
| By E. SIMMONS.<br>Brixton—20 and 24, Windade-road, 81 years,<br>ground-rent 16l. ....                                                                     | 790    |
| 89, Delberg-road, 83 years, ground-rent 6l. 10s. ....                                                                                                     | 360    |
| Rochester—1, Fawcett-road, freehold ..                                                                                                                    | 260    |
| Wandsworth, Amerland-road—84a. 3r. 10s. ....                                                                                                              | 3,395  |
| 84 years, ground-rent 6l. 10s. ....                                                                                                                       | 350    |
| New Cross—5 and 8, Knoyle-street, 78 years,<br>ground-rent 10l. ....                                                                                      | 210    |
| 22, Peppys-road, 72 years, ground-rent 10s. ....                                                                                                          | 640    |
| By D. YORGE.<br>Brixton—10, Brighton-terrace, 24 years, ground-<br>rent 4l. ....                                                                          | 135    |
| By C. C. & T. MOORE.<br>Poplar—103, 105, and 289, High-street, copyhold ..                                                                                | 800    |
| 2 and 4, Brunswick-street, copyhold ..                                                                                                                    | 755    |
| By DRYES & CO.<br>Buckingham, near—"Lomborough Farm,"<br>81a. 2r. 28p., freehold ..                                                                       | 2,400  |
| By F. STOCKER.<br>Dulwich, Exchange-buildings—Ground-rents 120l.,<br>reversion in 83 years ..                                                             | 2,890  |
| Ground-rents of 781l. 4s., reversion in 83 years ..                                                                                                       | 15,228 |
| In 17 lots ..                                                                                                                                             | 5,490  |
| 9 to 14, Exchange-building, freehold ..                                                                                                                   | 5,490  |
| By DENNANT & PORTER.<br>Westminster—18 and 18A, New-street, term 17<br>years and 8 years, ground-rent 7l. and 8l. ....                                    | 450    |
| By J. LARKE & SONS.<br>Lambeth—"The Cottage Flint Glass Works,"<br>copyhold ..                                                                            | 3,000  |
| By O. W. MILLAR.<br>Holloway, Prospect-road—Ground-rents of 163l. 16s.,<br>reversion in 90 years ..                                                       | 4,160  |
| Lysander-grove—Ground-rents of 58l. 14s., rever-<br>sion in 90 years ..                                                                                   | 1,455  |
| By E. LEWIS & CO.<br>St. George's-in-East—1 and 3, Providence-street,<br>34 years, ground-rent 16l. 11s. ....                                             | 135    |
| 83 to 89, Providence-street, 34 years, ground-rent<br>18l. 18s. ....                                                                                      | 555    |
| 10 to 32, Providence-street, 1 year, ground-rent<br>100l. ....                                                                                            | 50     |
| Improved Ground-rent, 55l. 6s. a year, term 34<br>years ..                                                                                                | 550    |

**Corrugated Iron.**—Messrs. North & Son, of London-road, Southwark, well known as contractors for galvanised corrugated iron roofing and buildings, have secured additional premises and land in St. Bride-street, Ludgate-circus.

## Miscellaneous.

**French Honours to English Architects.**—Mr. Edward I'Anson, vice-president of the Royal Institute of British Architects, Mr. R. Phené Spiers, F.S.A., and Mr. W. H. White, secretary of the Royal Institute of British Architects, have been elected honorary and corresponding members of the Société Centrale des Architectes, Paris.

**The Towns of the Riviera and the late Cholera Epidemic.**—The *Lancet*, in a special report on the effects produced at the fashionable health resorts of the Riviera by the outbreak of cholera at Marseilles and Toulon, remarks that the mortality was exceptionally low during the epidemic; yet so many persons kept away that a large number of bankruptcies resulted, and the municipal receipts were considerably reduced. Thus it unfortunately happened that, just at the moment when the strongest desire was manifested to undertake sanitary improvements, there was a total lack of means to carry them out. At Monaco, only the dread of cholera failed to keep away the visitors who crowded to the casino. But as there is no poor or indigent population at Monaco, and as the principality is at once the cleanest, the most orderly, and prosperous station on the whole Riviera, it is not surprising that the cholera failed to implant itself on this favoured spot. The fact that the population of Hyères did not suffer, though they harboured more than a thousand refugees from Toulon, was far more remarkable. The report describes the energetic measures taken by the municipal authorities, the vigorous disinfection practised, and the great improvement in the maintenance of cleanliness throughout the town. In spite of financial depression, a loan will be contracted to build sewers and make other sanitary ameliorations. At Nice 200 automatic flushing-tanks are to be added to the existing sewers. At Cannes a successful experiment of water-drainage has been made in the Vallon Provencal district. In the old town of Monaco a new sewer was hewn out of the solid rock, and at Mentone jetties are in course of construction to carry the sewage sixty metres out into the sea.

**Vermont (U.S.A.).**—A proposal to place a series of commemorative windows in the University Chapel of Vermont, United States, has recently been inaugurated by the completion of two large windows, designed and executed by Messrs. James Ballantine & Son, Edinburgh. One window is a memorial of the late George Wyllies Benedict, who was professor from 1825 to 1847. The other window commemorates Professor James Marsh, late president of the University. The next window of the series is proposed to be dedicated in memory of Professor Joseph Torrey. Messrs. Ballantine have also in hand the central window for another University Chapel at Dartmouth, U.S. The design of "John the Baptist preaching in the Wilderness" is chosen, in reference to the missionary zeal of Wheelock, the first President of the College, 1769–1779, to whose memory the window will be inscribed.

**Connaught Place at Swanley (Kent).**—A new Connaught Place, with chapel adjoining, has recently been erected at Swanley, in connexion with St. Bartholomew's Hospital, London, and was opened on Monday last, by their Royal Highnesses the Prince and Princess of Wales. The buildings have an effective appearance, and have been erected at a cost of upwards of 16,000l., by Messrs. Naylor & Son, of Rochester, from the designs and under the superintendence of Messrs. I'Anson & Son, architects, of Lawrence Pountney-lane, London.

**Constantinople Land and Building Company.**—The directors of the Constantinople Land and Building Company, Limited, on the 11th of this month ratified the contract made between their managers and the German Government for the erection of the new German embassy buildings at Therapia, on the Bosphorus. The land is a present from the Sultan to the Emperor of Germany. The engineer of the company, M. Cuignia, is a Frenchman.

**The Societe Francaise des Asphaltes v. Farrell.**—In this action for libel, brought against Mr. Farrell (secretary and manager of Claridge's Asphalt Company), the verdict was given for the defendant without the jury quitting the box. It is not necessary that we should enter into the merits of the case, which appears to have arisen out of trade rivalry.

**American Competition with England for Engineering Work.**—In Messrs. Mason & Grant's Engineering Trades' Report for the past half year, just issued, it is stated that bridge-builders and makers of structural ironwork have been fairly well employed during the last six months, but at prices unprecedentedly low. The cheapness of iron and steel, and the development of labour-saving machinery, together, brought down the cost of production, the advantage going entirely to the purchaser who has benefited also by the keen competition among manufacturers. In India, the extension of strategic lines in the north-west caused regular demand for bridges, which may be expected to continue for some time, and there have been considerable purchases on some of the private Indian lines for spans up to 200 feet. There is an increasing demand for bridges of other structures from the Australian Colonies, where the growing expenditure on railways and other public works not only gives present employment to manufacturers at home, but creates a future need for renewals and extensions. Competitive tenders for an important bridge 3,000 ft. long, for an estuary near Sydney, have just been sent in from English and American manufacturers. It has been known to English engineers, and this opinion is now being rapidly adopted in the United States, that the light and cheap American bridges, with pin connections, are neither so permanent enough to justify their use, nor at present there are political influences in South Wales which favour greatly the imposition of railway material from the United States.

**"The International College," Finchley-road.**—On Wednesday the Marquis of Lonsdale opened the International College, Finchley-road, Hampstead, of which Mr. James Hayman is principal. This college has been built as an auxiliary to the Anglo-French College, Burgess Park, Finchley-road, and will accommodate about 100 boarders, as well as an additional 100 day scholars. The building is lofty, the exterior being of red brick relieved by white stone, and is situated in the Finchley-road, close to the Metropolitan, Midland, and North London Railway Stations. The style is Gothic, frescoed. There are four floors, crowned by a tower, in which there is an astronomical observatory. The first and second floors are devoted to living rooms and dormitories for the boarders and masters. On the ground-floor there are several class-rooms and a large hall, capable of seating 800 persons, with open pitch-pine floor. The basement comprises a dining-hall, laid with covered playground 90 ft. by 45 ft., and domestic offices. There is also a large open playground and a bathroom. The architect is Mr. Banister Fletcher, and the builders are Messrs. Aldridge & Jenvey, Mr. J. Stunt being their foreman in charge. The gas and internal fittings are by Messrs. Keeling, Teale, & Co.

**Alterations in Amounts of Tenders.**—A correspondent writes to complain that although his tender for a particular job was the lowest sent in, the builder who put in the next lowest tender obtained the contract by undertaking to do the work for a less amount than that of the lowest tender. This is complained of as "a most unfair transaction," which is unquestionably so.

**Liverpool Architectural Society.**—The fourth meeting of the Junior Debating Club was held at the Rooms, Cook-street, on the 13th inst., Mr. Edmund Rathbone in the chair. There was a fair attendance to hear the paper by Mr. Joseph H. McGovern (visitor) "Valuations." Messrs. J. Nicholson, J. S. Mercer, the Chairman, and others, joined in the discussion which ensued.

**The Victoria Hotel, Manchester.**—The Victoria Hotel, Manchester, which was opened on the 6th inst. It has cost 120,000l. and has been erected from the designs of Mr. William Dawes, architect, Manchester. We are compelled to hold over further particulars of the building until next week.

**Saunders v. Fawley.**—In reference to the case, which was briefly reported and commented upon in our last, we understand that notice of appeal has been entered to set aside the verdict on five distinct grounds.

**The St. Paul's Ecclesiastical Society.**—The next meeting of the Junior Debating Club was held at the Rooms, Cook-street, on the 13th inst., this Saturday, the 18th inst. Train from King's-cross at 10.10 a.m.



**Registry and Exhibition of Architectural Appliances and Inventions.**—Under the title of "The Permanent Exhibition, Registry, and Agency of Approved Architectural Appliances and Inventions," an institution likely to be very useful to the building trade was opened on Saturday last, at 10, Carter-street, Portman-square, under the management of Mr. Stephen S. Phillips, with a view to admission. A small rent is charged for space to exhibitors, and the institution realises a percentage commission on all orders taken through its agency. A very ingenious system has been placed in it as a repository of all kinds of appliances, arranged in sections for materials, painting, roofing, decorating, drainage, and all other departments of building operations, to which architects or property owners may possibly refer with marked advantage in making choice of materials or accessories for dwellings, designing residences, or for comforts and conveniences during occupation. We may take opportunity of saying more about the undertaking on a future occasion.

**Local Government Board Inquiry at Chiswick.**—Major Tulloch, one of the Local Government Board's inspectors, held an inquiry at Chiswick on Wednesday last as to an application of the Chiswick Local Board for sanction of a loan of £4,100, for private street improvements at Bedford Park. Some important points were raised. The clerk stated that, although they were now only making application for sanction of the loan, the works in question had been completed, and 3,900 ft. had already been done to the contractor out of the general district fund, since the audit took place in March last. The inspector cautioned the Board, if they proposed to seek sanction for a loan, and forthwith proceeded to spend the money out of the rates on the works before sanction was obtained, and the audit took place in the interval, the transaction was a bad book, and the members of the Board had to find themselves in difficulties if the sanction of the Local Government Board was refused, any cause, refused to the borrowing of money. It was stated that the Board resolved to give the owners five years in which to pay the money; and to ask sanction for the loan to extend over five years; and that was the cause of the delay in the audit making the application to the Local Government Board. Ratepayers present strongly objected to the Board's insisting that all footpaths of new streets should be tar-paved. The clerk informed the Inspector that the Board seen the insufficiency of tar-paving as it had been put down in Chiswick; and had resolved to require York stone to be laid on all new streets. The Inspector said he would report in reference to the loan until he saw the tar-paved footpaths completed, which, it was said, they would be a fortnight hence, at which time he would inspect the paths.

**PRICES CURRENT OF MATERIALS.**

| TIMBER.                            | £ s. d. | £ s. d. |
|------------------------------------|---------|---------|
| Libert, B.G. .... ton              | 12 10 0 | 15 10 0 |
| E.I. .... load                     | 0 2 6   | 0 2 9   |
| India, U.S. .... ft. cube          | 3 0 0   | 5 0 0   |
| Canada .... load                   | 3 0 0   | 5 0 0   |
| " .... ft. cube                    | 3 10 0  | 5 0 0   |
| " .... ft. cube                    | 1 10 0  | 4 10 0  |
| " .... ft. cube                    | 3 0 0   | 5 0 0   |
| " .... ft. cube                    | 3 0 0   | 4 10 0  |
| " red .... ft. cube                | 3 0 0   | 4 0 0   |
| " yellow .... ft. cube             | 3 15 0  | 5 5 0   |
| Danish .... ft. cube               | 5 0 0   | 6 0 0   |
| Petersburg .... ft. cube           | 5 0 0   | 6 0 0   |
| Scot, Riga .... log                | 5 0 0   | 4 10 0  |
| Finland, 2nd and 1st. std. 100     | 8 0 0   | 9 0 0   |
| 4th and 3rd .... std. 100          | 6 10 0  | 7 10 0  |
| Petersburg, 1st yel. .... std. 100 | 7 0 0   | 8 0 0   |
| " 2nd yel. .... std. 100           | 8 0 0   | 9 15 0  |
| " white .... std. 100              | 7 0 0   | 8 10 0  |
| " dish .... std. 100               | 7 0 0   | 8 10 0  |
| St. Sea .... std. 100              | 8 10 0  | 9 10 0  |
| India, 1st yel. .... std. 100      | 12 0 0  | 13 10 0 |
| " 2nd yel. .... std. 100           | 12 0 0  | 13 10 0 |
| " 3rd yel. .... std. 100           | 7 0 0   | 8 10 0  |
| " Spruce 1st .... std. 100         | 9 0 0   | 10 0 0  |
| " 2nd .... std. 100                | 8 10 0  | 9 0 0   |
| " Brunswick, &c. .... std. 100     | 5 0 0   | 7 10 0  |
| all kinds .... std. 100            | 4 0 0   | 5 10 0  |
| ing, 1st, sq. 1 in. - Fre. ....    | 0 9 0   | 0 13 0  |
| nd ....                            | 0 7 6   | 0 8 6   |
| er qualities ....                  | 0 5 0   | 0 7 0   |
| Chile ....                         | 0 0 0   | 0 3 4   |
| duras, &c. ....                    | 0 0 0   | 0 4 4   |
| ralian ....                        | 0 0 0   | 0 3 0   |
| any, Cuba ....                     | 0 0 0   | 0 5 0   |
| oming cargo av. ....               | 0 0 0   | 0 5 0   |
| lean ....                          | 0 0 0   | 0 4 0   |
| uco ....                           | 0 0 0   | 0 4 0   |
| deros ....                         | 0 0 0   | 0 4 0   |

| TIMBER (continued).         | £ s. d. | £ s. d. |
|-----------------------------|---------|---------|
| Rose, Rio .... ton          | 7 0 0   | 17 0 0  |
| Bahia .... ton              | 7 0 0   | 18 0 0  |
| Satin, St. Domingo .... ft. | 0 0 8   | 0 1 0   |
| Porto Rico .... ft.         | 0 0 8   | 0 1 3   |
| Walnut, Italian ....        | 0 0 4   | 0 0 5   |

| METALS.                            | £ s. d. | £ s. d. |
|------------------------------------|---------|---------|
| Copper—                            |         |         |
| British, cke. and ingt. .... ton   | 47 10 0 | 49 10 0 |
| Best selected .... ton             | 49 10 0 | 49 0 0  |
| Sheets, strong .... ton            | 55 10 0 | 56 0 0  |
| New India .... ton                 | 53 10 0 | 53 0 0  |
| Australian, fine cash. .... ton    | 53 10 0 | 53 0 0  |
| Chili, bars .... ton               | 44 0 0  | 44 10 0 |
| Iron—                              |         |         |
| Best in Scotland .... ton          | 2 0 0   | 0 0 0   |
| Bar, Welsh, in London .... ton     | 5 0 0   | 5 7 0   |
| " " in Wales .... ton              | 4 12 6  | 4 17 6  |
| " Staffordshire, London .... ton   | 6 0 0   | 7 0 0   |
| Sheets, single, in London .... ton | 7 10 0  | 8 0 0   |
| Hoops .... ton                     | 7 0 0   | 8 0 0   |
| Nail-roads .... ton                | 6 0 0   | 7 0 0   |
| YELLOW METAL—                      |         |         |
| Lead, Pig, Spanish .... lb.        | 0 0 4   | 0 0 4   |
| English, com. brands .... lb.      | 12 10 0 | 0 0 0   |
| SPELTER—                           |         |         |
| Belgian, special .... ton          | 13 10 0 | 13 12 6 |
| Ordinary brands .... ton           | 13 7 6  | 13 10 0 |

| METALS (continued).             | £ s. d. | £ s. d. |
|---------------------------------|---------|---------|
| Tin—                            |         |         |
| Straits .... ton                | 96 15 0 | 97 5 0  |
| Australian .... ton             | 96 15 0 | 97 5 0  |
| English ingots .... ton         | 97 0 0  | 0 0 0   |
| TIN PLATES—                     |         |         |
| IC rolls .... box               | 14 0 0  | 15 0 0  |
| IX ditto .... box               | 21 0 0  | 25 0 0  |
| IC charcoal .... box            | 17 0 0  | 20 0 0  |
| IX ditto .... box               | 26 0 0  | 27 0 0  |
| OILS.                           |         |         |
| Lined .... ton                  | 22 0 0  | 23 0 0  |
| Cocunut, Cochin .... ton        | 32 10 0 | 33 0 0  |
| Ceylon .... ton                 | 27 10 0 | 0 0 0   |
| Copra .... ton                  | 26 10 0 | 0 0 0   |
| Palm, Lagos .... ton            | 23 0 0  | 0 0 0   |
| Palm-nut Kernel .... ton        | 26 10 0 | 0 0 0   |
| Rapeseed, English pale .... ton | 25 10 0 | 26 0 0  |
| " brown .... ton                | 24 0 0  | 0 0 0   |
| Cottonseed, refined .... ton    | 21 10 0 | 23 10 0 |
| Tallow and Oleine .... ton      | 25 0 0  | 45 0 0  |
| Lubricating, U.S. .... ton      | 7 0 0   | 10 0 0  |
| " Refined .... ton              | 8 0 0   | 15 0 0  |
| TURPENTINE—                     |         |         |
| American, in cks. .... cwt.     | 1 9 0   | 1 9 3   |
| Swedish, in cks. .... cwt.      | 1 2 0   | 1 2 6   |
| Archangel .... cwt.             | 0 14 0  | 0 14 6  |

**CONTRACTS AND PUBLIC APPOINTMENTS.**

**CONTRACTS.**

*Epitome of Advertisements in this Number.*

| Nature of Work, or Materials.                             | By whom required.                       | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|-----------------------------------------------------------|-----------------------------------------|-----------------------------------|--------------------------|-------|
| Sewage Works                                              | Colne and Marsden L. B.                 | H. Bancroft                       | July 21st                | ii.   |
| Alterations to Closets, &c., Repairs, and Making-up Roads | Wandsworth Bd. of Wks                   | Official                          | July 21st                | xiii. |
| Ironwork                                                  | Hackney Board of Wks                    | J. Lovegrove                      | July 22nd                | xiv.  |
| Wood Paving                                               | C. J. Ferguson                          | do.                               | do.                      | i.    |
| School Buildings, &c., Bury St. Edmunds                   | Vestry, St. Martin's-in-the-Fields      | Official                          | July 23rd                | xiii. |
| Drainage, &c., and Laying-out of Cemetery                 | E. Anglian, &c. School Company, Limited | W. Rade                           | July 25th                | ii.   |
| Sewage Works Extension                                    | Cheshunt Burial Board                   | Official                          | do.                      | xiv.  |
| New Park Office, Halifax                                  | Tottenham Local Board                   | Do Pape                           | July 27th                | ii.   |
| Repairs to Oak Fencing                                    | Com. of H.M. Works                      | Official                          | do.                      | ii.   |
| Public Mortuary, Ebury Bridge                             | Met. Asylums Board                      | A. & C. Harston                   | do.                      | xiv.  |
| Formation of Roadway                                      | St. George's (Hanover-square) Vestry    | Official                          | do.                      | ii.   |
| Rebering, Tar-Paving, Metalling, &c., Work                | Tottenham Local Board                   | Do Pape                           | July 28th                | ii.   |
| Making up Roadway, Paving, &c., Footways                  | Levisham Bd. of Wks                     | Official                          | do.                      | ii.   |
| Sinking, &c., of a Well                                   | Willenden Local Board                   | O. Claude Robson                  | do.                      | ii.   |
| Yorkshire Paving Stone                                    | Hastings R. S. A.                       | Jeffrey & Skiller                 | July 29th                | ii.   |
| Hot-water Tank                                            | Richmond (Surrey) U.S.A.                | Official                          | do.                      | xii.  |
| Blue Guernsey Granite                                     | West Ham Union                          | do.                               | do.                      | xii.  |
| Alterations and Additions to Infirmary                    | Romford Local Board                     | do.                               | August 1st               | xii.  |
| Vestry Hall Drainage                                      | Dartford Union                          | Ed. Hide                          | do.                      | xiv.  |
| Brook Sewer and other Works                               | Oxford Local Board                      | W. H. White                       | do.                      | xiv.  |
| Pipe Sewers, Manholes, &c.                                | Chelsea Vestry                          | J. M. Brydon                      | August 4th               | ii.   |
| Alterations and Additions to Workhouse                    | Willenden Local Board                   | O. Claude Robson                  | August 5th               | ii.   |
| New Church, Longridge, near Preston                       | do.                                     | do.                               | do.                      | xii.  |
|                                                           | Bromley (Kent) Union                    | J. Ladds                          | August 6th               | ii.   |
|                                                           | The Committee                           | Longworth & Gardner               | Not stated               | ii.   |

**PUBLIC APPOINTMENTS.**

| Nature of Appointment.       | By whom Advertised. | Salary.    | Applications to be in. | Page.  |
|------------------------------|---------------------|------------|------------------------|--------|
| Clerkship, Surveyor's Office | Bath U. S. A.       | 102s.      | July 31st              | xviii. |
| Surveyor                     | The Grocers' Co.    | Not stated | October 1st            | xviii. |

**TENDERS.**

|                                                                                                                                                     |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| For the erection of Wesleyan College at Canterbury. Mr. Charles Bell, F.R.I.B.A., architect. Quantities by Mr. H. Lovegrove, F.R.I.B.A., Budge-row— | £9,999 0 0 |
| Foster & Dicksee                                                                                                                                    | 9,999 0 0  |
| G. & J. Green                                                                                                                                       | 9,983 0 0  |
| Shrubsole                                                                                                                                           | 9,885 0 0  |
| McCormick                                                                                                                                           | 9,897 0 0  |
| Bull & Sons                                                                                                                                         | 9,414 0 0  |
| Dennis & Son                                                                                                                                        | 9,378 0 0  |
| Vallis & Clements                                                                                                                                   | 9,273 0 0  |
| Parmanor & Son                                                                                                                                      | 9,187 0 0  |
| T. Dennis                                                                                                                                           | 9,143 0 0  |
| Allen & Sons                                                                                                                                        | 9,100 0 0  |
| Judges                                                                                                                                              | 8,833 0 0  |
| Martin                                                                                                                                              | 8,830 0 0  |
| Forwalk                                                                                                                                             | 7,890 0 0  |
| For the erection of business premises, Goswell-road. Quantities by Mr. H. Lovegrove—                                                                | £1,880 0 0 |
| Barton                                                                                                                                              | 1,840 0 0  |
| Lister                                                                                                                                              | 1,840 0 0  |
| Hadman & Worsley                                                                                                                                    | 1,384 0 0  |
| Shenton                                                                                                                                             | 1,383 0 0  |
| Feary                                                                                                                                               | 1,300 0 0  |
| For the erection of business premises, Hampstead-road. Quantities by Mr. W. Heelis and Mr. H. Lovegrove—                                            | £5,550 0 0 |
| Scural                                                                                                                                              | 5,550 0 0  |
| Clarke & Mannoch                                                                                                                                    | 5,683 0 0  |
| Anley                                                                                                                                               | 4,980 0 0  |
| Shepherd                                                                                                                                            | 4,554 0 0  |
| Tarrant & Son                                                                                                                                       | 4,553 0 0  |
| Goss                                                                                                                                                | 4,725 0 0  |
| Smith & Son                                                                                                                                         | 5,000 0 0  |
| Scriveners                                                                                                                                          | 4,579 0 0  |
| Gibbons                                                                                                                                             | 4,466 0 0  |
| Axford                                                                                                                                              | 4,435 0 0  |
| G. & J. Green                                                                                                                                       | 4,300 0 0  |

|                                                                                                                                                                                                                                                 |             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| For internal cleansing, distempering, and other works at the Poplar and Stepney Sick Asylum, Bromley, Middlesex, for the managers Messrs. A. & C. Harston, architects, 15, Leadenhall-street. Quantities not supplied:—                         |             |
| W. G. Lilley                                                                                                                                                                                                                                    | 2357 0 0    |
| Vigor & Co.                                                                                                                                                                                                                                     | 1122 0 0    |
| W. Gibben                                                                                                                                                                                                                                       | 329 0 0     |
| A. W. Derby                                                                                                                                                                                                                                     | 308 0 0     |
| E. Proctor                                                                                                                                                                                                                                      | 300 0 0     |
| W. Wythe, 17, Brownlow-street,                                                                                                                                                                                                                  |             |
| Dalston (accepted)                                                                                                                                                                                                                              | 226 19 0    |
| For the erection of six girls' houses and other works in connexion therewith at the Bethnal Green Schools at Leytonstone, for the Guardians of Bethnal Green, Messrs. A. & C. Harston, architects, 15, Leadenhall-street. Quantities supplied:— |             |
| Hudman & Worsley                                                                                                                                                                                                                                | £13,764 3 8 |
| C. H. Stewart                                                                                                                                                                                                                                   | 13,180 0 0  |
| England & Thompson                                                                                                                                                                                                                              | 11,830 0 0  |
| O. Proctor                                                                                                                                                                                                                                      | 11,800 0 0  |
| J. Garrud                                                                                                                                                                                                                                       | 11,759 0 0  |
| Ward & Lambie                                                                                                                                                                                                                                   | 11,653 0 0  |
| W. Martin                                                                                                                                                                                                                                       | 11,638 0 0  |
| Thomerson & Son                                                                                                                                                                                                                                 | 11,490 0 0  |
| G. Dobson                                                                                                                                                                                                                                       | 11,420 0 0  |
| J. Holland                                                                                                                                                                                                                                      | 11,371 0 0  |
| Gregar                                                                                                                                                                                                                                          | 11,337 0 0  |
| J. H. Johnson                                                                                                                                                                                                                                   | 11,180 0 0  |
| Kirk Iron                                                                                                                                                                                                                                       | 10,693 0 0  |
| Jackson & Todd, 122, Hackney-road                                                                                                                                                                                                               | 10,495 0 0  |
| Scott, Walthamstow                                                                                                                                                                                                                              | 10,018 0 0  |
| Winkley                                                                                                                                                                                                                                         | 9,100 0 0   |
| * Accepted.                                                                                                                                                                                                                                     |             |

|                                                                                                                   |          |
|-------------------------------------------------------------------------------------------------------------------|----------|
| For additions and alterations to Olden Lodge, Clifton College. Mr. C. F. Hansom, architect. Quantities supplied:— |          |
| Ball & Westlake                                                                                                   | 2831 0 0 |
| W. C. Pugsley                                                                                                     | 777 0 0  |
| W. H. Cowlin & Son                                                                                                | 733 0 0  |
| Eastabrook & Sons                                                                                                 | 724 0 0  |
| Walters & Son                                                                                                     | 698 0 0  |
| J. Perrott                                                                                                        | 888 0 0  |
| E. Clark & Son                                                                                                    | 6 0 0    |
| J. V. & S. L. C.                                                                                                  | 1 0 0    |
| J. Winkley (accepted)                                                                                             | 1 0 0    |

For new church of St. Dunstan, at Earle-road, Edge Hill, Liverpool. Mr. Hugh Roulme Gough, architect, Carlton-chambers, Regent-street. Quantities by Mr. C. H. Gough, 6, Whitehall, S.W.:-

|                           |             |
|---------------------------|-------------|
| J. Bull & Son             | £10,250 0 0 |
| E. Gabbott                | 10,145 0 0  |
| F. Haham                  | 9,437 0 0   |
| J. Lister                 | 9,458 0 0   |
| Thos. Wootton Smith & Son | 9,400 0 0   |

For alterations and additions at 27, Upper Berkeley-street, for Mr. D. Johnston. Mr. H. Pope, architect. No quantities:-

|               |            |
|---------------|------------|
| Chapler       | £1,668 0 0 |
| Rhodes        | 1,231 0 0  |
| Goldman       | 1,200 0 0  |
| Harris        | 1,193 0 0  |
| Henwood       | 1,175 0 0  |
| A. G. Bolding | 1,167 0 0  |
| Goodwin       | 1,042 0 0  |

For rebuilding No. 112, High-street, Marylebone, for Mr. T. W. Bratt. Messrs. Hudson, Son, & Booth, architects. Quantities supplied:-

|                      |            |
|----------------------|------------|
| Mortet               | £2,508 0 0 |
| Nixon                | 2,583 0 0  |
| Thomson & Son        | 2,561 0 0  |
| P. Higgs             | 2,559 0 0  |
| Greenwood            | 2,437 0 0  |
| Spencer & Co.        | 2,486 0 0  |
| Hall, Beddall, & Co. | 2,394 0 0  |

For the erection of school and class-rooms, out-offices, &c. on land adjoining St. Paul's Church, Foleshill, Warwickshire, for the St. Paul's Church Building Committee. Mr. Herbert W. Chataway, architect, Coventry:-

|                                 |          |
|---------------------------------|----------|
| S. Mayo, Coventry               | £248 0 0 |
| J. Makepeace, Coventry          | 545 0 0  |
| G. Punsborough, Coventry        | 529 0 0  |
| C. Haywood, jun., Coventry      | 485 0 0  |
| A. Watney, Coventry             | 449 0 0  |
| R. Wootton, Coventry            | 431 0 0  |
| J. Kelley, Foleshill            | 411 15 0 |
| A. Randle, Foleshill (accepted) | 408 14 6 |
| S. Wright, Foleshill            | 406 10 0 |

For the re-building of Nos. 38 and 39, Chalk Farm-road, N.W. Messrs. Alexander & Gibb, architects, 9, Great James-street, Bedford-row. Quantities by Mr. H. Burton:-

|                       |            |
|-----------------------|------------|
| Manley                | £2,387 0 0 |
| Smith                 | 3,346 0 0  |
| Patman & Fotheringham | 3,173 0 0  |
| Beale                 | 2,809 0 0  |
| T. L. Green           | 2,859 0 0  |
| Gregory & Bence       | 2,835 0 0  |

Accepted for erection of premises, Oxford street, for Messrs. H. T. Batt & Son, veterinary surgeons. Mr. H. M. Newlyn, architect:-

Miller & Brown, London and Greenock. £28,330 0 0

For works to Cannon Hall, Hampstead, for Mr. Henry Clarke. Mr. Peebles, architect. Quantities supplied by Mr. W. E. Stoner:-

|                       | Repairs. | Additions. |
|-----------------------|----------|------------|
| Patman & Fotheringham | £721 0 0 | £2,190 0 0 |
| Bennett & Sons        | 611 0 0  | 1,298 0 0  |
| Simpson & Sons        | 659 0 0  | 1,209 0 0  |
| Kilby & Gayford       | 698 0 0  | 1,140 0 0  |
| McCormick & Sons      | 618 0 0  | 1,043 0 0  |

For the erection of a villa at Claygate Park, for Mr. J. Parnell. Mr. Walter J. N. Tomlinson, architect, Great James-street, Bedford-row. Quantities supplied by Mr. H. C. Leete:-

|                                         |            |
|-----------------------------------------|------------|
| G. Roberts, Croydon (too late)          | £1,112 0 0 |
| Staines & Son, 61, Great Eastern-street | 1,098 0 0  |
| H. Ingram, Woking                       | 1,090 0 0  |
| Hobbs Bros., Murbton-hill               | 1,077 0 0  |
| J. Saunders, New Malden                 | 1,037 0 0  |
| P. Peters, Horsham                      | 1,015 0 0  |
| T. Barton, West Croydon                 | 986 0 0    |
| J. Winstley & Sons, East Molesey        | 985 0 0    |
| W. Martin, Willendon-green (too late)   | 979 0 0    |
| Lewis & Knight, Kensington              | 867 0 0    |
| A. H. Harris, Sutton                    | 872 10 0   |
| C. P. Mills, Stoke Newington            | 854 0 0    |

For two pairs of villa residences, Sharnbrook, Essex, for Mr. J. Tilt. Messrs. Gordon & Lowther, architects:-

|                         |            |
|-------------------------|------------|
| Barlow, Walthamstow     | £2,190 0 0 |
| Hack, Poplar (one pair) | 2,144 0 0  |
| H. Dye, Old-street      | 2,143 0 0  |

For alterations and additions at "Highfield," Muswell Hill, for Mr. W. Comyns. Messrs. Leete & Hawley, architects, Tottenham:-

|                       |            |
|-----------------------|------------|
| J. Shoolbred & Co.    | £1,867 0 0 |
| Patman & Fotheringham | 1,277 0 0  |
| Mills                 | 890 0 0    |
| A. H. Science & Son   | 435 0 0    |

\* Withdrawn.

**Erratum.**—We are asked to state that the tenders for painting and repairs given at the bottom of the first column of p. 78 of last week's *Builder*, were not for the Workhouse at Homerton, but for the Infirmary at Bow. We are further asked to mention that the tender of Messrs. F. & F. J. Wood was accepted. We printed the list as it was received.

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our Office, 48, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

#### TO CORRESPONDENTS.

G.P.—P.S. & H.—C.P.—W.F.—P.C.—H.P.—A. & H. (we should rather think it must have been published already)—R. K. (thanks; we had previous information)—G. L.—W. G. & L.—W. W. (we published Professor Corfield's paper in full last week)—J. R.—J. F. F.—B.—J. C. W.—A. R. R. (should send amount)—J. M. H.—F. W.—A. & S.—C. W. D.—C. E. (thanks)—S. J. R.—T. W. H. (next week).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

**Note.**—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the author.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary matters should be addressed to THE EDITOR; all communications relating to advertisements and other extraneous matters should be addressed to THE PUBLISHER, and not to the Editor.

#### PUBLISHER'S NOTICES.

THE INDEX and TITLE-PAGE for Volume XLVIII. (January to June, 1885) were given, as a Supplement, with the Number of July 11th.

A COLOURED TITLE PAGE may be had, gratis, on personal application at the Office.

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The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

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Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

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"THE BUILDER" is supplied direct from the Office to residents in any part of the United Kingdom at the rate of 18s. per annum Prepaid. To all parts of Europe and America, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

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### The Growth of Brighton.



IF the many thousand persons who annually visit what may be called the metropolitan watering-place, few, if ever they give the matter a thought, are aware that Brighton, notwithstanding its

rather garish and modern air, can lay claim to a very respectable antiquarian parentage, though its earlier existence was passed under another name. St. Brightelm, a somewhat hazy Saxon bishop, was the first-known resident during the Heptarchy, and gave it the appellation of Brightelmstun, by which it was known in Domesday Book. Nor was it the only place in the neighbourhood which retains the basis of its original name at the present time, for we have, amongst other examples, that of Hov, or Hove, Preste-tun or Preston, and Wordings or Worthing. After Brightelm's death in battle (he was a fighting bishop), the place fell successively into the hands of the great Earl Godwin, his son Harold, and William the Conqueror, who, with his usual liberality, presented it to William, Lord of Warrene, in Normandy. Another link of nomenclature that binds ancient to modern Brighton is to be found in the Steine, which, under its former name of *Stane*, seems to mark the site of a Roman castrum, and from the places in its vicinity and to the north, such as Stanedean and Stammere, it is quite possible that one of the Roman vicinal roads ran in that direction to join the Stane-street between London and Regnum (Chichester). In Edward I.'s reign, Brighton's importance was recognised by having a constable appointed all to itself, and it was time that somebody was told off to take care of it, for the inroads of the sea were such that the town was gradually being eaten away. Between 1260 and 1340 upwards of forty acres disappeared, and this was repeated in 1665, when twenty-two copyholds were washed away, and again in 1703 and 1705, when the capstans and stake-places (for fishing) were destroyed, together with 113 tenements, until at last all the town under the cliff was entirely gone. The whole of the coast suffered alike, Hove losing 150 acres, Aldrington 40 acres, and Portslade 60 acres. In the reign of Elizabeth, Brighton consisted of seven streets and as many lanes, but the most spacious of them, known as South-street, fell a prey to the ocean, and as lately as 1710 the sea spread over what is now Brill's baths, and flowed back through Pool Valley. About 350 yards from Brill's there stood a house

belonging to a man named Male, who utilised the ground all around for rope-walks, while flax was grown over what is now Brunswick square and terrace. In course of time it dawned upon the inhabitants of the little fishing town, that if they wished to preserve it at all, something must be done to keep the enemy at a distance; and at length attempts were made, more or less successfully, by appeals to private benevolence, to bank out the sea, which eventually culminated in the extensive system of groyne, by which, even at the present moment, Brighton is rendered secure. The old groyne opposite the Junction-road cost upwards of 5,000*l.*, but the groyne of later days have been much more costly affairs. The one under the East Cliff, opposite Paston-place,\* was built of concrete at an expenditure of 10,350*l.*, though it serves also the purpose of an exceedingly pleasant little pier and promenade, and is a decided acquisition to that end of the town. The gain of land has been undoubtedly since the timber groyne were done away with. A large shingle bed has accumulated between the East Cliff groyne and the Chain Pier,—the King's-road was enabled to be doubled in width, and the Aquarium to be built on land that was formerly water. The work of protection appears to be tolerably constant, for a new groyne is now being built opposite East-street at an expense of 10,000*l.*, while all along the Hove front a fresh sea-wall has been made to repair the damages of a winter or two ago.

A great feature, indeed, in the life of Brighton is the ornamentation of the sea front, which is certainly the most unique of any watering-place in the world. The ugly-looking old Chain Pier, which was opened in 1822 at a cost of 30,000*l.*, for many years posed as one of the most bold and elaborate undertakings of the day,—as, indeed, it was until it was quite put into the shade by the West Pier in 1863, with all its paraphernalia of bazaars and kiosks. By the time that Brighton extends to Portslade (and it is not far off) another pier will be required, which will, perhaps, dwarf the last one both in length and attractions. From the West Pier nearly to the end of Hove, enclosures have been constructed with great skill, and little beds of flowers coaxed to grow under the shelter of the glossy-leaved *evonymus*. The enclosure in front of the Bedford, with its covered seats and lavatories, cost 6,000*l.*; and the East Cliff-gardens, laid out in 1875 by Mr. Dawney, were also expensive affairs. The glorious range of the East Cliff is naturally by far the nicest part of Brighton, and would be allowed to be so by most people were they not afraid of endangering their reputation for fashion. It also

possesses wonderful capabilities, though it is a question whether its unadorned beauty is not worth more than all the contemplated improvements. In 1874 it was suggested by a Mr. Macfarlane to erect a row of colonnades under the cliff from the Chain Pier to Kemp Town, so as to make a covered promenade, but happily the scheme came to nothing, though a series of public baths, with gardens and covered seats, extending from Atlingworth-street to Paston-place, is still spoken of, at a cost of 53,000*l.* Brighton is certainly not well off for baths considering its size, though Brill's and Hogben's are both good, the former particularly so. They originally belonged to Mahomed, a great shampooer of his time; and at his death in 1851, at the respectable age of 102, the baths were taken by Mr. C. Brill, in whose name they still stand, though carried on by a company.

The beginning of the present century was the halcyon time for East Brighton, the Royal-crescent having been built in 1807, and Mr. Kemp's fine terraces and crescents at the extreme end between 1821 and 1830. The tide of fashion, however, has long set westward, and Hove far outshines the east in the size and costliness of its dwellings. West Brighton has overflowed Hove and absorbed the adjoining parish of Aldrington, which in 1871 rejoiced in a church in ruins, five houses, and a population of twenty-seven. Now its sea-front is marked by a line of handsome terraces, though it must be confessed that they appear to be astonished at their own temerity at travelling so far from Brighton centre. At present they are, to a great extent, untenanted, and likely to remain so for some time, from the simple want of conveyance, the nearest being the steam tram that periodically plies between Portslade and West Brighton. Perhaps fortunately for itself, Kemp Town has entirely stood still as regards the extension of the marine residential portion, though as much cannot be said of the district to the north. A perfect forest of houses, mostly of the very small villa class, runs up the centre, and climbs the chalk hill at the back of the College towards the race-course, while a far denser mass does the same in the parallel valley on the west leading to Lewes. The steep sides of the hill above the cemetery, as also of the Ditchling-road, are marked with serried battalions of streets carried up the height with monotonous regularity and a glorious disregard of the sharp ascent. Precisely the same thing occurs further west up the London-road, with the difference that as soon as the once quiet and sequestered village of Preston is reached, a very different class of houses takes the place of the ten or twenty pound houses that have risen like mushrooms. The expansion of Brighton north-

\* Illustrated in the *Builder*, Nov. 10, 1883.



wards within the last few years is something prodigious, and the traveller who revisits the town after a long absence stands aghast to see the familiar downs presenting all the features of a crowded city. The country at the back of West Brighton is likewise evidently intended to be residential, though at present this is of a sparse and dropping character; but, doubtless, as soon as the Devil's Dyke Railway, now constructing, is finished, the whole district will be filled up, and Brighton and the Dyke will eventually become one.

The one spot which can never be dissociated from Brighton, with all its vicissitudes, is the Pavilion, the maddest imitation of the Moresque that it ever entered the mind of man to erect. Previously to 1750 (at which period Brighton had the luck to possess only one doctor), the town was practically unknown, and not visited for either health or pleasure. Then, however, Dr. Russell, of Lewes, settled here, on the site of what is now the Albion Hotel, and called the attention of the world to the value of sea water as a bath, the age being essentially of the non-tubing order. So persistently did he trumpet it forth, that people began to come, and, amongst others, the Duke of Cumberland, to whom his nephew, the Prince of Wales, paid a visit in 1782. So pleased was he, that he bought a house of Mr. Kemp, this house being the nucleus of the Pavilion, which was commenced in 1784, and finished in three years, at a cost, it is said, of a million sterling. But, for all the vast sums that were lavished upon it, it did not enjoy a very long fashionable life (although the pace was pretty fast while it lasted), for it had been useless and untenanted for a considerable time before the Brighton Corporation took the bold step of buying it in 1850 for 60,000*l.*, including everything. Then came a transformation almost as startling as the original building. The great dome which was over the stable, and held forty-eight horses in George IV.'s time, was turned into the present splendid concert-room, with a diameter of 124 ft., under the decorative superintendence of Mr. Dury, of Warwick, the only remains of the former occupation being the hay-racks, which have been so cunningly disguised with colour, as to quite dissipate any idea of what they once were. The Riding School is now used as a Corn Exchange, and the old stalls and coach-houses turned into the Free Library and Museum, at an expense of 10,000*l.* An excellent library (though not under the Act) it is too, with a fine central hall, 115 ft. in length, and with warming and ventilating chambers made out of the old subway that formerly existed for the purpose of allowing the stablemen and grooms to go between the stables and the Pavilion, and probably also for many a midnight frolic on the part of the Prince and his guests. Part of the premises are let off to the Brighton School Board, and altogether the modern Pavilion is a marvellous assemblage of literature and art placed freely at the disposal of the people. Considering the growth of the population, most people will be disposed to think the change a wholesome one.

The last few years have seen a considerable increase in the public buildings of Brighton, as also a great improvement in the architectural features. The chief amongst them are the Town Hall, a bald and uninteresting building, from designs by Mr. T. Cooper, in 1830, and which, plain as it is, cost 60,000*l.*; the Sussex County Hospital in Kemp Town, the work of the same architect, in 1847; and the Brighton College, very close to it, a Tudor range, by the late Sir Gilbert Scott, in 1857. Additions of which an illustration was given in the *Builder* for June 6th last) are even now being made to it from designs by Mr. Jackson, in the shape of a large boarding-house; and the original intention of Sir Gilbert, of a quadrangle, may, it is to be hoped, be still carried out. Crowning the hill above, and in close proximity to the Grand Stand, where Brighton Races first commenced, in 1783, is the workhouse, an extensive block of buildings in a magnificent situation, open to all the winds of heaven. It is the third of its kind, the first having been erected in 1727, where the market now

stands, and a very poor time the inmates must have had of it, for poverty was in those days deemed such a crime that all receiving parish relief were obliged to bear a badge, labelled "Brighton poor." A new workhouse was put up in 1822, and was superseded by the present one in 1853, which has connected with it a large industrial farm on the warren beyond the race-course. Of the more recent buildings, we may mention the Board schools in Sussex-street (1873), from designs by Messrs. Fletcher & Nightingale, at a cost of 6,500*l.*; the School of Science and Art, a florid frontage by Mr. A. Gibbins (1876), in a capital position in the Grand Parade; the new club at the corner of Preston-street, and the Hospital for Sick Children, in the Dyke-road, both these two from designs by Mr. Lainson. The old style of Brighton street architecture may be still seen in the Steine, in the front of a house tenanted by the railway company. As to churches, all tastes, whether architectural or religious, may be gratified. St. Nicholas, of course, is the most interesting, as being the oldest, and identified with Brighton's prosperity, if only as a land-mark, from very early times, as it is mentioned in Domesday; but it has been so built up to and around in the latter days, that it has well nigh lost its distinguishing feature in this respect. St. Peter's, also called the parish Church of Brighton, is a good modern Gothic, by Sir C. Barry, in 1824, and represents the moderate Low Church, which in Brighton is somewhat "over-crowded" by the ultra high party. The great influence of the late Mr. Wagner, who had strong ritualistic views and a long purse, is traceable everywhere in the central and west parts of the town, not only in the undoubtedly fine Church of St. Paul, which was built from the designs of Mr. Carpenter, in 1847, and which is a conspicuous feature in all the Brighton shore views, but in sundry other churches, built either by Mr. Wagner or after his death and in his memory by his sons and others. The three principal of these are the Church of the Resurrection, a singular subterranean parallelogram 132 ft. by 50 ft., built by Mr. Wagner at a cost of 8,000*l.* in 1875 as a Chapel of Ease to St. Paul's and for the use of the fishermen, so many of whom live in and about Russell-street; St. Martin's, a memorial church by Mr. Wagner's sons, from designs by Mr. Somers Clarke, and noted for its reredos and high altar; and St. Bartholomew's, which, although in a wretched position at the bottom of the valley, shows its high-pitched roof rather obtrusively from every point of the compass. This noted church was built by and at the cost of Mr. Wagner in 1874 from Mr. Edmund E. Scott's Early Norman designs. It is a parallelogram of nine bays, 180 ft. in length by 46 ft. in breadth, with a height to the ridge of 135 ft.\* One of the best and most striking churches in Brighton is the restored St. Mary's, in Rock-gardens, of noble dimensions and great dignity, and with an excellently-conducted service after the moderate fashion. Aldrington Church, which had been in ruins from time immemorial, was rebuilt in 1877 from designs by Messrs. Carpenter & Ingelow. At the top of the steep hill which rises from St. Mary's is the Queen's Park, which, with undoubted capabilities of situation, is as dreary a place as can well be imagined. A great opportunity has been lost here, for the whole area is now built around by sad-looking streets of builders' houses. The new Preston Park, on the other hand, the road to which was widened in 1876, is a great success, and although there are many who would have preferred the old village in its unadorned days, things are different now that it has become a great suburb, and the park is a good example of landscape gardening. Although not coming within the same category, the Drive ought certainly to be mentioned as a great feature of West Brighton, connecting the sea-front with the Dyke-road for a considerable distance inland.

So much for the main aspect of Brighton above-ground. We cannot dismiss the subject

\* A view of this church will be found in the *Builder* for 1874, p. 800.

without a few remarks on the underground arrangements, upon which, after all, its chief prosperity depends. The drainage of Brighton, Hove, and Preston, was planned in 1874 by Sir J. Hawkshaw, who carried a great intercepting sewer to a point of discharge nine miles east of the new West Brighton Estate, at the western end of the sewer being 5 ft. in diameter from Hove to the centre of Brighton, and the remainder 7 ft. in diameter. At Portobello (halfway between Kemp Town and Newhaven) is the penstock-chamber, 120 ft. in depth, with granite and concrete foundations on the tidal level, where the outfall-chambers are built. The cost of this large and complete system was about 200,000*l.* It must have been aggravating, notwithstanding this great outlay, to find that Brighton was not so healthy as it ought to be, and the inquiries made and published by the *Lancet* in 1882 will be fresh in the public memory. The statistics at that period were certainly very unfavourable, for the death-rate stood at 31.9, while the average for England did not exceed 24.7. It was a bad time for Brighton; measles, scarlet fever, and whooping cough prevailing extensively, and the average of zymotic mortality being 8.17 instead of 3.76. The intensity of the mischief, however, worked its own cure, and the Corporation were wise enough to see that "the least said, the soonest mended." Instead, therefore, of spending their money in an action for libel against their caustic and too plain-speaking friend, they adopted Sir J. Bazalgette's recommendations in certain matters which required alteration and improvement. The additional expenditure was amply justified, for Brighton has now one of the lowest death-rates in the kingdom. It would, indeed, be a sin if its gloriously health-giving air was allowed to be vitiated by preventable sanitary shortcomings.

Few towns in England (and none, in point of fact, which are not dependent on some staple industry) can show so rapid a development in the matter of population as Brighton, which, it should be mentioned, was enfranchised by the Reform Bill of 1832, and was incorporated in 1854, the town being divided into six wards. The municipal boundaries were extended in the decade between 1871 and 1881. The population tables run as follows:—

| Year. | Brighton. | Hove.  | Total.  |
|-------|-----------|--------|---------|
| 1781  | 2,000     | —      | 2,000   |
| 1785  | 3,600     | —      | 3,600   |
| 1794  | 5,669     | —      | 5,669   |
| 1801  | 7,389     | 101    | 7,490   |
| 1811  | 12,012    | 193    | 12,205  |
| 1821  | 24,429    | 312    | 24,741  |
| 1831  | 40,634    | 1,360  | 41,994  |
| 1841  | 46,661    | 2,509  | 49,170  |
| 1851  | 65,573    | 4,104  | 69,677  |
| 1861  | 77,693    | 9,624  | 87,317  |
| 1871  | 90,611    | 11,277 | 101,288 |
| 1881  | 107,546   | 20,804 | 128,350 |

The inhabited houses of the two places were 8,482 in 1841, 10,310 in 1851, 13,983 in 1861, 16,284 in 1871, and 20,395 in 1881. A few details respecting the houses of 1881 may be of interest:—

|                   | Inhabited. | Uninhabited. | Buildings. |
|-------------------|------------|--------------|------------|
| Brighton          | 15,093     | 1,200        | 552        |
| Preston           | 1,351      | 140          | 87         |
| Park Ward         | 2,960      | 397          | 352        |
| Pavilion Ward     | 937        | 201          | 25         |
| Pier Ward         | 2,091      | 143          | 105        |
| Preston Ward      | 1,351      | 140          | 87         |
| St. Nicholas Ward | 3,121      | 109          | 8          |
| St. Peter Ward    | 5,015      | 200          | 130        |
| West Ward         | 1,869      | 150          | 2          |
|                   | 17,344     | 1,340        | 619        |
| Hove              | 3,044      | 497          | 172        |
| Part of Preston   | 7          | —            | —          |
| Total             | 20,395     | 1,837        | 791        |

It need scarcely be said that the value of land for building purposes has risen like the population, in leaps and bounds. Ten years ago, some land was sold at White Lion Corner, at the junction of North-street and the Queen's-road, for 650*l.* for a frontage of 20 ft. and a depth of from 60 ft. to 63 ft., while another plot of 87 ft. frontage with a depth of 30 ft. was sold for 2,450*l.* Nearer the present time, a house which was sold for 150*l.* in 1823, fetched 2,300*l.*



The principal thing likely to curtail the growth of Brighton to any degree seems to be the railway monopoly, about which all classes in Brighton, except the stock-holders and the shareholders, complain bitterly. There can be no doubt that the railway accommodation is quite behind the age, the principal efforts of the company having been directed to the first-class passengers, a very mistaken and illiberal policy, which they are now beginning to perceive must be altered. It is not the Pullman-car passengers who are really making Brighton what it is, but the third-class travellers, who (as also the second-class) have had their interests entirely ignored, or have been contemptuously snubbed over and over again, while in matters of goods traffic, the Brighton tradesmen have just causes of grievance in the high charges and tardy deliveries. Moreover, the general station, improved as it is, is altogether too far from the centre of the town, while the station at Kemp Town is one of those little out-of-the-way spots which have to be diligently searched for and, when found, made a note of, for it might serve an east-end passenger on one occasion out of twenty. The proposal of the new line through Reigate has been hailed with delight, for it is felt by every one that no substantial redress will be obtained from the London, Brighton, and South Coast Company, except under the pressure of wholesome competition. Most places in England of half the size of Brighton have two, if not three, railways, and they are all the better for them.

## NOTES.

It will have been noticed that the concluding evidence given before the Select Committee of the House of Commons upon the subject of Irish industries turned upon the cost of railway conveyance. Mr. John Greenhill, a Belfast Harbour Commissioner, representing a large trading concern, who was examined last week, pointed out many inconsistencies and anomalies in freight charges, of a similar nature to those disclosed by the recent agitation on this subject in our own country. A striking instance was afforded by the coal traffic from Scotland, which is conveyed from an Ayrshire port at a lower rate than that charged for taking it from the Irish port to a station ten miles into the interior; while comparisons such as the following were made between the English and Irish inland rates:—From Belfast to Omagh, sixty-nine miles, the rate is 7s. 9d. per ton; the rate from Wigan to Bangor, being 6s. 9d., for a distance of ninety-five miles. Every English manufacturer doing business with Irish houses knows by experience that such high charges are not confined to the coal trade, and that they are, in some cases, quite prohibitory. Mr. Finlay, general manager of the London and North-Western Railway Company, has been examined at length as to the effect of a general reduction of rates. His opinion, as given at the close of his examination on Monday last, is that this would be a doubtful experiment in Ireland, as it would be very uncertain whether such a step would be followed by a sufficient increase of traffic to make it a success. Some of the more exorbitant rates have been cut down by order of the Railway Commissioners; but it appears that the railways of Ireland are not all under their direct control, and until they are all brought under their jurisdiction these evils are not likely to be remedied.

THE question of open spaces for the public has been much in front during the last week. There were on the 17th several deputations to the Metropolitan Board of Works, introduced by Mr. Shaw-Lefevre, who in a somewhat flowery speech urged the importance of the Board acquiring, for the benefit of the public, such portions of the property of Lord Mansfield and Sir Spencer Wilson as those owners were willing to sell, in order to preserve the heath intact and prevent the land being given over for building. The subject was agreed to be referred to a Committee of

the Board, which we hope will recommend definite and immediate action in the matter. Then the Vice-Chairman of the Metropolitan Public Gardens Association (Lord Dorchester), writes to the *Times* of the 21st to urge the acquirement of a small piece of land (6,000 square feet) adjoining the Working Lads' Institute at Whitechapel as a playground for the children from the surrounding houses; asking for subscriptions in aid of this scheme, which well deserves support; and the Chairman of the same Association, Lord Brasenay, appeals for help to acquire the Royal Pavilion Pleasure Grounds, Woolwich, for the people. This is just outside the Metropolitan area, and, therefore, the Board of Works can do nothing; and the Corporation of London aver that in consequence of the Government declining to renew the Act empowering them to tax corn entering the City, they have now no funds to devote to acquiring open spaces. 25,000*l.* is wanted for the gardens, which is a considerable sum to spend on a playground, no doubt; but once done, it is done for ever. It is gratifying to see how strong a feeling is being stirred up as to the need of open recreation spaces in a great and overcrowded city like London. All credit should be given to those who have contributed to arouse the feeling.

THE South-Eastern Railway Company have reduced their half-yearly dividend from the rate of 3½ to that of 3 per cent. per annum, carrying forward 1,480*l.*, while in the first half of 1884 they carried forward 2,386*l.* The ordinary capital of the South-Eastern Line in 1878 was 8,347,770*l.*, out of a total capital of 20,961,218*l.*; so that a comparatively small decrease of net earnings falls heavily on the ordinary shareholder. There can be no doubt that the natural prosperity of the South-Eastern Railway has been crippled by the construction of the London, Chatham, and Dover Line, involving a duplicate capital outlay not demanded by the traffic of the country. The proposal for the establishment of a joint purse arrangement between these companies and the Brighton Railway is one of which the advantage must depend on the ability with which it can be carried out. But that the money of the shareholders ought to be spared by some arrangement that should prevent the running of duplicate trains there can be no doubt. On the very day on which the above announcement was made, a train of six carriages was observed to arrive, over a newly-opened line, at a station about thirty miles from London, at six p.m., without a single passenger.

THE Great Eastern Railway Company have maintained the same low rate of dividend that they paid last year, viz., 3 per cent. per annum, at the expense of reducing their balance from over 17,000*l.* to a little over 4,000*l.* The Great Eastern, out of a total capital of about 37 millions, have original stock to the amount of only 10·4 millions. It is to be feared that the degree of prosperity measured by the maintenance of the dividend will be found to have been attained by the diversion of a certain amount of traffic from a neighbouring line.

A PARLIAMENTARY return issued on July 16, of the main features of the income-tax in Great Britain for 1883-4, gives a more distinct measure of the industrial depression under which the country is suffering than has hitherto been furnished. Under Schedule A, for "lands, tenements, manors, fines, &c.," there is an advance of 1½ per cent. on the figures of the last "Statistical Abstract"; while the annual advance for the decade 1873-83 was 3½ per cent. But under Schedule B, "in respect of the occupation of land, tenements, and hereditaments" there is a falling off of 3,276,917*l.*, or no less than 5·6 per cent. And under Schedule D, gains from professions or trades, including railways, canals, mines, gasworks, waterworks, &c., there is a falling off of 7,497,751*l.*, or very nearly 3 per cent. An actual loss of income, as compared with the former year, of no less than 10½ millions sterling is thus shown, where, under the cir-

cumstances, not of extraordinary prosperity but of the normal increase due to the growth of population, there ought to have been an increase to about an equal amount. In other words, house-rent shows somewhat of that increase which is due to the natural cause indicated; while all that comes under the head of profit shows a decline equal to the proper rate of increase, which is thus in a double ratio to the percentage of the figures compared.

THE Report on the Paisley Baptist Memorial Church designs, by Mr. James Sellars, of which a copy has been sent to us, appears to have been drawn up with great care, and we have no doubt that Mr. Sellars, as professional referee, has intended to act with entire impartiality. The touching affection of Scotchmen for each other, however, which has become a matter of proverbial observation, seems to receive an illustration in the results of this competition. Of the six invited competitors, three were Londoners, one was of Edinburgh, and two of Glasgow; and these last three are placed by the referee as superior in almost every particular to the London men. This is, at least, what is sometimes called a "curious coincidence." It may be no more than that; but such coincidences have a way of happening where Scotchmen are concerned. The report seems hardly to be quite accurate in all particulars. It is stated, for instance, that Mr. Billing's design had only one entrance, "inconveniently placed." The entrance under the tower is not very conveniently placed, but there are two entrances in the transepts, which the referee unnecessarily describes as a "exit doors." He appears to be inaccurate also in his statement that the only access to the retiring-rooms is through the church, for the plan certainly shows special entrances to these portions. We have felt some doubt of late whether the principle of appeal from "irresponsible, indolent committees" to a professional referee in architectural competitions will always produce all the happy results that seem to be imagined for it by some sanguine natures.

WE are accustomed to think of the great buildings of the Acropolis, the Parthenon, the Erechtheum, and the Propylea as national monuments gladly appeared by a willing and united people. Dr. Dörpfeld, in a paper dealing with the Propylea, succeeds in showing that things did not always go so easily and pleasantly. Jealousy, obstruction, and local prejudice put their spoke into the wheel of improvement then as now. From his examination of the foundations still extant, Dr. Dörpfeld comes to the conclusion that in the Propylea we have an instance of an ancient building in which the architect, midway in his work, had to modify his plan. The central part of the building, consisting of the two great halls with colonnades, was completed as the architect Mnesikles intended, but the two projected side halls to the north-east and south-east were never carried out. The north-west wing, containing the Pinakothek, was finished the full size intended, but the south-west wing was only built about one-third of the size originally planned. Dr. Dörpfeld gives a plan coloured to show the original scheme, and what was actually effected; he supports his view by a series of ingenious arguments, which are best understood in connexion with the plan.

DR. DÖRPFELD professes that he can see not only that Mnesikles had to curtail his design, but the reason of the curtailment. Close to the Propylea are two sacred places, the temple of Nike and the enclosure of Artemis Brauronia. Perikles and Mnesikles must, when they planned their Propylea, have hoped too much from the forbearance of the priests, and, possibly, intent on making the gateway a crowning artistic glory to the Acropolis, they forgot all about the local interests. But as soon as their project was known, the conflict began. We can imagine the rage of the orthodox, and their prompt suppression of the sacrilegious plan. There is no doubt that in the quarrel Perikles and Mnesikles got the worst of it. The plan



was curtailed so as to respect the sacred boundaries. But they could not bear to forego the hope that some time their first idea might be carried out. So they built the Propylæa, allowing for future addition. But, alas! the time never came. The building was still incomplete when the Peloponnesian war broke out, and the Propylæa that now remains is the Propylæa curtailed to suit the will of Athens and Artemis. This quarrel between architect and priest, art and ritual, seems therefore to take us back at least to the sixth century B.C. It was, in fact, a conflict that expressed the whole spirit of the times. Dr. Dörpfeld's paper appears in the current number of the *Mittheilungen des Deutschen Archäologischen Instituts*, and he promises a sequel on some other points of interest in the Propylæa excavations.

IN the last issue of the *Mittheilungen des Deutschen Archäologischen Instituts in Athen* (vol. x., part I.) an interesting statue is published which has recently been discovered at Beirouth. It was found during the falling down of an old house. Two figures are represented, one the torso of a woman draped in a chiton and diploidion, close by her side a naked child with wings. There can be no doubt as to the intention of the group. The sculptor had evidently in his mind Aphrodite and Eros. The odd and interesting point is the means taken by the sculptor to express this intention. A glance at the woman-figure shows that in pose and drapery it is of the Athene type; in fact, it stands very near to the Parthenos type, only a girdle across the breast disturbs the fall of the folds, and suggests Artemis. The artist had, in fact, taken the Athene type, and merely added the child Eros as an attribute to express Aphrodite. The child is well executed, and this is another clue to the date of the statue, which is manifestly a piece of post-Alexandrian eclecticism.

THE annual excursion of the Surrey Archaeological Society is announced to take place on the 29th inst., under the presidency of the Right Hon. Viscount Midleton, to Lingfield and Crowhurst,—members and friends to meet at Edenbridge Railway Station at 12.37 p.m. The Society has not visited this part since Oct. 15th, 1862, when its excursion for that year took place to the same neighbourhood. We would remind those of our readers who purpose attending the forthcoming excursion, and who would like to know something beforehand of the places to be visited, that a "Brief Account of Crowhurst Church and its monuments," with ground-plan and illustrations, by the late Mr. George Russell French, architect, will be found published in the third volume of the "Collections" of this Society, and an excellent paper, with copious illustrations of Lingfield and Crowhurst-place, entitled "Remarks on Timber Houses," by the late Mr. Charles Baily, architect, will be found in the fourth volume of the Society's collections. The excursion to Crowhurst in 1862 will be found noticed in the *Builder* for that year, p. 782.

THE Académie des Beaux Arts elected, on Saturday, M. Daumet, by a large majority, to succeed the late M. Ballu in the Architectural Section. The principal claims of M. Daumet are that he obtained the "Grand Prix d'Architecture" in 1855, and, as pensionnaire at Rome, sent home a remarkable study embodying the actual state, and a proposed restoration, of Hadrian's Villa, and subsequently published, in conjunction with M. Henzey, an important work entitled "Exploration Archéologique de la Macédoine." M. Daumet is at present architect to one of the Sections of the City of Paris, architect of the Palais de Justice (where he succeeded the late M. Louis Duc), president of the "Cercle des Ouvriers-Maçons et Tailleurs de Pierre," and head of one of the architectural ateliers the most renowned for its success. M. Daumet is son-in-law of M. Questel, the senior member of the Architectural Section of the Académie des Beaux Arts.

THE case of Leigh v. Dickeson, decided by the Court of Appeal, and which has recently been reported in full in the legal reports, is likely to prevent any persons from remaining owners in common of house property longer than they can help. The question of most interest decided in the case was that, however necessary repairs to a house may be, the tenant who pays for them cannot recover a proportion of the amount from another tenant in common. So that if one tenant will not pay, a house may either go to rack and ruin or the other tenant must do the repairs out of his own pocket. Lord Justice Lindley is therefore well justified in remarking that "tenancy in common is a tenure of an inconvenient nature, and it is unfit for persons who cannot agree among themselves, but the evils attaching to it can be dealt with only in a suit for partition or sale, in which the rights of the various owners can be properly adjusted." We should be inclined to say that there would be more persons inclined to disagree among themselves if they chanced to find themselves owners of house-property than to agree. Hence the moral of this case, and the result of general experience is that every one should get out of a tenancy in common as soon as possible.

THE First Commissioner of Works, after conferring with the Trustees of the National Portrait Gallery and with Captain Shaw, is so convinced of the danger to the pictures in their present position, that the Trustees, acting on his suggestion apparently, have decided to request the Science and Art Department to receive the pictures as a loan at the Bethnal-green Museum. In the mean time, the question of a proper site and proper building is to be considered.

THE discovery of a considerable portion of Roman tessellated pavement at Leicester is reported. It is in rude tesserae of irregular shapes. From the descriptions which reach us, it appears to be a good example of a style of work familiar to all students of Roman archaeology, and possibly not so artistically remarkable, apart from historical interest, as some published accounts would have us believe.

#### THE VICISSITUDES OF A ROYAL CHÂTEAU IN FRANCE.

THE little town of Villers-Cotterets, situated in the Department of Aisne, fifty miles from Paris, claims the double honour of having been the birthplace of Alexandre Dumas (père) and of possessing an ancient royal residence, which Francis I. delighted to adorn with fine carved work of the Renaissance. A slab placed on the house of the celebrated author of "The Three Musketeers" recalls the first of these glories,—a building with fissured walls, dis honoured by recent and awkward additions, constitutes what remains of the magnificent palace which still resounded in the last century to the music of the fêtes given by the Duke of Orleans, grandfather of King Louis Philippe, to hismorganatic wife, Madame de Montespan.

There are few historical châteaux which have not their legend. That of Villers-Cotterets is no exception in this respect, and the name "Male-Maison," by which it was already known in the twelfth century, seems to denote a sinister origin, to which the superstitions of another age would certainly have attributed the strange vicissitudes of the favourite abode of the "Valois."

Sacked many times during the hundred years' war, the antique manor-house was rebuilt by Francis I. about 1530, and became his favourite and ordinary resort during the fine season; the one where his hunting ardour could best be indulged, thanks to the neighbouring forests, which are the largest in France, and the best stocked with game.

Henry II. and Francis II. enlarged the château, and there Charles IX., on the occasion of his marriage, entertained an embassy from the Protestant princes of the Augsburg Confession. Catharine de Medici made frequent journeys thither, and Henry IV. carried the beautiful Gabrielle to the same retreat. The

perspective view which we give after an old print by Chastre preserved in the National Library is of about this epoch, and by it we can form a pretty correct idea of the general aspect of the original structure, which, besides, did not differ much from the modern plan we also reproduce.

Louis XIV. offered Villers-Cotterets to his brother Philippe of Orleans as a princely appanage. The first blows aimed at the elegant Renaissance architecture date from this time, notably the massive cornice which disfigures the façade of the old château, the style of which is in little harmony with the rest of the building. Then, too, Villers-Cotterets, now so gloomy, was in all its splendour, and its "parterres," designed by Le Nôtre, rivalled the gardens of the Trianon. Narratives of the time preserve the memory of the fêtes given in the sumptuous apartments where the "Tartuffe" of Molière, proscribed at Versailles by the bigotry of Madame de Maintenon, was applauded in secret.

This brilliant epoch lasted until the fall of the French monarchy. Like nearly all the royal residences swept by the revolutionary breath, the château was divested gradually of the jewels of its adornment, and, having become national property in 1791, it served at the same time as barracks, school, and prison. Rich furniture, valuable pictures, fine wood-carvings were sold and dispersed. It was one step towards its final destiny in 1806. The creation of a "Dépôt de Mendicité" necessitated the construction of very ugly annexes which completed the disfigurement of the palace, and successive administrations have since then emulated each other in carrying on this work of Vandalism, against which scholars, archaeologists, and artists have vainly protested. What will it be like when, in order to receive the ever-increasing number of sick and paupers sent to Villers-Cotterets by the Prefecture of Police, the central building, which is of so much artistic interest, shall have been enlarged and altered, according to a plan nearly decided upon!

As it is now, the "dépot" of Villers-Cotterets avails with its courtyards, gardens, and out-buildings, more than five English acres. The principal entrance is through a part devoted to offices, and under a porch of which the vaulted roof is adorned with sculpture, attributed,—wrongly as we think,—to Jean Goujon, who, as he was born in 1516, could have been only fifteen or sixteen when Villers-Cotterets was erected. It is therefore evident that the figures of winged genii, the carved pendants and bunches of fruit, are the work of an artist preceding Jean Goujon, whose artistic education could not have been completed at that time. This part of the façade would, moreover, not be of much interest were it not for an angle-pavilion erected in the reign of Henry II.

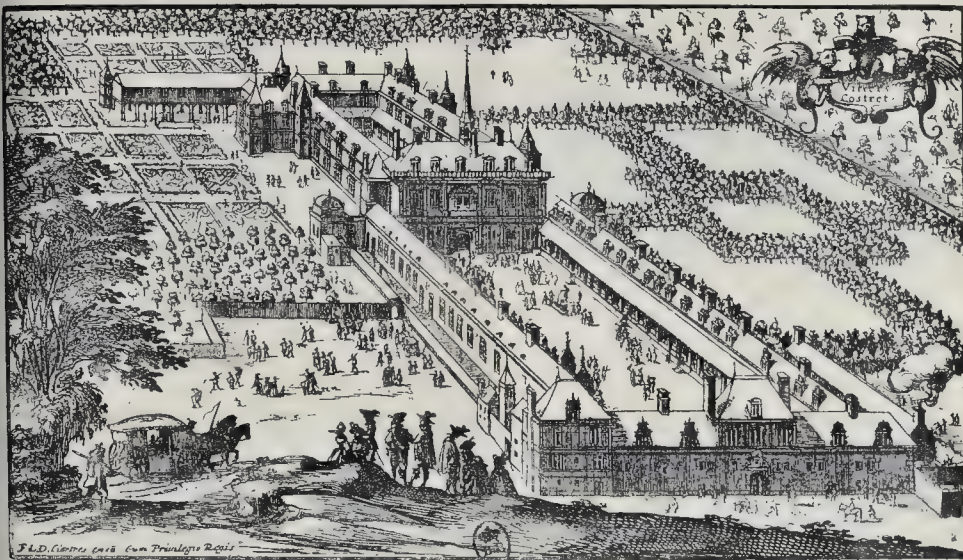
This pavilion, which was last used as a communal prison, has kept all its native elegance, in spite of the injuries of time and of men. The sharply-pointed roof, above which rises a high chimney, surmounts two stories, adorned with plasters and reached by an outside staircase enclosed in a turret. On the frieze of the first story are the initials of Henry II. and Diane de Poitiers, whilst on the return façade are those of Henry II. and Catharine de Medici, surrounded by a love-knot. Here the crescent of the beautiful Diane encloses the royal monograms. Thus at Paris can be seen on the façades of the Louvre the initial of Henry II. combined with that of his mistress. It may be added that Catharine altered not have been becoming a widow, and that nearly everywhere the monogram of H and D combined, became by a slight alteration the union of H and C.

From this pavilion to the old château on the left side extends a wing surmounted by a steep roof with dormer windows, of which the architecture entirely belongs to the sixteenth century. The heads of horses sculptured in high relief above the doors point to the original appropriation of the ground floor in its times of splendour to the use of the lower servants and as stables.

Casting the eye along this portion of the building we perceive two tall chimney-shafts, richly sculptured and adorned with Doric pilasters, with salamanders, crowned F's, and gigantic fleurs-de-lys.

The façade at the back or north side was formerly bounded by parterres and fountains, whence large avenues extended to the forest.





Villers-Cotterets in the Sixteenth Century.—From an Old Print.

The "Administration des Prisons" conceived the singular idea of shutting out this green perspective by planting a thick wall of cypress, the sombre foliage of which gives the aspect of a grave-yard to this asylum for old age. This façade, which is divided into five bays with rectangular windows, has no trace of its original decoration of the purest Renaissance style. It is flanked by two large turrets of a gubrious aspect, and merits no description.

The eastern or right-hand façade includes the more ancient portions of the old "château." It is also flanked by towers, one of which, springing from the entablature, has a high brick chimney, and here we again meet with the salamanders and crowned F's of the opposite façade. The right-hand turret, placed at an angle, abuts on a square pavilion reproducing the same arrangement as in the principal façade. This part of the "Dépôt" is surrounded by a courtyard, where the old men come to warm themselves in the sun.

The real architectural curiosities of Villers-Cotterets are not accessible to the public; and the administration, as if ashamed of not having better preserved them to art, takes jealous care to exclude them from every profane glance. A special permission is needed in order to penetrate into the court of honour by the porch which we have just described. A long row of venerable lime-trees leads to the entrance-gate of the old "château," which opens on to a large hemicycle bounded by two pilasters, which support a frieze ornamented with a bas-relief. Here we recognise, though useless now, the bust of Francis I. framed in garlands, terminated by heads of fauns, and which support two genii armed with clubs. On the first story this hemicycle contains a double window accompanied by two niches adorned with shells, salamanders, and figures seated on the pediments which crown the niches.

This façade, on which was formerly a slated spire, is divided into six bays separated from each other by columns which support the entablature, which was substituted for the original cornice. These bays contain double mutilated windows, which have been specially pointed out by M. Léon Palustre in his interesting study on the curiosities of the "Île de France." We give a sketch of one\*, for, according to him, their like is not to be found in any other part of France.

We will say nothing of the frieze of the entablature, which is not of the same period, and which jars with the whole; but, apart from this architectural anachronism, committed

under Louis XIV., the general aspect is of a great character.

In the vaulted entrance to the château, salamanders, grimacing masks, bunches of fruit and foliage, fleurs-de-lys, and crowned F's combine to form a decoration, the elegance of which contrasts painfully with the present use of the monument. The porch gives entrance to a gallery equally ornamented with sculptured garlands, and which leads to the kitchens of the dépôt, as also to an interior court, called the court of the well.

This is all which remains of the former rich decoration of that part of the château called the King's House, and which Francis I. caused to be built for his own use. M. Léon Palustre does not hesitate to attribute this building to Jacques and Guillaume le Breton, younger brothers of the celebrated Gilles le Breton, architect of the château of Fontainebleau. The two brothers remained, in fact, attached to the residence of Villers-Cotterets until their death, in 1570, and were succeeded by Robert Daultier and Gilles Agasses.

In this same gallery, between two straight walls formerly covered with beautiful tapestry, commences a large staircase, surmounted by a low-spreading elliptical vault, in the coffers of which, formed by ribs, which are enriched by foliage, are again reproduced salamanders, fleurs-de-lys, animals, and faces of children of wonderful fancy and great originality, executed in the Italian style of the sixteenth century. Not far from here is the true Renaissance gem of the Palace, imperfectly traced in our second sketch. This is a small staircase of rectangular plan, leading to the ancient chapel, now changed to a dormitory. The soffit of the first landing-place is adorned with two large panels, the sculpture of which was mutilated during the period of the Revolution. The second flight from the first floor is covered by a low ceiling, divided into three by small decorated arches, and supported by brackets. The first division contains an alto-relief representing a sleeping nymph surprised by a satyr; the second, Venus and Cupid; the third, Hercules strangling a Lion. Each of these panels is framed in a frieze supported by corbels. On the first floor is a landing-place in form of a loggia, the ceiling decorated by a horizontal panel containing a figure of Cupid of the finest workmanship. The balustrade of this loggia is formed of two squares, in which are salamanders of carved stone open-work, but which have nearly disappeared under a thick layer of whitewash.

The second-floor flight has five horizontal panels, of which the first four only contain

bas-reliefs still intact, representing Mercury, Jupiter, and Cupid, Pan teaching the flute to Apollo, and the head of a genius with wings. These sculptures are attributed to Giacomo della Robbia. In the third-floor flight there are salamanders of various symbolical treatment.

In a setting so marvellously appropriate to the luxury of an epoch in which all was to please the eye, we picture to ourselves Francis I. again descending the stone steps with his brilliant court, lords and ladies in dazzling costume. But this vision soon makes way for the sad reality, when we enter the first floor. In an immense apartment are lodged some of the poor women collected from the Paris streets. On each side are ranged two rows of iron bedsteads, with shelves overlaid with objects of all kinds,—household utensils, cast-off clothes, and crusts of bread. On entering we encounter a sickly, musty, odour, mixed with a disagreeable smell of kitchen; for, incredible as it may seem, this vast establishment,—something between a prison and a house of charity,—has no refectory, and the pensioners who are too old to work take their meals at the foot of their bed. They never seem to think of the pompous memories evoked by these walls which a charming imagination has excavated from the past, and clothed again with fanciful designs. Although known in the country by the name of "Salle des États généraux," this is evidently the ancient chapel. Here to the left, on entering, is an architectural arrangement which perfectly corresponds with the place occupied by a high altar. It is evident that these Doric columns should enclose the altar-screen, of which the outline is still to be seen formed of richly-sculptured figures and floral scrollwork; the three niches which separate these columns must once have contained images of saints.

This saloon, lighted by the double windows already described, is divided into three by fluted columns, which are adorned, at two-thirds of their height, by garlands bearing the Royal cipher. The walls are covered as if with a tapestry of salamanders, formerly enriched with gold plates, now discoloured, and half hidden under thick whitewash, which fills up the delicate carving and gives a cold and commonplace aspect to the whole. It is singular that the Historical Monuments Commission, whose duty it is to preserve the artistic riches of France, has not been able to re-act against the obligatory whitewashing, which, under the pretext of rendering them clean and wholesome, will end by entirely destroying not only the sculptures of Villers-Cotterets, but also the

\* See the double-page lithograph in the present number.





Hampton Court in the Reign of Queen Mary.—View from the River.

admirable ribs of vaults in the Gallery of Conclave, in the Palace of the Popes at Avignon.

The upper part of the saloon is particularly interesting. It is decorated with a large entablature, which rises above the columns and supports richly ornamented vases. The frieze of this entablature, which is truly like lace-work in stone, represents foliage, arabesques, and flowers in one marvellous medley, together with the arms of France and of the Valois. It is to be observed that this chapel, if chapel it be, is of no religious character, and that all here is combined not for the worship of God, but for the greater glory of a king fêted and flattered as though he were divine.

The modern chapel occupies the ground of an ancient orangery situated on the ground-floor (east side). It is enough to say that it has no architectural character—that the works of art which it contains consist of three very mediocre copies of pictures in the Louvre. This chapel is, moreover, doomed to disappear to make way for new dormitories.

We have now completely reviewed those parts of Villers-Cotterets which are of any real interest from the double point of view of art and archaeology. Since a strict rule prevents foreigners from admiring these curiosities, which are almost unknown even in France, we shall be pardoned for this rather long description, the more so as the approaching enlargement of the "Dépôt de Mendicité" will soon complete the destruction of this work of the last of the Valois.

For this reason we wished, in the name of all those who still reverence beautiful things, to rescue from the oblivion in which it is left one of the most remarkable specimens of the fine Renaissance period, of which the admirable remains seem still to protest here and there against such unjust neglect.

R. B. FENWICK.

#### A HISTORY OF HAMPTON COURT.

THAT the royal palace best known to Londoners, and oftentimes visited, should have had no worthy historian until the present time, is scarcely to the credit of our antiquaries. But the neglect has not been without its advantages. The modern chronicler has access to sources of information which even fifty years ago were practically closed, and the modern antiquary has a far more precise knowledge of art and architecture than his predecessors had any opportunity of acquiring. We have, therefore, a right to expect archaeological work of a high order nowadays, and Mr. Law's interesting and attractive volume\* fulfils this expectation. Its pages exhibit abundant evidence of painstaking and intelligent research, and the results that have been obtained are placed before the reader in an extremely pleasant manner. The author's style may not be so picturesque as Hepworth Dixon's, or as gracefully learned as that of Surtees, but it is clear, unaffected, and truthful, and these are far more important characteristics.

\* "The History of Hampton Court Palace in the Tudor Times," illustrated with 130 autotypes, etchings, engravings, maps, and plans. By Ernest Law, B.A. Barrister-at-Law. London: G. Bell.

Although on his title-page Mr. Law limits his History of Hampton Court to Tudor times, as a matter of fact he has not a little to say about Hampton at an early date, and about the subsequent descent of the manor. It is sufficient for our purpose to mention that the site upon which Wolsey's palace was built had been previously occupied by a Preceptory of the Knights Hospitallers, and that Elizabeth of York spent at least some days in the manor house of Hampton Court, in the year 1503. No traces of this building have ever been discovered. It seems to have been of small dimensions, and poorly furnished,—in a word, quite unsuited to the sumptuous habits of the Cardinal, who became its possessor in the summer of 1514. It was fairly bought, or rather leased, from the Prior of the Order, and the rent of 50*l.* a year was an equitable one. When the Crown became the owner, the principles of justice were not so apparent.

The energy displayed by the Cardinal in converting the manor-house and its domain of 2,000 acres into a noble palace, with gardens and park, was characteristic. Artificers of all sorts were employed. The land was enclosed with a substantial red brick buttressed wall, toned here and there with bricks of a darker hue, and at one point,—near the Paddock in the Kingston-road,—marked with the device of a cross in black bricks. A wide moat,—perhaps the latest made in England,—was constructed. Extensive gardens were laid out, while the care bestowed upon the drainage and the water supply was remarkable. Comparatively pure as the Thames must have been in those days, it was not sufficiently so for the Cardinal's taste, and accordingly a supply was brought through a double set of strong leaden pipes from Combe to Surbiton, and thence under the Thames above Kingston Bridge to the palace. Meanwhile the general construction of the mansion was pushed on, and by the month of May, 1516, had so far advanced that Wolsey was able to entertain the king and queen within its walls. Whether the cardinal was his own architect, or whether the designs were drawn by those under whose directions they were carried out, it is impossible to say. The only names which occur in the account-books are "James Bettles, master of the works," "Nicholas Townley, clerk controller," "Master Lawrence Stubbes, paymaster," and, at a later date, "Mr. Henry Williams, priest, surveyor of the works." It is easy to credit Wolsey with the same architectural taste and skill which Wykeham and Waynflete and other prelates exhibited; and, on the other hand, three centuries ago artist and craftsman were often combined in the same individual. As to the taste and skill with which the building was planned and carried out there can be no question, and there is sufficient distinctness in the style followed at Hampton Court, and in Wolsey's other edifices, to lead us to conclude that on all of them the same mastermind was engaged.

The material employed at Hampton Court was red brick, with stone-dressings and ornamentations. The chimney-shafts, all of brick, were,—and we may say still are,—varied in form, but never otherwise than pleasing.\* Some

\* Some of them, however, are modern restorations; very well carried out, it may be added.

are circular, some square (but set diagonally), and some octagonal; and they are grouped together in twos and fours, with their shafts carried up, sometimes solid and sometimes separate. Here and there terra cotta was used with happy effect for decorative purposes, and Mr. Law gives an illustration of the arms of Wolsey executed in this material, which he attributes to one of the Maiani, or, at any rate, to their school. The terra-cotta medallion busts, which are affixed to the gateway turrets, were, as the accounts testify, executed by Joannes Maiano, and not, as has often been said, by Della Robbia.

The general plan of Wolsey's palace comprised two spacious quadrangles communicating with each other. The west front, which extends with its two wings, from north to south, some 400 ft., was the first portion taken in hand. Being only two stories high, it may perhaps be thought wanting in dignity; but it must be remembered that it has undergone many changes, and its effect has been marred by the removal of the leaden cupolas (or "types") which crowned its numerous turrets. The simplicity and want of height in the façade would invest with greater importance the gate-house which formed the central feature, and which was a far loftier and more imposing structure than it now is. It was, in fact, a noble square tower, five stories high, rising with its four corner octagonal turrets high above the adjacent ranges of buildings, with its sky-line broken with the turret-caps, carved chimney-shafts, finials, pinnacles, and gilded vanes. Its lofty archway gave admission to the outer or base court (i.e., Base Court), which now measures 167 ft. from north to south, and 142 ft. from east to west. Three sides of this quadrangle were uniform in character, and resemble very much the college buildings of the same date, but the fourth or east side was treated in a very picturesque manner, the elevation being broken by turrets, and the façade diversified by windows of various proportions, irregularly distributed. There are some good specimens of interlacing brickwork on this side, and the centre is occupied by the clock tower, which rises to a height of 80 ft. The inner or clock-court is approached through this tower, and must have been of conspicuous beauty. Unfortunately, it has undergone so many alterations that it is only here and there that the original work can be traced. The great hall, which occupies the whole of the north side, though often called Wolsey's Hall, was really erected by Henry VIII., and all that we know of the cardinal's smaller hall is contained in the accounts of its destruction, given by Mr. Law in his appendix. Again, half of the east side of the court was rebuilt by George II., while the original south range is almost entirely obscured from view by the Ionic colonnade of Sir Christopher Wren. Behind this colonnade, however, are the very rooms which the cardinal occupied, and the chapel, though remodelled by Henry VIII., occupies its old site, and probably the same ground which the earlier chapel of the hospitallers also covered.

With regard to the internal arrangements of the palace one can only say that the lavish splendour everywhere exhibited roused the envy of some and the admiration of all who





Hampton Court in the Reign of Queen Mary.—North View.

visited the Cardinal. The satirists of the period did not spare him. Skelton and Roy were especially bitter, and the latter answers his own question:—

"Hath the Cardinal any gay mansion?"

in the following terms:—

"Great palaces without comparison;  
Most glorious of outward sight  
And within deck'd poynt device,  
More lyke unto a paradise  
Than any earthy habitation."

Carving and gilding added beauty to beautiful designs, rich arras hung upon the walls, and the buffets were bright with gold and silver plate,—in fact, the palace was in all respects too good for a subject, and, therefore (so the king seems to have reasoned), fit only for a royal residence. Henry got possession of it (we must not inquire by what means) as early as the year 1526, but it was not until five years afterwards that he formally entered upon its enjoyment. One of his first acts seems to have been to affix his arms and badges upon every part of the building, and the heraldic beasts and other insignia are still conspicuous features on the palace walls. But the chief work with which the king's name is associated is the great Hall, on which was expended a vast sum of money. Its external appearance has undergone little change, and its length, 118 ft., is that of one side of the Clock or Inner Court. A beautiful bay window, reaching nearly the whole height of the hall, breaks the uniformity of the design in a very happy manner; but two remarkable features are gone, namely, the fretwork parapet and the "femerell," or louvre. Of the latter, Mr. Law says the records are of special value, as there scarcely survives a single good and genuine sample of a Mediaeval louvre,—the best known, that on Westminster Hall, being a not very successful restoration by Smirke. The louvre was made of wood, and consisted of three stories or tiers diminishing in size, the sides with glazed openings, and the tops cased with lead. From the upper edge of each story rose a set of curved pinnacles, surmounted with beasts carrying vanes, while at the centre and summit of the whole was "a great lion bearing a great vane gilded," emblazoned with King Henry's arms, surmounted by a large close crown.

The interior of the Hall was and still is strikingly beautiful. The hammer-beam roof, divided into seven bays, is an elaborate piece of workmanship, and the numerous pendants are richly and curiously carved. As will be seen from the engraving (which will also serve as an example of the numerous detail illustrations in the book), the design is Italian in character, but the accounts clearly show that, from whatever source the drawings may have come, their execution was effected by English workmen.

By the end of the year 1538, Henry's additions to Wolsey's Palace were complete, the concluding portion being the "King's New Lodging in the Priory Garden." This consisted of a range of buildings facing south, and extending at right angles with the Queen's New Buildings (previously erected), and formed with them a new inner court. It was subsequently known as the "Cloister Green Court," but was pulled down by William III.

Wynegarde's views, taken at a somewhat

later date, show that the original style of the buildings was maintained throughout, and that there were several outlying towers and turrets, arbours and pavilions, most of which were



removed to make way for Wren's State apartments. The Water Gallery (in which the Princess Elizabeth was lodged) and the very beautiful water-gate are to be seen in Wynegarde's later view, and the two plates (reductions of which we enjoin) give a very fair idea of the extent and character of Hampton Court in Tudor times.

In our remarks we have been following only the architectural growth of the palace. Mr. Law, however, has given much more than this, for he has recorded at length the historical associations of each and every part of the building, its traditions (not without some "scandal about Queen Elizabeth"), its ghost stories, and even its natural history. The appendices also contain transcripts from the Public Records and Account Rolls of much value and interest. The whole book is an admirable example of intelligent industry successfully employed upon a subject well worthy of such treatment.

We look forward with much pleasure to the completion of the work which has been so well begun.

**Great Harwood.**—An arrangement has been effected with regard to the question of the erection of one or three chapels, for the proposed cemetery at Great Harwood, Lancashire, the Local Board having agreed to erect three chapels under one roof, within five years, from possession of the land being given. The consent of the Local Government Board has already been granted to a loan of 4,000*l.*, for the cost of the cemetery to be repaid within fifty years. The work will be proceeded without delay from the plans prepared by Mr. A. W. R. Simpson, architect, Blackburn.

## THE HOUSING OF THE WORKING CLASSES.

### PROVISIONS OF LORD SALISBURY'S BILL.

THE Bill which has been introduced in the House of Lords by Lord Salisbury to amend the law relating to the dwellings of the working classes provides that the Labouring Classes' Lodging Houses Acts, 1851 to 1867, may be adopted—(a) for the metropolis, by the Metropolitan Board of Works if one of Her Majesty's Principal Secretaries of State approves of such adoption; (b) for any urban sanitary district by the urban sanitary authority of such district in accordance with section 10 of the Public Health Act, 1875; and (c) for any rural sanitary district, by the sanitary authority of the district upon such certificate from the Local Government Board, and after such delay as hereinafter mentioned.

A rural sanitary authority in any district desiring to adopt the said Acts may apply to the Local Government Board for the certificate required for such adoption, and shall specify in such application the area in which they consider that accommodation is necessary for the housing of the labouring classes, and thereupon the Local Government Board shall direct a local inquiry to be held by one of their inspectors, and if after such local inquiry the inspector shall certify that accommodation is necessary in such area for the housing of the labouring classes, and that there is no probability that such accommodation will be provided without the adoption of the said Acts for that district, and that, having regard to the liability which will be incurred by the rates, it is, under all the circumstances, prudent for the said authority to undertake the provision of the said accommodation under the powers of the said Acts, the Local Government Board may, if they think fit, publish that certificate in the *London Gazette*, and thereupon the sanitary authority may adopt the said Acts, provided that (a) unless the Local Government Board state in publishing such certificate that an emergency renders it necessary to adopt the Acts immediately, such adoption in pursuance of the certificate shall not take place before the ordinary election of members of such authority which is held next after the date of the local inquiry; and (b) after the end of twelve months from the date of the certificate the Acts shall not be adopted without a fresh certificate; and (c) no land shall be acquired, nor buildings erected, under the said Acts, except within the area mentioned in the certificate.

The expression "lodging-houses for the labouring classes" when used in the Labouring Classes' Lodging Houses Acts, 1851 to 1867, shall be deemed to include separate houses or cottages for the labouring classes, whether containing one or several tenements. Land for the purposes of the said Act as amended by this Act may be acquired by the Metropolitan Board of Works and by any sanitary authority in like manner as if those purposes were purposes of the Public Health Act, 1875, and sections 175 to 178, both inclusive, of that Act (relating to the purchase of land), shall apply accordingly, and shall for the purposes of this Act extend to the metropolis in like manner as if the Metropolitan Board of Works were a local authority



in the said sections mentioned, and one of her Majesty's Principal Secretaries of State were substituted for the Local Government Board.

In the event of the removal from their present sites of Millbank Penitentiary or Pentonville Penitentiary, it shall be lawful for her Majesty, on the recommendation of the Commissioners of her Majesty's Treasury, and in the event of the removal from its present site of Coldbath-fields Prison, it shall be lawful for the justices of the peace for the county of Middlesex, if the justices think fit so to do, to sell and convey those respective sites, or any part or parts thereof, to the Metropolitan Board of Works, at such price, to be fixed by agreement or arbitration, as will enable the Board without incurring serious loss to appropriate the sites or parts so conveyed for the purposes of the Labouring Classes' Lodging Houses Acts, 1851 to 1867, as amended to this Act.\*

**Amendment of Artisans' Dwellings Acts, 1869, to 1882.**—The owner of any premises who is required by an order of a local authority made under the Artisans and Labourers' Dwellings Act, 1869, to execute any works on or to demolish any premises, shall cease to have the power to require the local authority to purchase such premises. Where an officer of health in pursuance of the Artisans and Labourers' Dwellings Act, 1869, or of section 8 of the Artisans' Dwellings Act, 1882, has reported to any local authority that any premises are unfit for human habitation, or that the pulling down of any obstructive buildings would be expedient, and the local authority fail within a reasonable time to put in force the provisions of the said Acts in relation to such premises or buildings, any sanitary authority or other local authority having jurisdiction in or near the parish or place in which such premises or buildings are situate, or the owner of any property in the neighbourhood of such premises or buildings, may complain of such failure to the Local Government Board, and the Local Government Board may, if after local inquiry they think it expedient so to do, order the local authority to put in force the said provisions, and it shall be the duty of the local authority to comply with such order.

**Amendment of Artisans and Labourers' Dwellings Improvement Acts.**—The Artisans and Labourers' Dwellings Improvement Acts, 1875 to 1882, shall extend to all urban sanitary districts in England. Where upon an official representation to a local authority within the meaning of the Artisans and Labourers' Dwellings Improvement Act, 1875, such authority fail to pass a resolution in relation to such representation, and in accordance with section 8 of the said Act the said authority send a copy of such representation and their reasons for such failure to the confirming authority, and the confirming authority hold a local inquiry, and after that local inquiry the confirming authority are of opinion that an improvement scheme ought to be made in respect of the area or of any part of the area included in the official representation which is the subject of inquiry, the confirming authority may by order direct the local authority to make within the time specified in the order a scheme for the improvement of such area or part, subject to such conditions (if any) as the confirming authority may see fit to insert in the order, and it shall be the duty of the local authority to comply with such order. Where an arbitrator has under the Artisans and Labourers' Dwellings Improvement Act, 1875 to 1882, determined the amount of compensation, an appeal shall not lie to a jury from the decision of such arbitrator without leave of the High Court of Justice, but any grant such leave upon application in a summary manner, and upon being satisfied that a failure of justice will take place if the leave is not granted.

**Amendment as to Interest on Public Works Loans.**—Any loan advanced by the Public Works Loan Commissioners in pursuance of the Labouring Classes' Lodging-houses Acts, 1851 to 1867, or of the Artisans Dwellings Acts, 1869 to 1882, or of the Artisans' and Labourers' Dwellings Improvement Acts, 1875 to 1882, or of any such Acts, or for labourers' dwellings in pursuance of the Public Works Loans Act, 1875, shall bear such rate of interest, not less than 3s. 2d. 6d. per cent., as the Commissioners

of her Majesty's Treasury may from time to time authorise as being in their opinion sufficient to enable such loans to be made without loss to the Exchequer.

**Amendment of General Sanitary Law, &c.**—It shall be the duty of every local authority intrusted with the execution of laws relating to public health and local government to put in force, from time to time as occasion may arise, the powers with which they are invested, so as to secure the proper sanitary condition of all premises within the area under the control of such authority.

Provisions are also made for securing decent lodging and accommodation for persons engaged in hop-picking, and for the prevention of overcrowding in vans used for human habitation. Another important provision is that the Settled Land Act, 1882, shall be amended as follows:—

(a.) Any sale, exchange, or lease of land in pursuance of the said Act, when made for the purpose of the erection on such land of dwellings for the working-classes, may be made at such price, or for such consideration, or for such rent, as, having regard to the said purpose and to all the circumstances of the case, is the best that can be reasonably obtained, notwithstanding that a higher price, consideration, or rent might have been obtained if the land were sold, exchanged, or leased for another purpose.

(b.) The improvements on which capital money may be expended, enumerated in section 25 of the said Act, and referred to in section 30 of the said Act, shall, in addition to cottages for labourers, farm servants, and artisans, whether employed on the settled land or not, include any dwellings available for the working classes, the building of which, in the opinion of the Court, is not injurious to the estate. (2.) Any body corporate holding land may sell, exchange, or lease such land for the purpose of the erection of dwellings for the working classes at such price, or for such consideration, or for such consideration, or for such rent, as, having regard to the said purpose and to all the circumstances of the case, is the best that can be reasonably be obtained, notwithstanding that a higher price, consideration, or rent might have been obtained if the land were sold, exchanged, or leased for another purpose.

Certain sections of existing Acts are repealed wholly or in part. The Act is not to extend to Scotland or Ireland.

#### BUILDERS' BENEVOLENT INSTITUTION.

The thirty-seventh annual meeting of this Institution took place on Thursday last, at Willis's Rooms, King-street, St. James's, Mr. George Plucknett, J.P., Treasurer, presiding.

The annual report, which was read by the Secretary, Major Bruton, states that the number of recipients on the funds of the charity is again increased, and that nearly all applicants for the benevolence of the Institution have been provided for by their election. "As in many other kindred institutions, there has been a falling off this year in the amount of subscription, notwithstanding which, it is hoped the deficiency will be made up in the ensuing year. The Committee appeal to the generosity of the valued friends of the charity, and to those who have not yet subscribed, but ought to do so, to provide sufficient funds to meet the necessary expenditure. Nine pensioners have been elected in the past year, and four have died. There not having been more deaths amongst the sixty pensioners, whose average age exceeds seventy years, will be regarded with gladness. The Institution is much indebted to the President for the past year, Mr. Stanley G. Bird, for the zeal he manifested for the success of its affairs, and the committee express their appreciation of his able advocacy. It is with much pleasure the committee announce the circumstance that the Worshipful Company of Carpenters have kindly granted the use of their fine hall for the annual dinner of the Institution, on the 5th of November next, when the chair will be taken by Mr. Arthur Charles Lucas, J.P., member of the respected and eminent firm who have most liberally contributed to the charity."

The balance-sheet shows total receipts from all sources during the year amounting to £5,211 4s. 7d. The total expenditure has been £438 3s. 6d.; 1,500l. has been invested in Consols; and there remains a balance in hand of £1,278 1s. 2d.

The report and balance-sheet were adopted, on the motion of the Chairman, seconded by Mr. T. Patrick.

Votes of thanks were given to the president for the past year (Mr. Stanley G. Bird), to the vice-presidents, to the trustees (Mr. Geo. Plucknett, J.P., Sir S. Morton Peto, Ald. Sir J. C. Lawrence, bart., M.P., and Mr. C. T. Lucas), to the treasurer (Mr. Geo. Plucknett, who was again re-elected), to

the Committee, the retiring members of which were re-appointed, and to the auditors (Messrs. Crutwell, Ward, and Bolding).

The Chairman proposed that Mr. Arthur Charles Lucas, J.P., be elected as president for the ensuing year, hoping that under him the Institution might even do better than it had done in the past year.

Mr. Thomas Stirling seconded the motion, adding that the Lucas family had always been large and cheerful contributors to the charity.

On the motion of Mr. W. J. Mitchell, a cordial vote of thanks was passed to Mr. Plucknett for presiding, and the meeting terminated.

#### Illustrations.

##### SCULPTURE. "BONHEUR," BY M. DAILLON.

THIS is another of the sculpture works exhibited at the Salon of the present year, which has now closed. Its author, M. Daillon, has gained great credit for his works this year, including this group and his fine recumbent figure entitled "Réveil d'Adam," of which mention has before been made in our columns.

##### DESIGN FOR STAINED GLASS.

BY MR. E. BURNES JONES, A.R.A.

THIS is a reproduction, from the artist's cartoon, of his design for a window in Jesus College, Cambridge; the subject being "The Vision of St. Stephen."

##### HOUSE, RICKETTSWOOD, NEAR REIGATE.

The illustration shows the scheme for recasing the whole of the present house, adding a new wing, with sitting-room and kitchen offices behind, connecting the house with the block of stable-buildings beyond. The present house, the residence of Mr. A. M. Rendel, is of brick, with Bath stone dressings to plate-glass sash-windows, and with the upper floors tile hung. The effect is very sombre, and a casing of timber and plaster was proposed as a remedy. The new part, nearest the spectator and extending to the stables, is designed in solid timber with lath and plaster. The work has not yet been carried out, though the quantities have been taken and a tender obtained from Mr. Rudd, the builder, of Grantham. The architect is Mr. Halsey Ricardo.

##### THE GLAMORGANSHIRE AND MONMOUTHSHIRE INFIRMARY.

The Glamorganshire and Monmouthshire Infirmary at Cardiff was opened about two years ago, having been erected by public subscriptions: on a site about five acres in extent generously given, together with several important money donations, by the Marquess of Bute, K.T. The building accommodates about 130 patients. The view of the administrative block which we give shows the rooms used by out-patients, with their entrance and exit, the chief entrance being in the middle of the front seen on the left.

Local stone, with Bath stone dressings and red Radr stone bands, with buff brick chimneys, are the chief materials; the roofs are covered with green slates, half-timber work being used at intervals. The ward blocks, laundry, &c., with kitchens and operating-rooms, &c., occupy the ground to the right of our view.

The buildings were erected by Mr. C. Burton, of Cardiff, for about 24,000l., from the designs of Messrs. James Seward & Thomas, architects, of Cardiff.

##### CENTRE OF FAÇADE OF THE "ÉCOLE CENTRALE," PARIS.

For the description of this building, see separate article on another page.

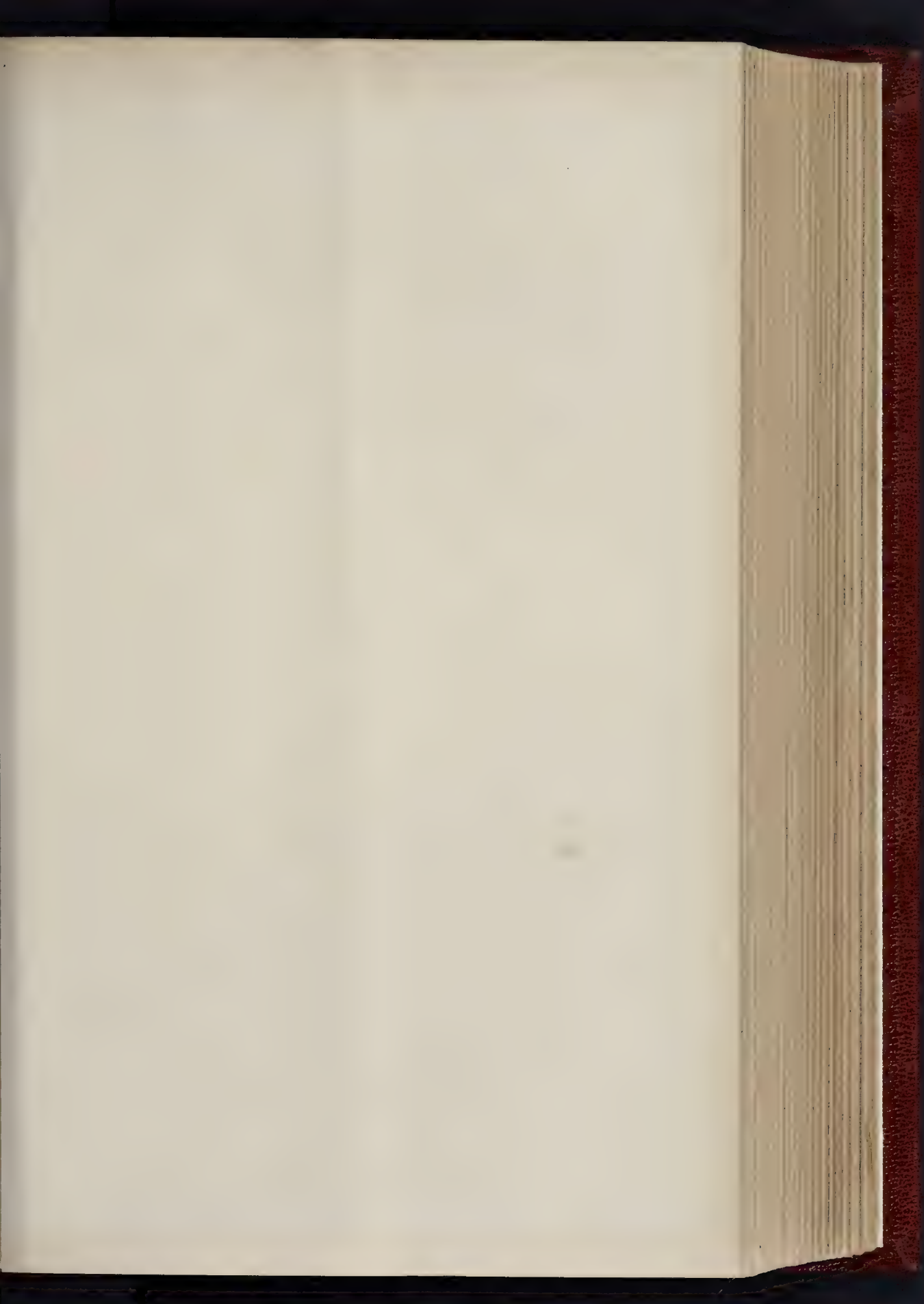
##### THE CHÂTEAU OF VILLERS-COTTERETS.

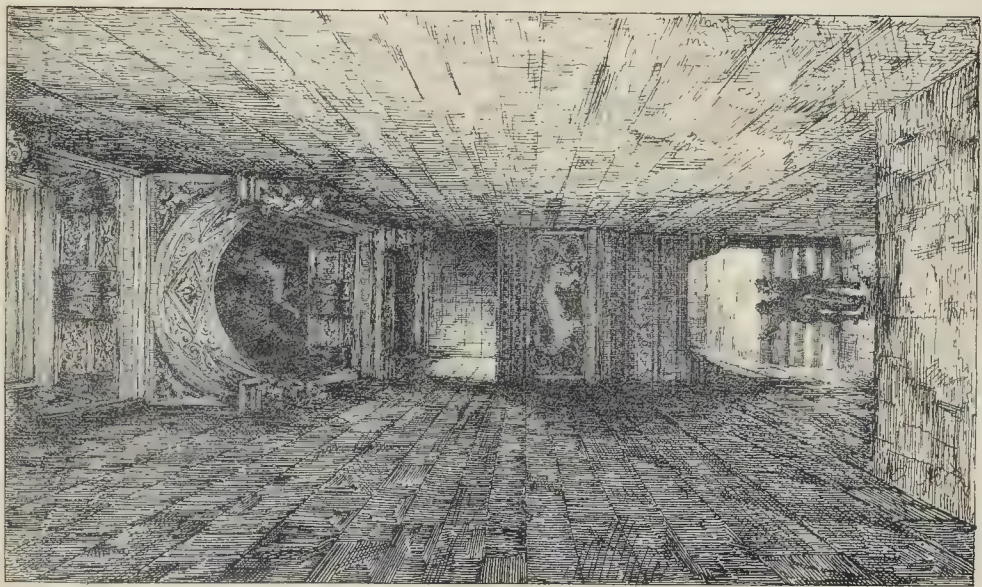
For article descriptive of these sketches, see p. 114.

**The Hull and Barnsley Railway** was opened last week. On the goods-sheds and stations of this line at Hull, and also at the Alexandra Docks, Hull, Mr. T. W. Helliwell has put on above 53,000 square feet of glazing in six weeks.

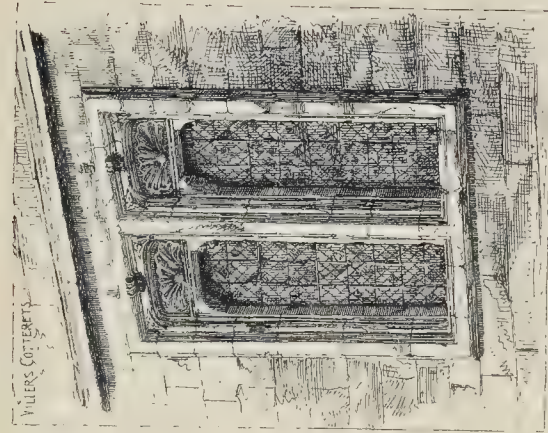
\* There was a pretty sharp discussion in regard to this provision, the principle of which we have already commended, and we regret that it was carried without modification.







THE FRANÇOISIER STAIRCASE.

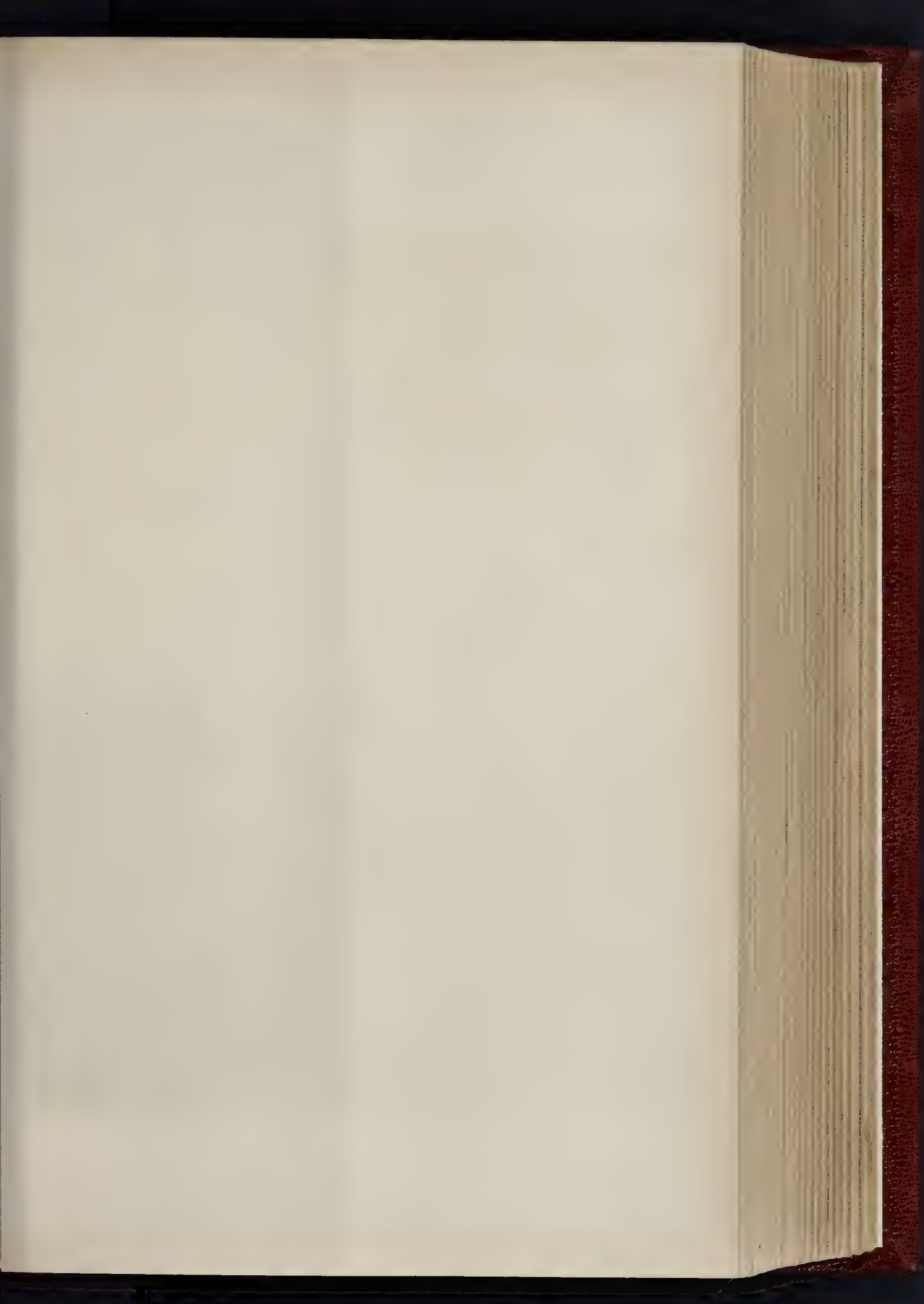


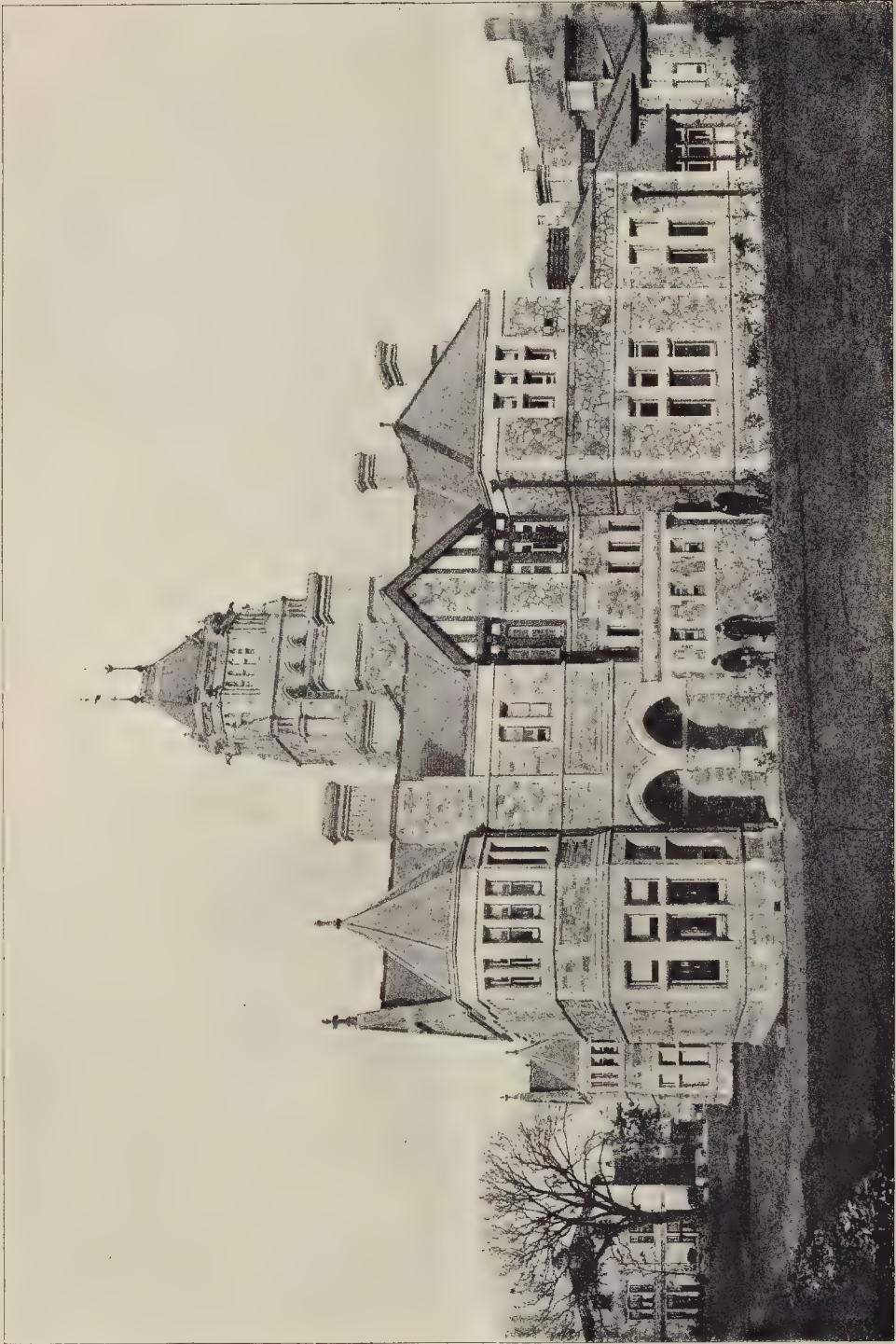
A WINDOW IN THE PRINCIPAL FACADE.

ILLUSTRATIONS OF THE  
ANCIENT  
CHÂTEAU OF VILLERS-COTTERETS.

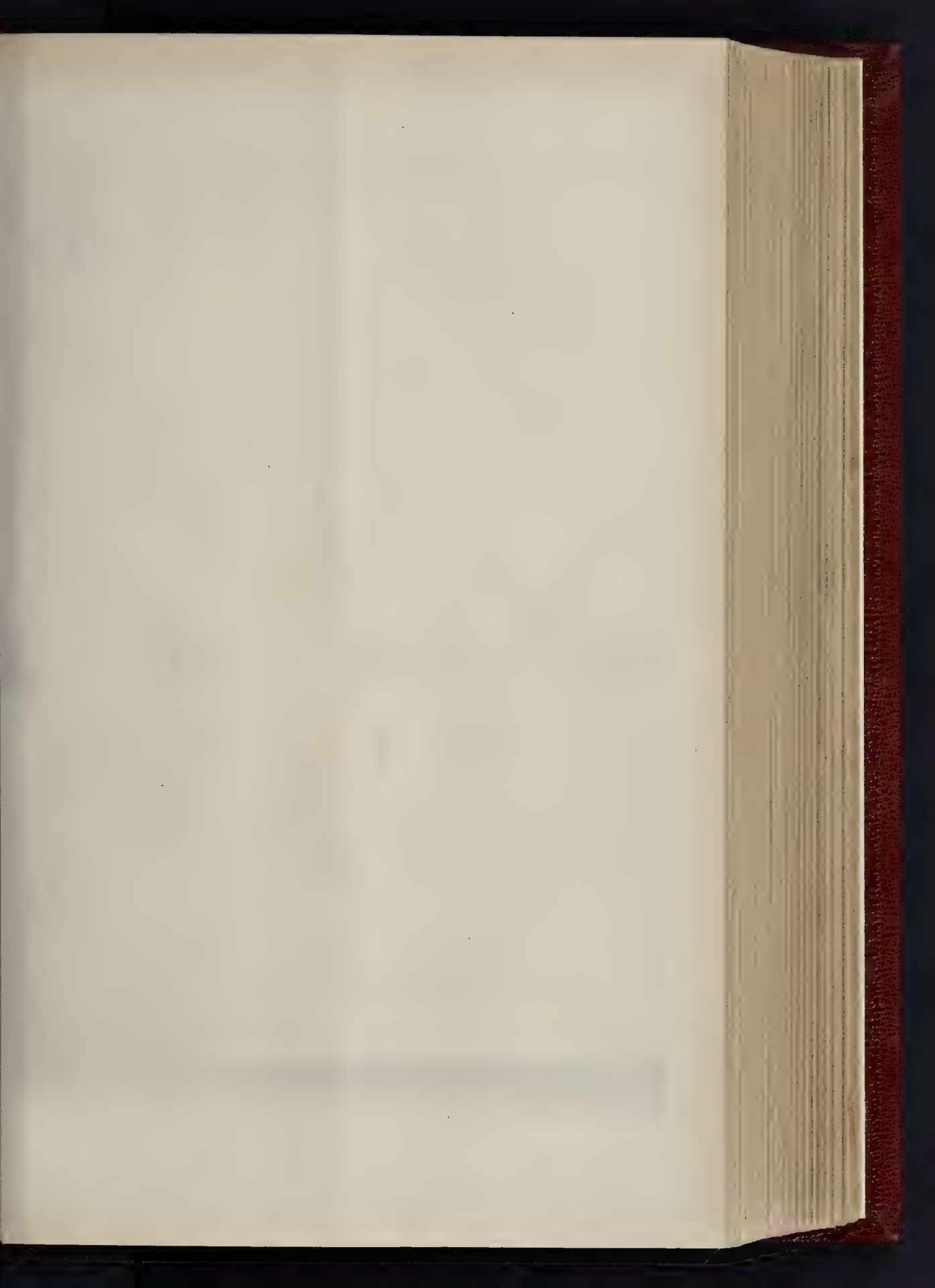
FROM ETCHINGS GIVEN IN M. LÉON PALUSTRE'S WORK,  
"LA RENAISSANCE EN FRANCE."













NEW PHOTO SPRAGUE & CO. LONDON

SCULPTURE FROM THE PARIS *Salon*.

"BONHEUR"

M. DAILLON, SCULPTOR.





INK PHOTO SPRAGUE & CO LONDON

DESIGN FOR STAINED GLASS.  
"THE VISION OF ST. STEPHEN" (WINDOW IN JESUS COLLEGE, CAMBRIDGE),  
BY MR. E. BURNE JONES, A.R.A.





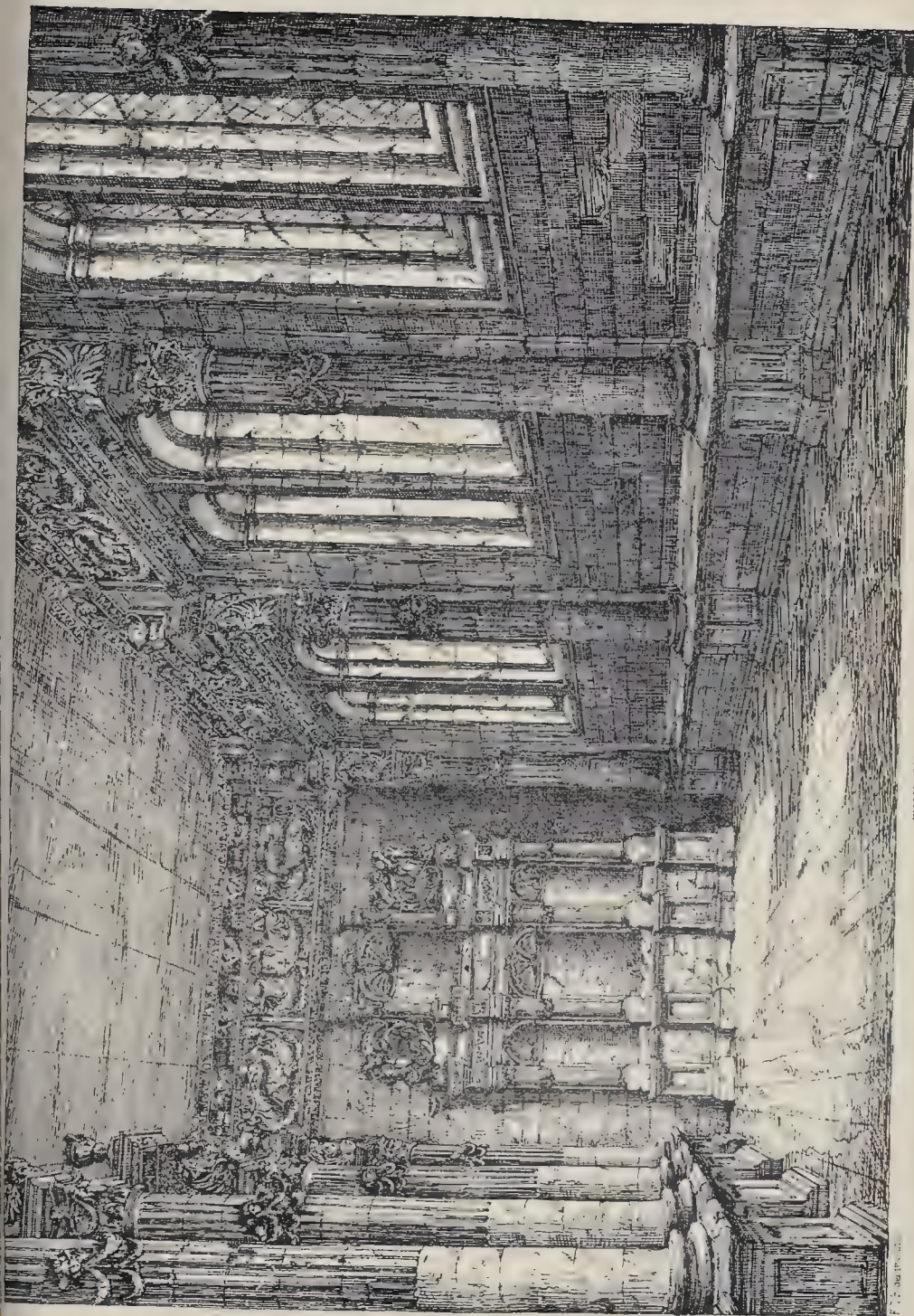


CENTRE OF FAÇADE OF THE NOUVELLE ÉCOLE CENTRALE, PARIS

M. DENFER, ARCHITECT



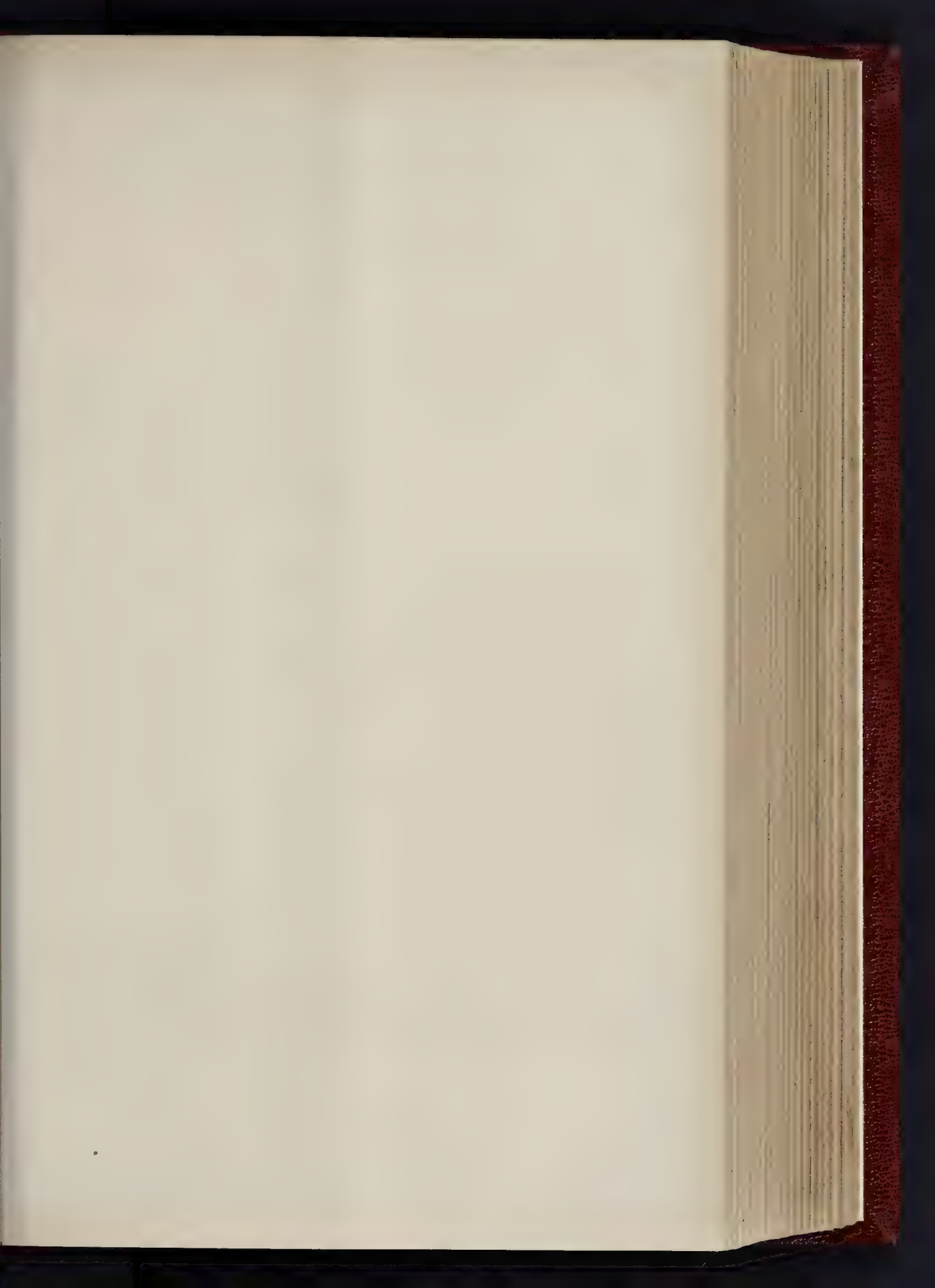




THE INTERIOR OF THE CHAPEL,  
(NOW CALLED THE "SALLE DES ÉTATS GÉNÉRAUX.")









PROPOSED ALTERATIONS, 1

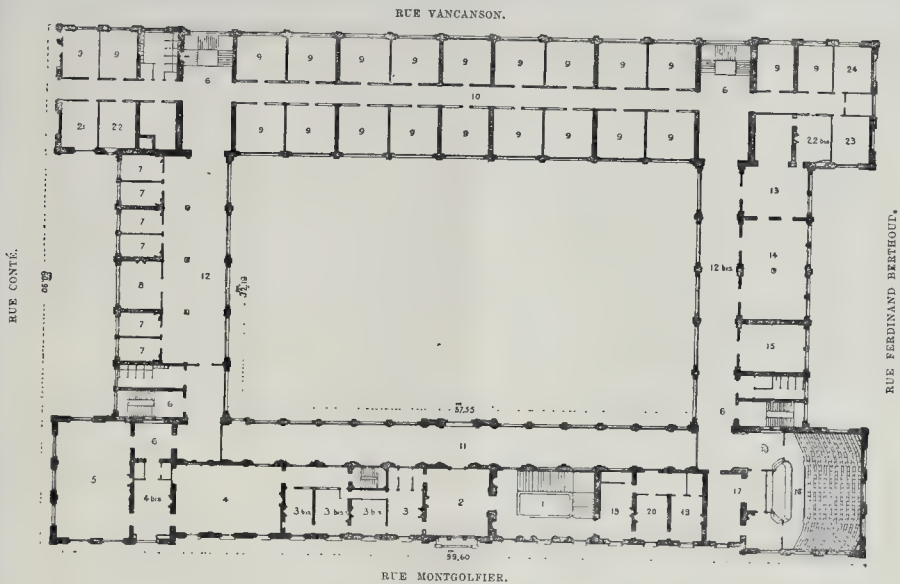




MR. HALSEY RICARDO, ARCHITECT.







École Centrale.—First Floor Plan.

THE NEW "ÉCOLE CENTRALE,"  
PARIS.

This building, inaugurated on the 8th of November last year, forms the present home of the École Centrale des Arts et Manufactures, replacing the old Hôtel de Juigné-Thorigny, which has long been notoriously insufficient for its purpose.

The École Centrale was established there in 1799. The old mansion which has sheltered it fifty-five years was built in 1656 by Aubert de Tenay, a rich financier and farmer of taxes, and was then one of the handsomest houses in Paris. The Marshal de Villeroi lived there for some time.

With the exception of a grand staircase, in which the architect has endeavoured to recall the magnificence of the Hôtel de Juigné, nothing in the new buildings recalls the gay fashions of the last century; no reminder of the fêtes of brilliant and giddy epoch will trouble the eyes of this austere building, so appropriate to the serious work of modern civilisation; but there is nothing heavy or forbidding in its appearance, and the young people who will now on their studies, there will have not only as in the good old times,—

... "Un banc de chêne usé, lastré, splendide, une table, un pupitre, un lourd encrier noir, une lampe, humble sœur de l'étoile du soir,"—

pleasant rooms also, where a profusion of light will circulate, with a uniformity of warming and ventilation, immense laboratories, with every modern convenience, for lighting, gas and electricity.

The construction of the new school, at first led to the architect Demimiot, was, on his decease, taken up in 1882 by M. Denfer, a former pupil of the École des Arts et Manufactures, in which he is now Professor of architecture. The establishment is situated in one of the quietest quarters of Paris. It occupies the site of the Hôtel de Juigné-Thorigny, which was lately stood a people's theatre. The building comprises four large pavilions, united by angle pavilions and enclosing a large rectangular court. This large space, bounded by Rue Montgolfier, Rue Ferdinand Berthoud, Rue Vancanson, and Conté, covers an area of 4,000 metres, of which 4,000 are covered with buildings. The principal façade is towards Rue Montgolfier, and only the central portion, in stone, relieves its extreme simplicity. This central portion of which we give a plan in the present number. The entrance opens on the ground-floor into two large consoles, which support a balcony on the first-floor level. The upper part, ornamented with pilasters and garlands,

and palms, adorning an allegorical head, terminate in a large pediment decorated with a cartouche, on which is sculptured the emblematic bee of the École Centrale. The portions included between the centre and the angle pavilions are in three stories, the first-floor windows are surmounted with pediments and the whole crowned by mansard roofs with dormers. There is a large entrance towards the Rue Conté, reserved for students, surmounted with a gable enclosing a clock face. Entering by this doorway we find on the left the gallery "des chaudières," on the right that "des machines."

This inner façade offers much the same disposition as that towards Rue Ferdinand Berthoud, to which it is parallel: this last includes a court giving access to the laboratory offices. Towards the Rue Vancanson, opposite the Conservatoire des Arts et Métiers, extends the rear façade, where are placed the laboratories, a portion of the studies, and the refectory. It is of extreme simplicity of design, but perhaps offers to professional eyes more of technical than the principal façade, in a purely artistic point of view. There are the same angle pavilions with rusticated piers, but the ingenious combination of brick and iron, and the large windows giving copious light to the rooms, give an expression happily suited to the objects of a building in which convenience is not sacrificed to the demands of external effect.

In retracing our steps, we enter the Rue Montgolfier entrance, and find a spacious vestibule, separated from the central court by an iron gate. On the right commences the fine staircase (1) we have before alluded to as recalling the glories of the Hôtel Juigné-Thorigny. On the first floor we salute, in passing, the busts of the four founders of the school: Olivier (1793-1853), Péciot (1793-1857), J. B. Dumas (1800-1884), and Lavalley (1797-1873). On this story commences a long gallery (11), where the administrative portion of the establishment is arranged. Similar galleries traverse, on each story, the central court.

To define precisely the system of arrangement of the building, it may be mentioned that each story (there are three without counting the dormers) corresponds to one particular year of study, comprising all the departments bearing upon it,—studies, an exhibition-room, a lecture-room, &c. These latter, all constructed on the same model (16), seat from 250 to 300 students, and are well lighted by numerous windows or by Edison lamps. Behind the lecture platforms are three immense blackboards, moved up or down by hydraulic power. To each theatre is attached a preparation-room (17). All the galleries are furnished with glass

cases, in which are stored the collections of models. At the four angles are placed stairs, lifts, and latrines.

The students' rooms (9) are all constructed on one very simple model, furnished with numerous gaslights and reflectors, and containing large tables which are lighted by windows giving a left-hand light, an indispensable condition for drawing work. In the portion set apart for first-year students there are eighteen rooms for twelve each, four rooms for eight each; and for second-year students eighteen rooms for twelve each, and two rooms for six each. For the third or last-year students there are eighteen rooms for twelve each: 692 "places" in all.

These students' rooms open on long corridors (10) lighted right and left by windows contrived in the upper portion of the party-walls, and which give access both to the lecture-rooms and the examination-rooms. These last are of monastic simplicity,—convent cells, having no furniture but a table, a chair, and a large black board.

In traversing the first-floor galleries one is shown a precious souvenir piously preserved in a glass case; this consists of the laboratory apparatus which was used by the illustrious J. B. Dumas in the numerous experiments which have made his name famous. Near this is the Salle des Fêtes, which occupies the pavilion at the angle of the Rue Conté (5), and has the defect of being a little dark and sombre. It is tapestried with red hangings, powdered with gold bees. The ceiling is divided into compartments by iron beams covered with decorative terra cotta. A massive stone chimney-piece carved with acanthus leaves, foliage, and lions' heads, again reproduces in its upper portion the emblematic bee. This room communicates with the council-room (4), which is finished with oak woodwork and dark-green hangings. All this part of the building is lighted by electric light on the Edison system.

Immediately above the Gallery of Administration, on the second floor, is the "Salle de Portefeuille," where are kept in large cabinets the collections of drawings and other works at the end of each year of promotion. Further along is the library, containing above 6,000 volumes, mostly old books. This is a very restricted scientific collection, and one which there unfortunately seem at present to be no available funds for augmenting; for the State shows a lamentable parsimony, in this respect, in regard to an institution so valuable to French industry, and for which is recruited the personnel directing the great public works of the country. The library and scientific collections subsist



only on private donations, which are not numerous, and they are accordingly by no means up to the needs of the present day, and have the antiquated air of a provincial museum. The Ministry have, since the opening of the school, given a donation of two or three hundred thousand francs, but this does not go far to keep up to the proper mark the laboratories, the scientific collection and library. There should be an annual subvention forming part of the budget. One of the professors, to whom we expressed our surprise at such a penury of scientific resources, spoke, indeed, hopefully of the future, and was convinced that the great exhibition of 1889 would be a *new point de départ*, and that numerous collections then exhibited would be offered spontaneously to the school by exhibitors, many of whom will have been among its old pupils.

Above the third story, entirely occupied by the third-year students, is a roof-stage where is a laboratory, a description of which may apply to the laboratories generally. This is an immense room, lighted by fourteen windows and sub-divided crossways by tables with hard enamelled tops, where 112 students can work at a time, each with table space of 4 square feet, and each with a separate ventilator and his own box of chemicals, &c. Twenty-one brick muffs are placed at equal distances.

In the midst of the court enclosed by these buildings, among the at present very meagre plantation of trees, is the old fountain of the Carré St. Martin, constructed in 1806, the bronze vase of which is supported by four allegorical figures executed by Gols, a sculptor who had, under the Second Empire, his hour of celebrity.

All round the ground-floor is a spacious gallery in the form of a cloister, with the circular arches ornamented with rustication. Beneath the cloister, which has a vaulted roof, covered with terra-cotta panels, is the large refectory for the students, the laboratory of industrial physics, the collection of mineralogy, &c. The warming apparatus (on Genest & Herscher's system) is installed in the sub-basement in a long gallery extending beneath the cloister, and served by a small Decauville railway to transport fuel and material required for the laboratories.

The Ecole Centrale actually contains at present 667 pupils (*élèves externes*), admitted by competitive examination, paying each 1,000 francs a year, some of whom, however, are educated at the expense of the State, the Departments, or the City of Paris. At the end of the three years' course they receive, according to the marks they have obtained and to their general merit, the *brûlet* of "Ingénieur Civil des Arts et Manufactures," or a simple certificate of having passed through the course of study.

We may add, to complete this notice, that the cost of the construction of the new school has been, 4,700,000 francs for the building, 1,200,000 francs for furnishing, and 1,800,000 francs for the site,—a total of 7,700,000 francs, which is not large, considering the importance of the work, the rapidity of its execution, and the great care bestowed on it. The building is a very interesting example of a scholastic edifice, the disposition and arrangement of which give ample means of providing for the demands of a complex scientific instruction, with a general appearance exactly expressing the destination of the building. Iron, which enters so much into modern construction, has been well combined with stone and brick, to produce a certain decorative effect of a grandiose and severe description. The whole does great credit to M. Denfer, the accomplished architect under whom it has been constructed.

#### THE YORKSHIRE COLLEGE, LEEDS.

THE new buildings of the Yorkshire College, Leeds, which has been founded for the advancement of technical education, were opened by the Prince of Wales on the 15th instant. The progress of the buildings may be thus concisely stated:—In 1880, the Dyeing and Weaving Department was erected by the Clothworkers Company, at a cost of 9,939. At the present time these buildings are being extended at the expense of the same Company, the contracts for these additions amounting to 8,110. The further buildings which were inaugurated by the Prince of Wales are those erected as a memorial to Sir Edward Baines. The accounts

for this block amount to 31,000, the following firms having carried out the different trades:—Messrs. J. Wood & Sons, bricklayers and masons; Messrs. Longley Bros., carpenters and joiners; Messrs. Franks & Evans, plasterers; Mr. Jas. Season, slater; Mr. J. Lindley, plumber and glazier. The Engineering Department, now in course of erection, is estimated to cost about 5,000, thus bringing the cost of the buildings so far (exclusive of fittings, &c.) up to 53,793. The buildings have been erected from the designs and under the superintendence of Mr. Alfred Waterhouse, R.A., Messrs. John Wood & Son, of Leeds, being the contractors for the principal portions of the work. The scheme has not yet been fully carried out, but at present the scattered blocks will one day be united, so as to form a complete quadrangle. The materials used are red brick with stone dressings. A notable feature of the buildings already erected is the "Edward Baines Memorial Wing," at the south-east corner, which has a lofty tower with corbelled angle-turrets. The Clavering-road wing lies at the back, and is connected with the Baines wing by a rectangular block, so that they form together an irregular three-sided figure. Projecting west into the central space, and looking upon College-road, is the Engineering Department. Further west stands a T-shaped block,—the new dyeing sheds. At right angles to the southern elevation is the Textile Department, which, with the dyeing and weaving sheds, yet more west, has been occupied since the close of 1880, when the opening ceremony was performed by the late President, Lord P. Cavendish.

The parts of the at present gaping quadrangle towards De Grey-road, will ultimately be connected by a building intended to serve as a Museum. The door beneath the tower before mentioned leads directly to the chemical theatre. The corridor to the left gives access to a suite of three rooms for the Registrar, the Council, and the Principal. Branching from the centre of this is another corridor which forms the main passage from College-road to the Clavering-road wing. On the left of it are special laboratories for chemistry, and on the right store and dining-rooms. The northern extremity joins two slightly bent sections of another corridor which runs east and west through the Clavering-road wing. Along the south side of this lofty and well-lighted corridor is a series of polished Bavarian granite columns, which, when the museum is built, will be transformed into an open arcade. On the north side are rooms lighted from Clavering-road,—cloak, common, history, and physical lecture-rooms. A staircase in the north-west corner connects this corridor with the other corridors in this wing. The first-floor corridor is similar in structure to that below, and runs on the same lines. On its left are gas analysis, re-adjustment and balance rooms, arts and coal-mining lecture-rooms, optical, physical, diagram, and class rooms. Along the right are stone arches similar in arrangement to those on the ground floor, but standing upon a ledge a foot or two high. West of this arcade stands the principal chemical laboratory,—broad, spacious, and light. Crossing this room we come to another corridor parallel with College-road, and immediately above that which gives admission to the registrar's, the council, and the principal's rooms. From the main entrance it is reached by a flight of stone steps. On the side facing the chemical laboratory, and lighted from College-road, are the Chemical Professor's room, the librarian's room, and the library, the two latter being thrown into one. At the east end of this corridor is a diagram-room over the chemical theatre. Upon the second floor is the biological class and lecture room, flanked by a broad passage, in which are placed cases of specimens. A turning to the left on mounting the steps leads into the chemical lecture-room for medical students. By a separate and narrow staircase we reach a portion of the roof which has been made flat, and floored with concrete. This is for outdoor experiments in biology. On the second floor of the Clavering-road wing are a lecture-room for engineering and arts, an engineering drawing-room, and other apartments. The basement is appropriated as workshops, &c.

It is intended (says the *Leeds Mercury*) that the Yorkshire College shall be placed at least on a level with other colleges in the country in the matter of appliances for teaching engineering science in all its branches. With a view to the realisation of this object was begun the

building which projects west from the Memorial Wing, and which is now near completion. It consists of a basement and three stories, having a length of 60 ft. and a greatest breadth of 43 ft. The principal machine-room is on the ground-floor. The chief piece of apparatus will be a testing-machine, arranged for making tensile, compressive, bending, and other tests. There will also be an assortment of tools, such as lathes, planing, slotting, shaping, and drill machines. A small office, separate from the machine-room, is so arranged that experiments in the machine-room may be viewed. The rooms occupy the first-floor. The largest will be a laboratory for light work; the two remaining will be used as a lecture-room to accommodate fifty-six students, and as a private room for Professor Barr. The laboratory is 60 ft. long by 21 ft. wide. Joiners' benches, a mechanical lathe for wood turning, and other appliances, will be put into this room, so that students, while constructing models and standards for experimental illustration and investigation, may have practice in the use of tools. Appliances are to be had for experiments working of limes and cements. A machine will also be supplied for testing the strength of briquettes of these substances, in order to ascertain their values for building purposes, and the effects which different modes of treatment have upon their properties. The lecture-room will be furnished with drawing-board desks. The second-floor is taken up chiefly by the drawing class room, well lighted and warmed from the north.

The textile, weaving, and dyeing departments are at the west end of the building, and have been in use since their opening by Lord Frederick Cavendish. The building devoted to textile industries forms the south-west boundary of the central court. Two shelves branching westward at right angles are for weaving. Between them has recently been built a third shed for weaving. The liberality of the Clothworkers' Company has provided a new dyeing department, the walls of which rise on the northern border of the court. It is a T-shaped building. The frontage towards College-road is in red brick with ashlar dressings and mullioned stone windows. On the ground floor are lecture, preparation, and dyeing rooms. Along the west wall lie the students' room and the library, close to the colour-mixing room. The yarn dye-room is large, and leads into two small apartments, for weighing and storing dyes and drugs. On the floors above, reached by the staircase from the main entrance, are store and private rooms, with a balance-room and a lavatory over the archway. The experimental dyehouse rises two stories high.

The friends of the College have already contributed 140,000, towards bringing it into its present position, but the Council at the annual meeting on the 26th of June asked for 60,000 more, in order, as the Marquis of Ripon, President, said on that occasion, that the last amount already given might be really fruitful and entitle the College to be admitted to closer connexion with the Victoria University at Manchester.

#### THE VICTORIA HOTEL, MANCHESTER.

THIS building is the latest addition to the hotel accommodation of Manchester. About eleven years ago a company was formed to buy from the Manchester Corporation the land bounded by Victoria-street, Deansgate, and St. Mary's Gate, and Mr. William Dawes was appointed architect of the proposed building. The company, however, became involved in financial difficulties the buildings were unfinished, and the property reverted to the Corporation, who, after much consideration, constructed Mr. Dawes to proceed with and complete the building. The site, which is triangular in shape, presented some difficulties in the way of planning, but these seem to have been well met by the architect. The Grill-room in the basement, and the Dining-hall, on the ground-floor, are placed in the centre of the building, surrounded on all sides, except the Deansgate face with the offices of servants' staircase, and on the Victoria-street side with the two smoke-rooms, the bar, managers' offices, &c., the main corridor dividing them. These two rooms are the largest and most important rooms in the hotel being about 72 ft. long by 42 ft. wide. Dining-room is placed in the centre of a la-



ce, and top-lighted through ornamental glass. In the first floor are a number of private sitting-rooms, arbitration-rooms, &c., whilst on this floor on the Deansgate side are placed the commercial-room, Stock-room, Sale-rooms, &c. The general contractors for the completion of the building were Messrs. E. Neill & Sons, of Rangeways. The decorations were completed by, and finally let to three well-known local firms, Messrs. Sutherland & Son, Heighway & Son, and Lomas & Sons. The decorations of the Grill-room are by Messrs. Sutherland, the lining decorations being painted on glass by a method which that firm has introduced. The floured ornament is painted direct on to the inner surface of the glass, and protected when necessary by a coating of lead paint. Into the walls of the room panels of Burnmantofts faience are inserted, and Burnmantofts tiles and modelled figures are largely used. A description of this room would be incomplete without mention of the two mantels and over-mantels, made in American walnut, from designs supplied by the architect. These are the work of Messrs. W. Wilson & Co., of Manchester, in conjunction with Messrs. E. P. Milne & Son, of Manchester, who have also supplied the chimney-pieces in the two Smoke-rooms, and a large number of walnut chimney-pieces in various parts of the building, including the two in the large drawing-room. Messrs. Elliott, Edmondson, Olney, of Deansgate, supplied the gas brackets to be seen at the sides of the room, and the sunlight. The Smoke-room, in the basement, calls for no special comment: it is simply a treatment of tiles and woodwork. The chimney-piece and over-mantel, after designs from Mr. Dawes, forms the most striking feature in this room. The wall-tiling has been done by Messrs. Elliott & Co., and the painted decorations fall into the contract of Messrs. Sutherland & Son.

The public entrance to the Grill-room, from Victoria-street, has been carried out in Minton's tiles by Messrs. Elliott, the ceiling and glass lining decorations having been done by the same process as the ceiling of the Grill-room. The tiles on the main staircase and on the ground floor are all Burnmantofts faience, the work of Messrs. Wilcock. Higher up the staircase, Lincrusta-Walton and Tynemouth tapestry executed the tile work.

Passing along the corridor one enters the dining-hall. The decorations of this room have been in the hands of Messrs. Lomas & Son, of Rangeways. The Dining-room is lighted from a glass roof, painted with plants representing various fruit trees springing from a growth of ground foliage, and executed by Messrs. Sutherland & Son. The decorations of the room consist of a marble surbase made up of a grotto, grand antique, and rouge roiles, surmounted with a dado of rich bluish tiles, and finished off with a double lining of walnut-wood enclosing a band of a brownish hue. The room is divided by pedestals and pilasters into seven bays. The panels are made up entirely of marble, the panels being jasper with rouge grotto tiles mouldings. Springing from the pedestals, resting on a plinth of Blen St. Remy, are pilasters, which are also marble, the panels in this case being St. Sylvester and the stiles of the case. These are finished off with heavily carved caps, gilt solid. The spaces between the pilasters are filled in with mirrors, with tile panels, like those in the Grill-room. The height of this room is comparatively low, this being a necessity of the situation, and the ceiling therefore occupies an abnormal proportion of space. The ceiling is covered in the first place, and springs out from the wall towards the centre of the room for about 6 ft. each side. Springing upwards, the line of the pilasters are filled of broad ribs, which divide the ceiling into spaces corresponding with the wall panels. These ribs are filled in between the lining with paintings on canvas mounted on, portraying various kinds of bird life and forms.

The floors of the Grill-room and the Dining-room are of mosaic work, executed by Messrs. Lomas & Son. The more decorative portion of the floor-glass work has been executed by Messrs. Lomas & Co., whilst the remaining leaded glass has been entrusted to Mr. J. Jones. The work of the modelled ceilings and fibrous work throughout the hotel have been executed by Mr. James Hammond, from full-drawings supplied by the architect, and the rooms and sitting-rooms have been deco-

rated by Messrs. Lomas & Co. and Messrs. Fergusson & Co.

The stone employed externally has been obtained from three quarries,—that in the basement from Mount Tabor, and that in the general facing of the superstructure from the Ackworth and Spinkwell quarries. The main stairs, from the ground-floor upwards, are constructed with Hopton Wood stone polished, and the two principal stairs down to the basement are constructed of red polished granite. The carvings round the exterior of the whole block are worth notice. Those on the old portion were executed by Messrs. Williams & Milson, and those on the new by Mr. Bonehill. For the most part they illustrate *Æsop's Fables*.

Considerable pains appear to have been taken to secure the efficient ventilation of the various parts of the building. The kitchens and offices attached have been fitted up by Messrs. Benham & Co., of Wigmore-street, London. Messrs. Alston & Elliott, of Deansgate, supplied the grates and chimney-pieces in the basement. The whole of the hotel has been fitted throughout with a perfect system of electric bells and speaking-tubes, by Mr. J. R. Wilson, electrician, Oxford-street, Manchester. The laundry machinery has been supplied and erected by Messrs. Thomas Bradford & Co., of Manchester.

In the entire block known as Victoria-buildings, and including the hotel, there are twenty-eight shops, eighty-eight offices, and forty-eight cellars; 231 rooms in the old portion of the building are devoted to hotel purposes, and fourteen cellars are used for the same purpose. This is exclusive of the billiard-room, which will, when complete, hold sixteen tables, and be the largest of its kind in the district. There are 1,559 windows in the whole building, 408 of which are for offices or shops, the remaining 1,051 belonging to the hotel. The height from the street pavement to the top of the flag-staff on the pavilion is 133 ft. There are 151 bedrooms, thirty-four sitting-rooms, fourteen stock and show-rooms, besides the principal entertaining-rooms already described. The frontages have an aggregate length of 940 ft., divided as follows:—Victoria-street, 375 ft.; Deansgate, 360 ft.; and St. Mary's Gate, 205 ft. The entire superficial area covered by the various floors is near upon 280,412 ft., or above 6½ acres.

#### THE NATIONAL AGRICULTURAL HALL, KENSINGTON.

On Tuesday afternoon the foundation-stone of this important building was laid. The site adjoins Addison-road Station, so that the building will be in direct communication with most of the leading lines of railway.

To give some idea of the proportions of the hall, we may briefly state that it is about one-half greater in size than the Agricultural Hall at Islington. The following are some of the leading dimensions of the building:—Total area, 250 ft. by 440 ft. = 110,000 ft.; span of main roof, 170 ft.; clear height, 99 ft. 8 in.; distance of main ribs apart, 34 ft.; depth of main ribs, 7 ft.; thickness of main ribs, 2 ft.; length of main roof, 11 ft. by 34 ft. = 374 ft.; side galleries, width, 40 ft.; end galleries, width, 26 ft. and 40 ft.; height of gallery-floor, 20 ft. 1½ in.; height of junction between main and side roofs, 45 ft. 6 in.; height of springing of main rib, 15 ft. 8 in. The main ribs are supported on double-pivoted columns, with the view of avoiding all except vertical and central strains. The horizontal and bending strains from the ribs are resisted by wrought-iron frames of an effective depth of from 10 ft. to 13 ft., the half of each being underground, the other half occupying the back part of the aisles. The iron structure is thus complete in itself, without the brick walls, and, as we are informed, calculated to bear a wind-pressure of 56 lb. per foot super. besides the load, with ample safety. The outline of the main ribs is a simple semicircle, and is very strongly marked by the great bulk of the ribs, 7 ft. by 2 ft., but this outline is developed into much detail, the thickness of the iron used in the roof being only ½ in. The material consists of rolled angle irons and flat bars, plates of suitable shape being used only at some of the connexions. The wrought iron-work for the support of the galleries consists of angle irons and flat bars of somewhat greater thickness. Every part has the distinct function of supporting weight and pressure, and its form is that most suitable for this function. Some

girders are straight, most are fish-bellied or arched; the latter are invariably continuous girders. No conspicuous ornamentation is employed in the ironwork, in which entire reliance for architectural effect is placed in the organic grouping of the elementary bars, according to the strict rules of utility. Two screens of plate glass, framed in wrought-iron lattice-work, terminate the main roof, which is also glazed on iron framework.

The elevation is of an Italian character, with a façade of brick and stone. The principal entrance is under a boldly designed archway between two projecting wings, surmounted by an allegorical figure of colossal dimensions; the remainder of the front is occupied by an arcade terminating in projections ornamented by Corinthian pilasters in Portland stone. In the interior there is ample space for all kinds of exhibitions, military tournaments, the display of agricultural stock, meetings of all kinds, &c. The gallery which runs round the hall will offer advantages for the exhibition of pictures and works of art. The Minor Hall, which will form an annexe to the Grand Hall, can be used separately for smaller exhibitions and entertainments, or for concerts and lectures, and will be fitted up for refreshment and public and private dining-rooms.

The roof has been designed under the immediate direction of the architect, by Messrs. Walmesley & Am-Ende, engineers, of 7, Westminster-chambers.

The architect, as we have said before, is Mr. Henry Edward Cox, of 4, Furnival's Inn, who with his late partner designed the Agricultural Hall at Islington. The contractors for the entire buildings are Messrs. Lucas & Son, of Kensington, the amount of the contract being 131,573*l*.

#### ARTISANS' DWELLINGS, SEWARD-STREET, ST. LUKE'S, E.C.

In the report of the Royal Commission appointed to inquire into the question of housing the poor, special reference is made to the overcrowded and unsanitary condition of St. Luke's. Before, however, the Commission was instituted, the City and Central Dwellings Company was being formed, with the intention, implied by the name, to acquire property in the City districts, and the unenviable notoriety of this parish marked it as a most promising field for building operations. Whatever may be said as to the advantages of fresh air, and the facilities afforded by workmen's trains to enable them to reach a purer atmosphere, the majority of workers have a decided preference for remaining in a central position from which they can more readily reach their work, and this view is exclusively held by the piece-workers and those who work at home for different employers, and who are obliged to call for or deliver their work at irregular periods.

The buildings under notice are already in progress on a site facing Seward-street and Central-street, near the Goswell-road, the site containing about 40,800 ft. super., the corner stone, some 6 ft. or 7 ft. above the ground, having been laid by the Lord Mayor, in the presence of several members of Parliament and two members of the Royal Commission. The accommodation provided will include one-room, two-room, and three-room tenements, at rents which may fairly insure their immediate occupation; for instance, the three-room tenements are placed as low as 7*s*. 6*d*. per week, which is under the average of similar rooms in the neighbourhood or elsewhere. Owing to the nature of the soil it has been found necessary to carry the foundations to depths varying from 16 ft. to 20 ft., and notwithstanding this, it has been considered advisable to do without basement rooms, as these never find favor with the better class of tenants; furthermore, as a financial matter, a basement is scarcely a remunerative floor, although, perhaps, this is not generally recognised. Another point of interest is the treatment of the staircase, the steps of which, when made of the universal breeze concrete, become in time of a highly dangerous nature, owing to their slippery state when worn. To obviate this, Doulton's silicon nosings to the treads are adopted, giving a good foothold, and, judging by experience, wearing better than any natural or artificial stone. The floors are of iron and concrete, boarded over, with the exception of the scullery, which has a finished face to the concrete. Each tenement







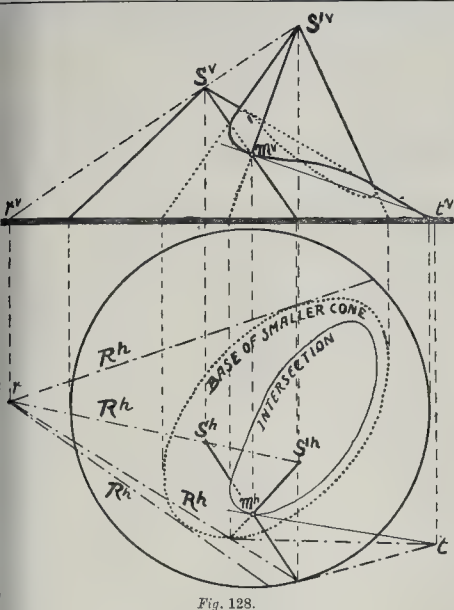


Fig. 128.

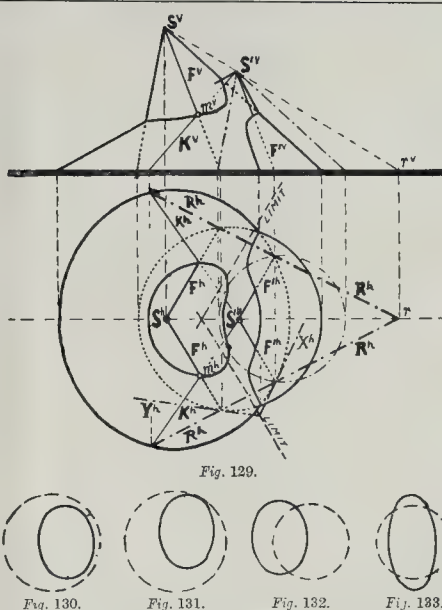


Fig. 129.



Fig. 130.



Fig. 131.

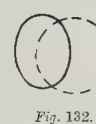


Fig. 132.



Fig. 133.

## The Student's Column.

### DESCRIPTIVE GEOMETRY.—PART II.

IX.

Find the intersection of two cones.

Let the planes  $R$  cutting both cones and passing through their tops  $S$  and  $S'$  will cut the cones along their generators. Therefore, if we prolong the  $S'S$  until it reaches in the point  $r$  the of the bases of the two cones, all the  $R$  whose traces  $R^h$  pass through the  $r$  will contain generators of both cones; we can find the intersections of these generators of the cones as we did before for the sections of the cylinders. In the fig. 128 we have shown the construction for finding at  $m$  of the intersection and the tangent (See fig. 128.)

The intersections will form closed curves as 128, except in the case where some of the generators of each cone are parallel, for then the intersections will form disconnected curves branches infinitely extended and having to the position of their tangents similar to those of the hyperbola; although they are plane curves, but have a double curvature, a curve was drawn on a sheet of paper when the paper was rolled up afterwards. In 129, where the elevation plane has been drawn parallel to the plane which divides the figure, shows on the elevation lines of curvature of the cylinders of the developed curves would have to be upon to get their real shapes in space. The properties and characteristics of these section curves, they form the subject of *Analytical Geometry*, where objects in are represented by algebraical equations; shall, therefore, limit ourselves to the observation that, thanks to the particular symmetrical arrangement of fig. 129, the elevations of intersection curves are hyperbola.

recognise whether there are any infinite branches in the intersections of two cones, we draw one of the cones parallel to itself until its apex  $S'$  corresponds with the apex  $S$  of the other cone, and then draw its new base, which, in fig. 129, we have indicated with a thin broken line. Wherever this new base cuts the base of the first cone of apex  $S'$  both cones have the same generators  $F$  in common; therefore, when the first cone is shifted back to its original position the generators  $F$  and  $F'$  will be parallel, we may conclude that one of the intersections of the cones has infinite branches. In the other hand, the generator  $F$  does not intersect a generator  $K$  of the other cone in the plane, belonging to a second intersection of

the two surfaces. Fig. 129 shows us, therefore, that the intersection of two cones may give two distinct curves, the one infinitely extended the other closed.

Figures 130, 131, 132, 133 show different cases resulting from the above operation. With fig. 130 we conclude there are no infinite branches. With fig. 131 there is one intersection with infinite branches but without limits to the positions of their tangents, the curve resembling therein the parabola. With fig. 132 there is one intersection with infinite branches and with limits to its tangents as for the hyperbola. With fig. 133 we should get four intersections with infinite branches and with limits to the positions of their tangents.

In fig. 129 we have shown the way of finding the limits to the positions of the tangents to the intersections with infinite branches; the limits are again the intersections of the planes  $X$  and  $Y$  tangent to each cone along the generators  $F$  and  $F'$  that are parallel. The limits are also parallel to those generators. (See figs. 129, 130, 131, 132, 133.)

Find the intersections of a cylinder and a cone.

If from the top of the cone we draw a line,  $D$ , parallel to the generators of the cylinder, as shown in perspective sketch, fig. 134, all planes

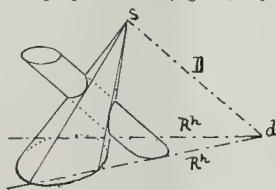


Fig. 134.

$R$  which cut both the cone and the cylinder along their generators must contain this line  $D$ ; therefore the traces  $R^h$  will pass through the point  $d$  foot of the line  $D$ . With this slight alteration, the intersections are found by the same method as the intersections of two cylinders or two cones. (See fig. 134.)

**St. Alban's Abbey.**—In the account of the visit of the Architectural Association last week, the impression was unintentionally conveyed that Mr. Harry Hems was executing a new reredos at the Abbey. Mr. Hems is engaged in "restoring" the well-known ancient reredos or high altar screen, in which, however, there is, we believe, a good deal of entirely new carved work.

## Miscellaneous.

**The Royal Archaeological Institute of Great Britain and Ireland** will hold its annual meeting at Derby, commencing on Tuesday next, July 28th, and extending to Wednesday, August 5th, inclusive. The President of the Meeting is the Earl of Carnarvon, P.C., D.C.L. The President of the Antiquarian Section is the Rev. J. C. Cox, LL.D. The Historical Section will have for its President the Dean of Lichfield. The Architectural Section will be presided over by the Right Hon. A. J. Beresford Hope, M.P., F.S.A. During the week visits will be paid to Kedleston Hall and Church, Norbury, Ashburne, Chesterfield, Bakewell, Haddon Hall, Arbor Low, Youlgreave, Swley, Dale Abbey, Morley, Breadsall, Repton, Bresson Priory and Earthworks, Melbourne Church, Chapel-en-le-Frith, Castleton, Peak Castle, Tideswell, Hassop, Carls Wark, Hathersage, North Lees, &c. The excursions will be under the direction of Mr. W. H. St. John Hope, F.S.A., and Mr. Hellier Gosselin. The Temporary Museum of the Institute will be formed under the direction of Mr. Henry Alpass, F.R.S.L., and Mr. W. T. Ready, in the Free Library, where the sectional meetings will also be held.

**Institution of Mechanical Engineers.**—At the summer meeting, to be held at Lincoln on Tuesday, August 4th, and the following days of that week, the following papers have been offered for reading and discussion, after the address of the President, Mr. Jeremiah Head:—"Description of Dunbar and Ruston's Steam Navy," by Mr. Joseph Ruston, M.P., of Lincoln; "On recent Adaptations of the Robey Semi-Portable Engine," by Mr. John Richardson, of Lincoln; "Description of the Tripper Spherical Eccentric," by M. Louis Poillon, of Paris; "On Private Installations of Electric Lighting," by Mr. Ralph H. C. Nevile, of Wellington; "On the Iron Industry of Frodingham," by Mr. George Dove, of Frodingham; "Description of an Autographic Test-recording Apparatus," by Mr. J. Hartley Wickstead, of Leeds.

**National Art Competition.**—The annual exhibition of the works submitted for this competition by the schools of art throughout the kingdom is now open in the central block of the buildings on the south of the Royal Horticultural Gardens (science collections), Exhibition-road entrance, want of space preventing the exhibition of the works in the principal buildings of the South Kensington Museum. We shall have something to say about the Exhibition in our next.

**Improved Dwellings for the Industrial Classes.**—Mr. Charles Gatliff, of 8, Finsbury-circus, E.C., has compiled an interesting return, giving an approximate list of improved dwellings which are in course of erection, or have been provided within the metropolitan area since the 15th of September, 1841, when the Metropolitan Association for improving the dwellings of the industrial classes was formed. Compiled from many sources, it gives the names of private individuals, chartered associations and societies, limited companies, municipalities, and of other bodies and persons who have been engaged in this enterprise, and, in the words of a footnote, gives "some idea of the contents and cost of the many huge blocks of improved dwellings which now present themselves to the eye of a careful observer in so many parts of the metropolis." It appears that in the course of the forty-four years embraced in the return, private individuals provided 57 sites for dwellings, accommodating 2,566 families, representing a population of 11,582, and a cost or value of 311,767l. 4s. 6d.; chartered associations and limited companies 132 sites, with dwellings for 19,143 families, and 94,497 population, and a cost or value of 4,703,726l. 14s. 10d.; municipalities, corporations, parochial charities, &c., 11 sites, 758 families, 4,506 population, the cost being 373,048l. 3s. 8d.; and builders and contractors 53 sites, 7,776 families, or a population of 36,224, and involving a cost or value of 1,192,700l. The totals these figures represent are as follow:—Sites, 253; number of families, 29,643; population, 146,809; and cost or value, 6,581,242l. 3s.—*Times*.

**The Four per Cent. Industrial Dwellings Company, Limited.**—A very interesting enterprise is about to be tried by a number of financier-philanthropists who have banded themselves together under this title. The object of the company is to provide the industrial classes with more commodious and healthy lodgings and dwellings than those which they now inhabit, giving them the maximum of accommodation at a minimum rent, compatible with the yielding of a net 4 per cent. per annum dividend upon the investment of the paid-up capital of the company, which is to be 40,000l. in 25l. shares. The seven subscribers required by the Companies Acts to the Memorandum of Association are Lord Rothschild, and Messrs. Samuel Montagu, F. D. Mocatta, E. L. Raphael, H. Sylvester Samuel, Henry Solomon, and Charles Samuel. The number of directors is not to be less than six nor more than twelve, and their qualification is to be shares of the nominal value of 500l. The first directors are the subscribers to the company and Messrs. Maurice Beddington and Leon Lewishohn. The services of all the directors are understood to be purely honorary.—*Sanitary Record*.

**The Guildhall School of Music.**—The foundation-stone of the Guildhall School of Music, on the Victoria Embankment, Whitefriars, close to the City of London School, was laid on Tuesday afternoon by Mr. Pearce Morrison, chairman of the Music Committee of the Court of Common Council. The Corporation of London established the school in September, 1880. The site comprises an area of 8,000 square feet, is close to Tudor-street, and has three frontages to recently-formed roads. The building is to consist of four floors, and will contain forty-two class-rooms in all. The building on three of its sides is to front on to the streets. The ground story is to be of rusticated pilasters of Portland stone, the first floor of the Doric, and the second of the Ionic order. The building, which is to be erected from designs and under the superintendence of Mr. Horace Jones, the City Architect, is estimated to cost 20,000l.

**New Quays, Antwerp.**—It has been arranged that the King and Queen of the Belgians, accompanied by the Crown Prince and Princess of Austria, will visit Antwerp on Sunday, the 28th of July, to be present at the opening of the new quays, which have been several years under construction at a cost of upwards of four millions sterling. After the opening ceremony an historical procession of nations is announced to take place on the Scheldt with illuminations. The Great Eastern Railway Company will run their new steel paddle steamer *Adelaide* from Harwich (Parkstone Quay) to Antwerp in connexion with a special express train leaving Liverpool-street Station at nine a.m. on Saturday next to accommodate travellers intending to be present at these fêtes.

### Supply of Water to Dwelling Houses.

At a meeting of the Clerkenwell Vestry on July 9th, the owner of a house in that district appeared to protest against the prosecution of the Vestry, who were proceeding against him for not having complied with their order to provide a water-supply for a house occupied by twenty persons. The water-supply had been cut off by the water company on account of the absence of proper fittings, and the owner objected to incur the expenditure necessary to provide those which would meet the requirement of the company. The medical officer of health stated that the Vestry could not compel landlords to put on water, but could proceed against them for a nuisance if such arose from the absence of water. This is no doubt correct in the particular case, but the Vestry need not always wait for a nuisance to occur before taking action. The Vestry can require a water-supply under the 27th section of 15 and 16 Vict., cap. 84, provided it can be supplied at a rate not exceeding 3d. per week, and may, if their notice be not complied with, do the necessary work and recover the expenses from the owner. Again, the absence of proper fittings itself constitutes a nuisance within the meaning of the Nuisance Removal Act when these are required for the purpose of a constant water-supply (34 and 35 Vict., cap. 113, section 33). Under other circumstances, the nuisance must occur first before the Vestry can proceed to procure the very necessary supply of water for a dwelling-house; and thus the prevention of a condition which is injurious to health is not within the power of the sanitary authority, but merely the abatement of a nuisance.—*Lancet*.

**The Working Lads' Institute.**—The Princess of Wales has promised to visit and open the new Working Lads' Institute, White-chapel-road, London, on Saturday, October 31. The memorial stones of the building were placed last October by the Lord Mayor, M.P. The Queen is patron of the Institute, which we understand is the first ever built for this special purpose, and provides reading, recreation, refreshment and class rooms, workshops, school of art, gymnasium, and dormitories, &c., with accommodation for one thousand working lads. The total cost, including freehold land, fittings, furniture, &c., is 12,000l., of which 6,000l. has still to be raised. Contributions may be sent to the treasurer, F. A. Bevan, esq., 54, Lombard-street, E.C., or the hon. sec., Henry Hill, esq., 35, Bow-lane, E.C.

**Edinburgh Architectural Association.**—We have received the list of prizes offered by or through this Association during Session 1885-86. From it we learn that the Sketch-Book Committee have decided to offer prizes with the object of encouraging contributions to the Sketch-book. To further encourage the study of old examples, and with the view of paying for an organised annual sketching tour of eight or ten days' duration by members of the Association, the President offers a volume of his own sketches and measured drawings now being published, for the best set of studies, made during the current year, of any building or parts of buildings of a date prior to the eighteenth century. The Senior Vice-President offers a prize of 2l. 2s. for the best design for title-page to volume iv. of the Sketch-book.

**Okehampton.**—Miss Luxmore, of the Park, Okehampton, Devon, last week invited a party of about twenty antiquaries to visit the many remains of antiquity with which the park abounds, including ancient crosses, Danish and Roman encampments, ancient British village, Druid circles, the castle, and other points of interest. The party included Mr. W. H. R. Wright, Plymouth; Messrs. F. & J. S. Amory, Ashburton; Roscoe Gibbs, Torquay; Octavius Ralling, Exeter; W. Crossing, South Brent; J. E. Monk, Plymouth; Henry Leduc, Exeter; Schoultess Young, Inner Temple; Sampson Seaton, Plymouth; Revs. W. S. Lach-Szysrma, rector of Newlyn, Penzance; and J. Erskine Risk, M.A., of Plymouth. The excursion occupied three days.

### PRICES CURRENT OF MATERIALS.

| TIMBER.          |          |         |         |
|------------------|----------|---------|---------|
| Greenheart, B.G. | ton      | 12 10 0 | 7 10 0  |
| Teak, E.I.       | load     | 6 10 0  | 15 10 0 |
| Senegal, U.S.    | ft. cube | 0 2 8 0 | 2 8 0   |
| Ash, Canada      | load     | 3 0 0   | 5 0 0   |
| Birch            | 3 0 0    | 4 10 0  |         |
| Elm              | 3 10 0   | 5 0 0   |         |
| Fr. Dantaic, &c. | 12 10 0  | 4 10 0  |         |
| Oak              | 3 0 0    | 5 0 0   |         |
| Canada           | 6 0 0    | 7 0 0   |         |
| Pine             | 3 0 0    | 4 0 0   |         |
| " red            | 3 0 0    | 4 0 0   |         |
| " yellow         | 3 15 0   | 5 5 0   |         |

### TIMBER (continued).

|                                            |             |        |        |
|--------------------------------------------|-------------|--------|--------|
| Lath, Dantaic                              | .....fathom | 5 0 0  | 6 0 0  |
| St. Petersburg                             | .....       | 5 0 0  | 7 0 0  |
| Walrus, Right                              | .....       | 3 0 0  | 10 0 0 |
| Deals, Finland, 2nd and 1st                | std. 100    | 8 0 0  | 9 0 0  |
| " 4th and 3rd                              | .....       | 6 10 0 | 7 0 0  |
| Riga                                       | .....       | 17 0 0 | 18 0 0 |
| St. Petersburg, 1st yr.                    | .....       | 17 0 0 | 18 0 0 |
| " 2nd                                      | .....       | 8 0 0  | 9 0 0  |
| " white                                    | .....       | 7 0 0  | 11 0 0 |
| Sweden                                     | .....       | 7 0 0  | 12 0 0 |
| White Sea                                  | .....       | 8 10 0 | 10 0 0 |
| Canada, Pine 1st                           | .....       | 18 0 0 | 35 0 0 |
| " 2nd                                      | .....       | 12 0 0 | 18 0 0 |
| " 3rd, &c.                                 | .....       | 7 0 0  | 13 0 0 |
| " Spruce 1st                               | .....       | 9 0 0  | 12 0 0 |
| " 3rd and 2nd                              | .....       | 6 10 0 | 8 0 0  |
| New Brunswick, &c.                         | .....       | 5 0 0  | 7 0 0  |
| Battens, all kinds                         | .....       | 4 0 0  | 13 0 0 |
| Flooring Boards, sq. 1 in.—Prepared, first | .....       | 0 9 0  | 0 0 0  |
| Second                                     | .....       | 0 7 6  | 0 0 0  |
| Other qualities                            | .....       | 0 5 0  | 0 0 0  |
| Cedar, Cuba                                | .....foot   | 0 0 33 | 0 0 0  |
| Honduras, &c.                              | .....       | 0 0 33 | 0 0 0  |
| Australian                                 | .....       | 0 0 3  | 0 0 0  |
| Malagasy, Cuba                             | .....       | 0 0 3  | 0 0 0  |
| St. Domingo cargo av.                      | .....       | 0 0 54 | 0 0 0  |
| Honduras                                   | .....       | 0 0 4  | 0 0 0  |
| Tobacco                                    | .....       | 0 0 4  | 0 0 0  |
| Honduras                                   | .....       | 0 0 4  | 0 0 0  |
| Rosa, Rio                                  | .....ton    | 17 0 0 | 17 0 0 |
| Bahia                                      | .....       | 7 0 0  | 10 0 0 |
| Satin, St. Domingo                         | .....ft.    | 0 0 8  | 0 0 0  |
| Porto Rico                                 | .....       | 0 0 8  | 0 0 0  |
| Walnut, Italian                            | .....       | 0 0 4  | 0 0 0  |

### METALS.

|                           |          |         |         |
|---------------------------|----------|---------|---------|
| Iron—Pig in Scotland      | .....ton | 2 0 0   | 0 0 0   |
| Bar, Welsh, in London     | .....    | 5 0 0   | 5 0 0   |
| " in Wales                | .....    | 4 12 6  | 4 0 0   |
| " Staffordshire, London   | .....    | 5 0 0   | 5 0 0   |
| Sheets, single, in London | .....    | 6 10 0  | 6 0 0   |
| Hoops                     | .....    | 7 0 0   | 8 0 0   |
| Nail-roads                | .....    | 4 0 0   | 7 0 0   |
| Copper                    | .....    | 47 10 0 | 48 0 0  |
| British, cke. and ingt.   | .....ton | 48 0 0  | 49 0 0  |
| Best selected             | .....    | 48 10 0 | 49 0 0  |
| Sheets, strong            | .....    | 55 10 0 | 56 0 0  |
| " India                   | .....    | 67 10 0 | 68 0 0  |
| Australian, fine cash     | .....    | 54 10 0 | 55 0 0  |
| Chili, bars               | .....    | 43 15 0 | 44 0 0  |
| YALOGAL METAL             | .....lb. | 0 0 46  | 0 0 0   |
| Lead—Pig, Spanish         | .....    | 12 10 0 | 0 0 0   |
| English, com. brands      | .....    | 12 15 0 | 0 0 0   |
| SPELTER                   | .....    | 13 15 0 | 14 0 0  |
| Silesian, special         | .....ton | 13 12 6 | 13 14 0 |
| Ordinary brands           | .....    | 13 12 6 | 13 14 0 |
| Tin—                      | .....    | 91 2 6  | 94 11 0 |
| Strait                    | .....    | 94 2 6  | 94 11 0 |
| Australian                | .....    | 94 2 6  | 94 11 0 |
| English ingots            | .....    | 96 0 0  | 0 0 0   |
| TRIPLES—                  | .....    | 14 0 0  | 15 0 0  |
| IO cke                    | .....box | 21 0 0  | 22 0 0  |
| IX ditto                  | .....    | 17 0 0  | 18 0 0  |
| IO charcoal               | .....    | 17 0 0  | 18 0 0  |
| IX ditto                  | .....    | 26 0 0  | 27 0 0  |

### OILS.

|                        |          |         |        |
|------------------------|----------|---------|--------|
| Unseed                 | .....ton | 25 10 0 | 26 0 0 |
| Cocoon, Ceylon         | .....    | 32 10 0 | 33 0 0 |
| Ceylon                 | .....    | 27 10 0 | 0 0 0  |
| Copra                  | .....    | 24 10 0 | 0 0 0  |
| 20 lb. Lard            | .....    | 20 10 0 | 0 0 0  |
| Palm-oil, Kernel       | .....    | 20 10 0 | 0 0 0  |
| Rapeseed, English pale | .....    | 25 10 0 | 26 0 0 |
| " brown                | .....    | 24 0 0  | 0 0 0  |
| Cottised, refined      | .....    | 21 10 0 | 22 0 0 |
| Tallow and Oleine      | .....    | 25 0 0  | 45 0 0 |
| Lubricating, U.S.      | .....    | 7 0 0   | 10 0 0 |
| " Refined              | .....    | 8 0 0   | 15 0 0 |

|                |           |        |        |
|----------------|-----------|--------|--------|
| TURPINE—       | .....     | 1 9 0  | 0 0 0  |
| Amber, in cks. | .....cwt. | 1 2 0  | 1 0 0  |
| TAR—Stockholm  | .....bbl. | 0 14 0 | 0 10 0 |
| Archangel      | .....     | 0 14 0 | 0 10 0 |

### TENDERS.

For construction of collecting-tank, outlet culverts, accessories, for the Corporation of Portsmouth (See Outfall, Contract No. 1). Sir Frederick Brampton, F.R.S., engineer. Quantities supplied by Mr. H. Foster.

|                                |       |         |        |
|--------------------------------|-------|---------|--------|
| F. Bevis, Portsmouth           | ..... | 259,863 | 13 0 0 |
| H. T. Sanders, Southampton     | ..... | 59,000  | 0 0 0  |
| J. W. & J. Neave, Leytonstone  | ..... | 51,780  | 0 0 0  |
| H. & W. Evans, Portsmouth      | ..... | 61,614  | 0 0 0  |
| T. P. Hall, Portsmouth         | ..... | 50,298  | 7 0 0  |
| W. Ward, Portsmouth            | ..... | 45,190  | 0 0 0  |
| J. Perks, Stockton-on-Tees     | ..... | 1,194   | 0 0 0  |
| J. McKay, Southsea             | ..... | 45,904  | 10 0 0 |
| Hull, Sons, & Co., Southampton | ..... | 45,483  | 0 0 0  |
| J. Mowlem & Co., Westminster   | ..... | 42,933  | 0 0 0  |

For alterations and additions to British Salt-bath by the Sea. Mr. John Mitchell Bottomley, architect, Middlebrough-on-Tees.

|                                  |       |         |        |
|----------------------------------|-------|---------|--------|
| J. Dwyer, South Bank             | ..... | 421,241 | 0 0 0  |
| H. W. Bulmer, South Bank         | ..... | 1,240   | 0 0 0  |
| T. D. Ridley, Middlebrough       | ..... | 1,225   | 0 0 0  |
| J. Johnson, Middlebrough         | ..... | 1,209   | 0 0 0  |
| F. D. Dwyer, Saltburn-by-the-Sea | ..... | 1,194   | 0 0 0  |
| J. G. Robson, West Hartlepool    | ..... | 1,181   | 11 0 0 |
| J. N. & W. Sturdy, Middlebrough  | ..... | 1,180   | 0 0 0  |
| T. H. Dwyer, Saltburn-by-the-Sea | ..... | 1,135   | 0 0 0  |
| Wm. H. Smith, Saltburn           | ..... | 1,081   | 15 0 0 |

For the construction of waterworks, Sutton-in-Ash (Notts.), for the Local Board of Health. Contract exclusive of ironwork. Mr. George Hodson, C.E., Leamington, and Mr. Herbert Walker, O.E., Nottingham joint engineers.

|                                     |       |        |       |
|-------------------------------------|-------|--------|-------|
| Frank Dwyer, Barry, Lancashire      | ..... | 49,547 | 0 0 0 |
| T. & J. W. Fisher, Mansfield        | ..... | 9,478  | 0 0 0 |
| Thomas Sinar, Nottingham            | ..... | 9,250  | 0 0 0 |
| J. Picketall & Sons, Merthyr Tydfil | ..... | 9,068  | 3 0 0 |
| J. Greenwood, Mansfield             | ..... | 8,530  | 0 0 0 |
| H. Vickers, Nottingham              | ..... | 7,860  | 0 0 0 |
| Foster & Barry, Nottingham          | ..... | 7,700  | 0 0 0 |

\* Accepted.



## COMPETITIONS, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Explanations of Advertisements in this Number.

## COMPETITIONS.

| Nature of Work.             | By whom required.     | Premium.                   | Designs to be delivered. | Page. |
|-----------------------------|-----------------------|----------------------------|--------------------------|-------|
| For Vestry Hall and Offices | Parish of Fulham      | 75 gs., 50 gs., and 25 gs. | Sept. 21st               | i.    |
| For a Library               | Pennance Library Com. | Not stated                 | Not stated               | i.    |

## CONTRACTS.

| Nature of Work, or Materials.           | By whom required.        | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page.  |
|-----------------------------------------|--------------------------|-----------------------------------|--------------------------|--------|
| Works Extension                         | Tottenham Local Board    | — De Papa                         | July 27th                | ii.    |
| Extension of Roadway                    | do                       | do                                | July 29th                | ii.    |
| ing, Tar-Paving, Metalling, &c. Work.   | Lewisham Bd. of Wks.     | Official                          | do                       | xi.    |
| ing up Roadway, Paving, &c. Footways    | Willesden Local Board    | O. Claude Robson                  | do                       | ii.    |
| ing Cardiff Barracks                    | War Department           | Official                          | July 29th                | ii.    |
| Water Tank                              | West Ham Union           | do                                | do                       | ii.    |
| Extension of Cemetery Church            | Rev. Evan Davies         | G. H. Davies                      | August 1st               | ii.    |
| ing Paving on Blackheath                | Met. Board of Works      | Official                          | do                       | ii.    |
| Extensions and Additions to Infirmary   | Dartford Union           | do                                | do                       | xviii. |
| ing Drainage                            | Oxford Local Board       | W. H. White                       | do                       | ii.    |
| ing Ground Tank                         | War Department           | Official                          | August 3rd               | ii.    |
| Extension in Masonry of Pier of the     | do                       | do                                | do                       | ii.    |
| ing Hall Buildings                      | Great Western Ry. Co.    | J. M. Brydon                      | August 4th               | ii.    |
| ing and Spire, Christ Church, Camarvon  | Chelsea Vestry           | Arthur Ingleton                   | do                       | ii.    |
| ing Sewer and other Works               | Willesden Local Board    | O. Claude Robson                  | August 5th               | ii.    |
| ing Towers, Manholes, &c.               | do                       | do                                | do                       | ii.    |
| ing of Granite, Flints, &c.             | Bexley Local Board       | Official                          | do                       | xi.    |
| ing Making and Paving                   | Fulham Board of Wks.     | do                                | do                       | xviii. |
| ing Bridge, &c., Deptford               | Met. Board of Works      | do                                | do                       | ii.    |
| ing Tower and Subway, &c.               | Midland Railway Co.      | A. A. Langley                     | August 6th               | ii.    |
| ing and Painting                        | Orford Corporation       | T. & C. Hawkey                    | August 8th               | ii.    |
| ing Cast-iron Socket Pipes              | Met. Arithms Board       | do                                | August 11th              | xi.    |
| ing Work Thatched Shelters              | Reigate U. S. A.         | do                                | do                       | xi.    |
| ing and Forming Roads at Meadvale       | do                       | do                                | do                       | xi.    |
| ing Granite                             | Old Windsor Burial Bd.   | Official                          | do                       | xi.    |
| ing and Enclosing                       | Lon. & N. W. Ry. Co.     | do                                | do                       | ii.    |
| ing out Burial Ground                   | Com. of H.M. Works       | Baldwin Latham                    | August 12th              | ii.    |
| ing Station at Workington               | Fiern Barnet U.S.A.      | do                                | August 26th              | xi.    |
| ing Works                               | Dublin Bd. of Public Wks | T. N. Deane & Son                 | Sept. 2nd                | ii.    |
| ing Science and Art Museum and National | Lowestoft Burial Board   | W. Doubleday                      | Not stated               | xi.    |
| ing Lodge, &c., Lowestoft Cemetery      | Longworth & Gardner      | do                                | do                       | xviii. |
| ing Church, Longridge, near Preston     | J. H. Swan               | do                                | do                       | xi.    |
| ing Upper Tooting                       | do                       | do                                | do                       | xi.    |

## PUBLIC APPOINTMENTS.

| Nature of Appointment.                         | By whom Advertised.  | Salary.         | Applications to be in. | Page. |
|------------------------------------------------|----------------------|-----------------|------------------------|-------|
| Justice of the Peace for the County of Warwick | Justice of the Peace | 400l. per annum | August 31st            | xvi.  |
| The Grocers' Co.                               | Not stated           | Not stated      | October 1st            | xvi.  |

|                                                                                                                                              |             |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| the erection of new Vestry and Union offices in street, Grosvenor-square, for the Parish of St. Hanover-square. Mr. A. J. Bolton, architect. | £15,791 0 0 |
| the supplied by Mr. W. S. Pinner                                                                                                             | 14,930 0 0  |
| land & Hannea                                                                                                                                | 14,935 0 0  |
| lake & Foreman                                                                                                                               | 14,895 0 0  |
| re Bros                                                                                                                                      | 14,895 0 0  |
| ss & Son                                                                                                                                     | 14,873 0 0  |
| man & Fotheringham                                                                                                                           | 14,843 0 0  |
| Wen & Co.                                                                                                                                    | 14,669 0 0  |
| appell & Co.                                                                                                                                 | 14,465 0 0  |
| ggs & Hill                                                                                                                                   | 14,444 0 0  |
| o, Bros                                                                                                                                      | 14,391 0 0  |
| water, Bros                                                                                                                                  | 14,362 0 0  |

|                                                                                     |            |
|-------------------------------------------------------------------------------------|------------|
| ted for the re-building of St. Alban's Schools, at Mr. C. H. M. Mileham, architect— | £3,000 0 0 |
| Dorey, Brentford                                                                    | £3,000 0 0 |

|                                                                                              |          |
|----------------------------------------------------------------------------------------------|----------|
| ew warehouses, &c., Gun-street, Reading, for Mr. ek. Mr. W. Ravenscroft, architect, Reading. |          |
| ies supplied by Messrs. H. Cooper & Sons, head—                                              |          |
| Winter                                                                                       | £725 0 0 |
| St. Coot                                                                                     | 690 0 0  |
| St. Eggs & Sons                                                                              | 680 0 0  |
| Stottrell                                                                                    | 646 0 0  |
| Heard                                                                                        | 633 0 0  |
| H. Margetts (accepted)                                                                       | 628 0 0  |

|                                                                                         |            |
|-----------------------------------------------------------------------------------------|------------|
| ew house and offices, Goring, Oxon, for Mrs. v. Mr. W. Ravenscroft, architect, Reading. |            |
| upplied by Messrs. H. Cooper & Sons, Maiden-                                            |            |
| Higgs, Goring                                                                           | £2,703 0 0 |

|                                                                                             |  |
|---------------------------------------------------------------------------------------------|--|
| terations to the buildings of the St. James's Hall v. Mr. W. Emden, architect, Southampton. |  |
| terations, Quantities by Messrs. Evans & Deacon, -street, Charing Cross—                    |  |
| Contract No. 2.                                                                             |  |

|          |            |
|----------|------------|
| atignals | £9,971 0 0 |
| machian  | 9,190 0 0  |
| erson    | 9,150 0 0  |
| renewal  | 8,997 0 0  |
| aters    | 8,844 0 0  |
| E. Les   | 8,662 0 0  |

|                                                 |  |
|-------------------------------------------------|--|
| ables, &c., at Dr. Ridge's Food Factory, Shell- |  |
| nd, Kingland—                                   |  |
| £2,300 0 0                                      |  |

|             |           |
|-------------|-----------|
| Forest      | 2,195 0 0 |
| aley        | 1,187 0 0 |
| ox          | 2,068 0 0 |
| erson & Son | 2,064 0 0 |
| E Green     | 2,050 0 0 |
| is & Son    | 2,023 0 0 |
| Shurmut     | 1,969 0 0 |

|                                                                                                                                      |            |
|--------------------------------------------------------------------------------------------------------------------------------------|------------|
| For excavating, forming roads, and laying sewers on the Beulah Park Estate, Upper Norwood. Mr. W. Newton Dunn, surveyor, Bucklebury— |            |
| J. S. Halliwell, Ealing                                                                                                              | £5,922 0 0 |
| A. Oliver, Harlesden                                                                                                                 | 5,837 0 0  |
| C. Lloyd, Millbank-street                                                                                                            | 5,100 0 0  |
| W. J. Bottrell, Cannon-street                                                                                                        | 4,617 0 0  |
| G. Felton, Broad-street                                                                                                              | 4,414 0 0  |
| Beale Bros, Eritth                                                                                                                   | 4,363 0 0  |
| J. Clarke, Thornton Heath                                                                                                            | 3,938 0 0  |
| A. T. Catley, Lloyd-square                                                                                                           | 3,735 0 0  |
| W. Nicholls, Wood-green                                                                                                              | 3,726 0 0  |
| J. G. B. Marshall, Brighton                                                                                                          | 3,659 0 0  |
| Woodham & Fry, Greenwich                                                                                                             | 3,578 0 0  |
| J. Wood & Co., Carter-street                                                                                                         | 3,399 0 0  |
| E. Pail & Son, Bromley Common                                                                                                        | 3,346 0 0  |
| G. J. Butler, Camberwell                                                                                                             | 3,069 0 0  |
| A. Blake, Sydenham                                                                                                                   | 2,856 0 0  |
| Dierden & Co., Broad-street                                                                                                          | 2,844 0 0  |
| S. Saunders, Fulham                                                                                                                  | 1,969 0 0  |

|                                                                            |            |
|----------------------------------------------------------------------------|------------|
| For making a new road and laying down pipe sewers at Basing, for Mr. Wood— |            |
| Mowlem, Westminster                                                        | £4,506 0 0 |
| Killingback, Camden Town                                                   | 3,665 0 0  |
| Ford & Everest, Brentford                                                  | 3,750 0 0  |
| Adams & Son, Ealing                                                        | 3,642 0 0  |
| Neall, Wandsworth                                                          | 3,620 0 0  |
| Pizzey, Hornsey                                                            | 3,470 0 0  |
| Bath, Wandsworth                                                           | 3,300 0 0  |

|                                                                                               |            |
|-----------------------------------------------------------------------------------------------|------------|
| For alterations to the "Princess Alexandra," Barking-road, E. Mr. George Treacher, architect— |            |
| Turtle & Appleton                                                                             | £2,345 0 0 |
| M. Palmer & Co.                                                                               | 2,698 0 0  |
| W. Shurmut                                                                                    | 2,695 0 0  |
| J. Beale                                                                                      | 2,650 0 0  |
| W. Parker                                                                                     | 2,580 0 0  |
| J. Walker                                                                                     | 2,543 0 0  |

|                                                                                                                                          |          |
|------------------------------------------------------------------------------------------------------------------------------------------|----------|
| For completing House, Washington-road, Worcester Park, Surrey, for Miss Blower. Mr. Herbert D. Appleton, architect, Wool Exchange, City— |          |
| A. H. Harris                                                                                                                             | £387 0 0 |
| C. J. Paine                                                                                                                              | 353 0 0  |
| W. Robinson (accepted)                                                                                                                   | 315 0 0  |

|                                                                                                                                              |          |
|----------------------------------------------------------------------------------------------------------------------------------------------|----------|
| For completing two houses, Bradgate-road, Rushy-green, for Mr. Edward P. Trenchard. Mr. Herbert D. Appleton, architect, Wool Exchange, City— |          |
| A. Benjamin                                                                                                                                  | £460 0 0 |
| B. Will                                                                                                                                      | 450 0 0  |
| H. Bridel                                                                                                                                    | 420 0 0  |
| G. Avis & Son (accepted)                                                                                                                     | 345 0 0  |

|                                                                                                                                                  |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| For alterations and additions to No. 233, Lewisham High-road, Brockley, for Mr. W. Bindon. Mr. John James Downes, architect, Lewisham High-road— |          |
| Mark Redman, Brockley                                                                                                                            | £447 0 0 |
| S. Brading, Clapton                                                                                                                              | 430 0 0  |
| J. W. Heyes, London Wall (accepted)                                                                                                              | 347 0 0  |

|                                                                                               |             |
|-----------------------------------------------------------------------------------------------|-------------|
| For new school, Berners-street, E., for the London School Board. Mr. T. J. Bailey, architect— |             |
| G. S. Pritchard                                                                               | £13,345 0 0 |
| J. Holloway                                                                                   | 14,353 0 0  |
| F. & F. J. Wood                                                                               | 14,204 0 0  |
| M. Palmer & Co.                                                                               | 14,036 0 0  |
| Patman & Fotheringham                                                                         | 14,000 0 0  |
| W. Downs                                                                                      | 13,840 0 0  |
| Perry & Co.                                                                                   | 13,746 0 0  |
| J. R. Hunt                                                                                    | 13,725 0 0  |
| W. Shurmut                                                                                    | 13,698 0 0  |
| Stimpson & Co.                                                                                | 13,680 0 0  |
| W. Oldrey                                                                                     | 13,596 0 0  |
| Wall Bros                                                                                     | 13,590 0 0  |
| S. J. Jerrard                                                                                 | 13,489 0 0  |
| E. C. Howell & Son                                                                            | 13,398 0 0  |
| C. Cox                                                                                        | 13,359 0 0  |
| Atherton & Latta                                                                              | 13,300 0 0  |

|                                                                                               |             |
|-----------------------------------------------------------------------------------------------|-------------|
| For new schools, Mowlem-street, E., for the London School Board. Mr. T. J. Bailey, architect— |             |
| W. Scrivenor & Co.                                                                            | £13,909 0 0 |
| M. Gentry                                                                                     | 13,871 0 0  |
| W. Downs                                                                                      | 13,614 0 0  |
| W. Oldrey                                                                                     | 13,631 0 0  |
| Wall Bros                                                                                     | 13,553 0 0  |
| J. J. Goodman                                                                                 | 13,328 0 0  |
| J. E. Hunt                                                                                    | 13,189 0 0  |
| J. H. Johnson                                                                                 | 12,901 0 0  |
| W. Shurmut                                                                                    | 12,888 0 0  |
| Grover & Son                                                                                  | 12,675 0 0  |
| H. L. Holloway                                                                                | 12,643 0 0  |
| Patman & Fotheringham                                                                         | 12,583 0 0  |
| Perry & Co.                                                                                   | 12,576 0 0  |
| Howell & Son                                                                                  | 12,547 0 0  |
| Stimpson & Co.                                                                                | 12,523 0 0  |
| T. Boyce                                                                                      | 12,488 0 0  |
| C. Wall                                                                                       | 12,438 0 0  |
| S. J. Jerrard                                                                                 | 12,426 0 0  |
| C. Cox                                                                                        | 12,275 0 0  |
| Atherton & Latta                                                                              | 12,260 0 0  |

|                                                                                                  |             |
|--------------------------------------------------------------------------------------------------|-------------|
| For new schools, Wilton-road, Hackney, for the London School Board. Mr. T. J. Bailey, architect— |             |
| H. Hart                                                                                          | £13,094 0 0 |
| Lathey Bros                                                                                      | 13,024 0 0  |
| F. & F. J. Wood                                                                                  | 12,927 0 0  |
| M. Gentry                                                                                        | 12,822 0 0  |
| W. Downs                                                                                         | 12,761 0 0  |
| Perry & Co.                                                                                      | 12,629 0 0  |
| J. H. Johnson                                                                                    | 12,603 0 0  |
| Wall Bros                                                                                        | 12,589 0 0  |
| G. S. Pritchard                                                                                  | 12,487 0 0  |
| Steel Bros                                                                                       | 12,456 0 0  |
| J. R. Hunt                                                                                       | 12,472 0 0  |
| W. Oldrey                                                                                        | 12,467 0 0  |
| J. Holloway                                                                                      | 12,400 0 0  |
| Grover & Son                                                                                     | 12,389 0 0  |
| W. Shurmut                                                                                       | 12,384 0 0  |
| C. Wall                                                                                          | 12,283 0 0  |
| E. C. Howell & Son                                                                               | 12,281 0 0  |
| Stimpson & Co.                                                                                   | 12,258 0 0  |
| Patman & Co.                                                                                     | 12,258 0 0  |
| S. J. Jerrard                                                                                    | 12,143 0 0  |
| Scrivenor & Co.                                                                                  | 12,093 0 0  |
| Kirk & Randall                                                                                   | 12,091 0 0  |
| T. Boyce                                                                                         | 11,888 0 0  |
| Atherton & Latta                                                                                 | 11,970 0 0  |
| C. Cox                                                                                           | 11,983 0 0  |

|                                                                                                         |            |
|---------------------------------------------------------------------------------------------------------|------------|
| For new schools, William-street, Hammersmith, for the London School Board. Mr. T. J. Bailey, architect— |            |
| B. L. Holloway                                                                                          | £9,367 0 0 |
| Marey & Son                                                                                             | 9,236 0 0  |
| Pritchard & Son                                                                                         | 8,897 0 0  |
| Wood Bros                                                                                               | 8,844 0 0  |
| Lathey Bros                                                                                             | 8,838 0 0  |
| Grover & Son                                                                                            | 8,817 0 0  |
| Scrivenor & Co.                                                                                         | 8,800 0 0  |
| W. Shurmut                                                                                              | 8,784 0 0  |
| C. Wall                                                                                                 | 8,769 0 0  |
| Wall Bros                                                                                               | 8,754 0 0  |
| J. H. Hobson                                                                                            | 8,726 0 0  |
| Kirk & Randall                                                                                          | 8,675 0 0  |
| W. Oldrey                                                                                               | 8,641 0 0  |
| J. R. Hunt                                                                                              | 8,390 0 0  |
| W. Tongue                                                                                               | 8,350 0 0  |
| Stimpson & Co.                                                                                          | 8,282 0 0  |
| Holloway Bros                                                                                           | 8,191 0 0  |
| G. Johnson                                                                                              | 8,151 0 0  |
| J. Holloway                                                                                             | 8,106 0 0  |
| W. Downs                                                                                                | 8,100 0 0  |
| S. J. Jerrard                                                                                           | 8,080 0 0  |

|                                                                                                                |            |
|----------------------------------------------------------------------------------------------------------------|------------|
| For enlargement of schools, Gleaster-grove, Chelsea, for the London School Board. Mr. T. J. Bailey, architect— |            |
| W. Downs                                                                                                       | £2,610 0 0 |
| F. & F. J. Wood                                                                                                | 2,483 0 0  |
| Williams & Son                                                                                                 | 2,461 0 0  |
| G. S. Pritchard                                                                                                | 2,441 0 0  |
| Patman & Fotheringham                                                                                          | 2,423 0 0  |
| W. Shurmut                                                                                                     | 2,413 0 0  |
| C. Wall                                                                                                        | 2,392 0 0  |
| H. L. Holloway                                                                                                 | 2,217 0 0  |
| J. R. Hunt                                                                                                     | 2,212 0 0  |
| Turtle & Appleton                                                                                              | 2,185 0 0  |
| Grover & Son                                                                                                   | 2,194 0 0  |
| Kirk & Randall                                                                                                 | 2,193 0 0  |
| Scrivenor & Co.                                                                                                | 2,130 0 0  |
| J. Holloway                                                                                                    | 2,180 0 0  |
| J. F. Kearley                                                                                                  | 2,150 0 0  |
| Lathey Bros                                                                                                    | 2,144 0 0  |
| S. J. Jerrard                                                                                                  | 2,143 0 0  |
| W. Oldrey                                                                                                      | 2,126 0 0  |
| Holloway Bros                                                                                                  | 2,103 0 0  |
| Stimpson & Co.                                                                                                 | 2,100 0 0  |
| G. Johnson                                                                                                     | 2,095 0 0  |
| Howell & Son                                                                                                   | 2,067 0 0  |

|                                                                                                         |           |
|---------------------------------------------------------------------------------------------------------|-----------|
| For new branch bank at Limehouse, for the London and County Banking Company. Mr. Zeph. King, architect— |           |
| W. Parsons                                                                                              | 7,060 0 0 |
| T. Boyce                                                                                                | 6,966 0 0 |
| W. Shurmut                                                                                              | 6,897 0 0 |
| J. T. Chappell                                                                                          | 6,780 0 0 |
| Perry & Co.                                                                                             | 6,641 0 0 |
| J. Hyth                                                                                                 | 6,616 0 0 |
| T. Rider & Son                                                                                          | 6,489 0 0 |
| J. Morter                                                                                               | 6,317 0 0 |
| Higgs & Hill                                                                                            | 6,280 0 0 |
| W. Johnson                                                                                              | 6,265 0 0 |
| J. Holloway                                                                                             | 5,961 0 0 |

For building a Wesleyan Church, including spire, in Jubilee-square, Swanage, Dorsetshire. Messrs. Bucknall & Jennings, of Swanage and Bristol, architects:—  
 Linnington ..... £4,000 0 0  
 R. Hardy ..... 3,844 3 6  
 W. Hardy ..... 3,687 5 6  
 Heaves ..... 3,343 16 3  
 Wellstead (accepted) ..... £1,827  
 Griffin (accepted) ..... 1,287  
 3,097 0 0  
 \* Excavator's, mason's, slater's, and plasterer's work, and  
 † Carpenter's, joiner's, plumber's, painter and glazier's, &c., work.

For building a new bridge and other works over the River Quaggy at Eltham, Kent, for the Earl of St. Germans:—

Nowell & Robson ..... £2,046 0 0  
 Nowell & Co. .... 1,929 0 0  
 Money ..... 1,865 0 0  
 Tongue ..... 1,850 0 0  
 Pizze ..... 1,750 0 0  
 Bedle ..... 1,565 0 0  
 Blackmore ..... 1,537 0 0

For repairs, painting, &c., at St. James's Public Baths:—

Macintosh ..... £1,183 0 0  
 Scrivenor & Co. .... 1,106 0 0  
 Goodall & Thring ..... 1,063 10 0  
 Braid ..... 995 0 0  
 Beach ..... 894 9 0  
 Foxley ..... 901 10 0  
 Knight ..... 907 0 0  
 Deacon (accepted) ..... 465 0 0

For decorating five houses in Pollard-road, Hendon, for Mr. M. W. Furneaux. Mr. Walter Hall, surveyor, Chancery-lane:—

Farmer ..... £250 0 0  
 Sanders & Co. .... 224 0 0  
 Gordon, Kell, & Smith ..... 175 0 0  
 Bloomfield & Mallord (accepted) ..... 150 0 0  
 Hill ..... 125 0 0

For finishing six houses in Milton-road, on same Estate, Hendon. Mr. Walter Hall, surveyor:—  
 Farmer ..... £1,050 0 0  
 Parker ..... 900 0 0

For decorating six houses in Milton-road, Hendon, on same Estate. Mr. Walter Hall, surveyor:—  
 Harrington ..... £1,000 0 0

For entrance-lodge to "Spencers," Maidenhead, for Mr. Ernest Gardiner. Mr. E. J. Shrewsbury, architect, Maidenhead:—

Silver & Sons ..... £303 0 0  
 Woodbridge ..... 391 0 0  
 Cooper & Son ..... 348 0 0  
 West Bros. .... 340 0 0  
 Part's Bros. (accepted) ..... 337 0 0

For villa residence, Castle Hill, Maidenhead, for Mr. Arthur Pallant. Mr. E. J. Shrewsbury, architect, Maidenhead:—

West Bros. .... £914 0 0  
 Woodbridge ..... 896 0 0  
 Part's Bros. .... 895 0 0  
 Silver & Sons (accepted) ..... 853 0 0

For alterations and additions, less allowance for old materials, to Walnut Cottage, Taplow, for Mr. H. A. Woolfryes, Mr. J. Rutland, architect, Taplow. Quantities by Mr. E. J. Shrewsbury, Maidenhead:—

West Bros., Maidenhead ..... £778 2 5  
 Almond, Burnham (accepted) ..... 756 7 8  
 Stirling .....  
 Almond (accepted) ..... £310 0 0

For re-building business premises, High-street, Guildford, for Mr. W. H. Wrist. Messrs. Peak, Lunn, & Peak, architects:—

R. Downes, Guildford ..... £1,187 5 0  
 G. & E. Smith, Guildford ..... 1,160 0 0  
 E. Elliott, Guildford ..... 1,125 0 0  
 G. Skuse, Guildford ..... 1,122 0 0  
 G. Strudwick, Guildford ..... 1,093 0 0  
 Billmore & Smith, Guildford ..... 1,064 0 0  
 Horne & Fenn, Guildford and London ..... 898 0 0  
 T. E. Downes, Guildford ..... 872 10 0

For building two houses in Cumming-street, Pentonville, for Mr. J. Young:—

Hunt ..... £1,149 0 0  
 Kellaway ..... 1,163 0 0  
 Sidney Poole, Pentonville (accepted) ..... 1,091 0 0

For semi-detached villa residences, Godalming, for Mr. W. C. Shuff. Mr. J. W. Stevens, architect, New Bridge-street, Blackfriars:—

T. H. Kiergerle, Oxford ..... £1,080 0 0  
 G. Horne, Godalming ..... 1,030 0 0  
 R. Pink, Milford, Surrey ..... 1,000 0 0  
 G. Shears, Woking ..... 1,510 0 0  
 Smith & Sons, Norwood ..... 1,479 0 0  
 Horne & Fenn, Guildford and London ..... 1,323 0 0  
 F. Hall, Godalming ..... 1,063 10 0

For new Wesleyan chapel, Normandy, Surrey:—  
 H. Capp & Son, Guildford ..... £714 0 0  
 C. Kemp, Aldershot ..... 650 0 0  
 W. Garland, Aldershot ..... 620 0 0  
 Horne & Fenn, Guildford and London ..... 620 0 0  
 Billmore & Smith, Guildford ..... 479 0 0

For alterations and decorations to 11 and 12, Castle-street, Holborn, according to plans and specifications prepared by Mr. Alfred Ebbes, architect:—

Purey & Lumley ..... £489 0 0  
 Turtle & Appleton ..... 445 0 0  
 W. Langridge & Sons ..... 420 0 0  
 C. W. Reading (accepted) ..... 374 0 0

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered to our Office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

**TO CORRESPONDENTS.**  
 J. C. W.—J. B.—J. H. C. (we do not print letters which are duplicated for circulation to various journals. See below).—H. H.—E. & P.—A. W. B.—W. & T.—E. A. F. P.—W. E. M.—T. K. T.—H. G.—A. W. S. (we do not print letters which are duplicated for circulation to various journals. See below).—

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

**NOTE.**—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT REQUIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other matters should be addressed to THE PUBLISHER, and not to the Editor.

## PUBLISHER'S NOTICES.

THE INDEX and TITLE-PAGE for Volume XLVIII. (January to June, 1885) were given, as a Supplement, with the Number of July 11th.

A COLOURED TITLE-PAGE may be had, gratis, on personal application at the Office.

CLOTH CASES for binding the Numbers are now ready, price 2s. 6d. each; also

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THE FORTY-EIGHTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence.

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DOUGLAS FOUNDRY, Publisher.  
 Addressed to No. 46, Catherine-street, W.C.  
 Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

**SPECIAL.**—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY morning.

PERSONS Advertising in "The Builder," may have Replies addressed to the Office, 46, Catherine-street, Covent-garden, W.C. free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

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 "THE BUILDER" is supplied gratis from the Office to persons in any part of the United Kingdom at the rate of 12s. per annum. For all parts of Europe and America, 25s. per annum. India, China, Ceylon, &c. 30s. per annum. Remittances to DOUGLAS FOUNDRY, Publisher, No. 46, Catherine-street, W.C.

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**WESTWOOD GROUND,**  
 Box Ground, Combe Down.

**Corsham Down,**  
 And Farleigh Down.  
**RANDELL, SAUNDERS, & CO., Limited,**  
 Corsham, Wilts. [A]

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 Seyssel, Patent Metallic Lava, and White Asphaltes.  
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# The Builder.

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### Prehistoric America and its Art.

THE questions of anthropological history which are raised in the Marquis de Nadaillac's work on "Prehistoric America," now presented in an English translation,\* though they are of the deepest interest in their own way, are not those which specially concern us here. The interest of the work to us lies in the examples of what may be called prehistoric American art with which the pages of the work are filled. The expression "prehistoric," of course, has a different meaning in connection with the American continent from that which we attach to it when speaking of European countries. History in regard to America is comparatively but of yesterday; and that which is "prehistoric" there may be contemporary with European epochs on which almost full light of history shines. But this does not lessen,—it perhaps emphasises,—the interest and significance attaching to the existence of types of art work and of ornament differing little in essentials from those which the researches of Schliemann and others have familiarised us in the European world. Still, we will not pass over without a word the author's first chapter, with the somewhat national title, "Man and the Mastodon." There is something weird in the mere conceptions arising out of the stray observations of various investigators in American paleontology, as if the history of a dream were woven down by fits and snatches. We have glimpses of a continent thickly populated with people of the most varying degrees of civilisation, set up to or at the time when the Spaniards were upon the New World, and sent a blight to its inhabitants. But, far before this, we have glimpses, afforded by this or that discovery of bones and flint implements, of an early world, nearly, if not, identical with the early world of Europe; of men contending the rudest of weapons against monstrous long-ago-extinct animals, alike on American and European soil. "We are in a position to see that the earliest vestiges of man in America and in Europe resemble each other very closely; and by no means the least extraordinary part of the case is that in the New World, men began to struggle for existence with almost identical means."

Prehistoric America. By the Marquis de Nadaillac. Translated by N. d'Amers. Edited by W. H. Dall. 19 Illustrations. London: John Murray, 1895.

The flint implements of Mexico do not differ appreciably from those of Kent's Hole. "Our early ancestors had to struggle with the bears and lions of the caves, with the terrible *machairodus* with tusks as sharp as the blade of a dagger, with the mammoth and the *Rhinoceros tichorinus*. . . The first Americans, too, were contemporary with gigantic animals which, like their conquerors of Europe, have passed away never to return." The bones of the mastodon have been found surrounded by flint arrow-heads and lance-heads by which men who were perhaps but one degree above brutes had attacked him, probably when he was already from some cause partially disabled. Was there in those far-away ages land communication between the American and European continents? Or did similar causes and conditions produce similar effects? The question becomes more significant when we notice the same kind of parallelism between Europe and America in far later times; when we find the style and pattern of vases the same in essentials on both sides of the Atlantic, and notice the Greek key pattern in its finished form on the side of a jar found on the banks of the San Juan (see fig. 1, next page).

As to the date of this and many other such remains on the American Continent it seems difficult to form any precise estimate. One reflection that suggests itself on finding these striking resemblances in ornamental work all over the globe is that, if one may so put it, everything is a great deal older than we used to be in the habit of thinking. There must have been a very long period for that pattern which we used to regard as especially Greek to have had time to be adopted and used over so large a portion of the earth's surface and at such widely separated localities, and the idea is not unnaturally suggested that possibly, in accordance with the recognised tendency of arts and civilisation to move westward, some of the details of Greek and Assyrian art might have had their origin in what is now the New, but was then the Old, World. Whatever connexion there is between the pattern on this San Juan jar and that to be found in Greek work, must have been before and not after the Greek period. There can have been no communication between the continents within historic times: we know not what there may have been in prehistoric times. Our author, indeed, observes that the pottery manufactured in America was very superior to that of the same period of development in Europe; "it is also probable that many of the numerous fragments of which we were unable to fix the dates belong to very remote epochs. They were rarely associated with metal objects, and the only weapons of the mound builders were hatchets, knives, and arrows of stone, which

resemble alike in form and workmanship those of Europe, dating from the period to which archaeologists have given the name of the stone age." We must, therefore, assume the immense (comparatively speaking) antiquity of such a feature as the Greek key pattern, and its slow percolation westward around the globe; or we must assume that the same causes produce the same effects in early civilisation, and that there is an inherent tendency in mankind to the production of certain forms of ornament. This is not likely to be true of any except forms of phallic origin, which would, of course, have the same general characteristics everywhere; and the idea of this simultaneous and unconnected production of special forms of course almost includes the idea of simultaneous and unconnected development of mankind in the two continents, which anthropologists will by no means admit of. We must fall back on the idea of the remote antiquity of what we are accustomed to think of as Classic patterns, and of a far more widespread and universal use of these than has been generally recognised. The fact is, that the more we study remnants of early or prehistoric art in whatever quarter of the globe, the more is brought home to us the fact of the unity of the race of man and the general similarity of semi-barbarous art and science all over the world. We can only account for this by allowing great antiquity to these common forms of ornament, and leaving them ample time for their slow dissemination over the globe in days when, though communication were slow, change and development of ideas were still slower. Then came the historic period in which fancy grew and developed more quickly, and each more civilised subsection of the race developed a special art of its own, with "excellent differences." And now, in these days of steam, strangely enough, the intercommunication is too fast to allow of the special developments going on undisturbed, and we are again in a way to have the same form of art going on all over the world; Japan and Birmingham are doing their best to assimilate, and India has shaken hands with South Kensington.

The races who have left their mark on American soil, so as to be visible to the present time, are very various, and in the book before us are considered under several groups. The first are the "mound-builders," the makers of numerous vast mounds arranged in more or less symmetrical forms on plan, or sometimes in irregular but distinctly marked forms, which seems to have a symbolical meaning. The Marquis de Nadaillac comes to the conclusion that the making of these mounds extended over a great many centuries, and that the people who made them were in essentials the





Fig. 1.



Fig. 2.



Fig. 6.

same with the now fast-disappearing North American Indians. The making of some of these mounds appears to have been as late as the earliest European exploration of America, while the pottery associated with others seems to carry them back to a probably very remote era. The most interesting portion of the present work, from the point of view we are now taking, is the chapter on the pottery, weapons, and ornaments of the mound builders. In the ordinary vases we find a general similarity in shape to much ancient pottery of the European world, though the most characteristic shapes found at Hissarlik and Cyprus, such as the double-necked vase or double vase united by a band, do not appear. Many of the ordinary shapes are exceedingly "classic" in outline, but it may be observed that such forms, with the globose body and long neck with spreading rim, are really the natural outcome of the desire to obtain practical suitability for the purpose, on the same principle which Viollet-le-Duc illustrated so happily in his lectures in regard to the forms given to metal vessels for holding liquids. But in regard to what may be called the curiosities of design in earthenware, the use of human and animal forms as a portion of the vessels, we meet here again with all the same kind of fancies with which we have been familiarised in the ancient pottery of Europe; animals with chimneys on their backs, vases and bowls with animal faces, and bottles combined with female forms in almost exactly the same manner as in some of Dr. Schliemann's examples. One form of utensil there is which is more peculiar to American remains, the pipe-bowl, in which also the forms of animals are largely introduced; a bowl in the form of a wild cat, another representing a woodpecker, another a heron with a fish in its mouth; a hole in the back of the model forming in each case the bowl of the pipe. This kind of bad taste, for such we hold it really to be, has been apparently universal among the misguided sons of men. We did, indeed, hear it defended by a modern decorative artist the other day, who, in answer to our expressed opinion that a butter-boat in the shape of a cow with a lid in the back was bad taste, whenever and by whomsoever it was done, half assented, but with the saving clause (introduced as an afterthought), "at least, unless the cow is very well modelled." That is a possible view of the matter, no doubt, but we adhere to the broad principle, whether among American mound-builders or in Bond-street. One vessel of the mound series, in which a serpent is combined with the design in a more rational and artistic manner, we give an illustration of (Fig. 2).

There are two other great divisions of American art-remains dealt with in the book before us, those of the "cliff dwellings," and the very different and much more elaborate remains of Central America. The cliff dwellings, found in the valleys drained by the rivers San Juan, Rio Grande del Norte, Colorado

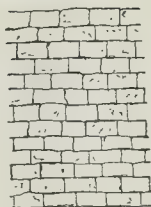


Fig. 3.

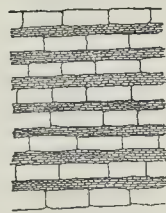


Fig. 4.



Fig. 5.

Chiquito, and their tributaries, may be regarded as the antithesis, among human habitations, of the lake dwellings. The inhabitants of the latter sought security by pushing themselves out horizontally from the shore, the cliff dwellers sought it by ascending vertically from the ground to dwellings on the sides and tops of apparently inaccessible cliffs. In some cases these were obviously approached by steps cut in the rock, as a frozen snow slope is now ascended by the Alpine climber; in some it is a matter of puzzle how access was ever obtained. Habitations so placed speak vividly of the state of dread of one another in which the ancient people who contrived them must have lived. It is possible, however, that these were only fortresses for occasional retreat, not for ordinary habitation, though they seem wonderfully numerous on such a supposition. "Imagine," says a recent traveller, the dry bed of a river shut in between steep inaccessible rocks of red sandstone, and a man standing in that bed looking up at the habitations of his fellow-creatures perched on every ledge. . . . The cliff houses take the form and dimensions of the platform or ledge from which they rise. The masonry is well laid, and it is wonderful with what skill the walls are joined to the cliff and with what care the aspect of the neighbouring rocks has been imitated in the external architecture." The collections of such dwellings, forming a series of small square apartments, were called by the Spaniards "pueblos," a name signifying a village or collection of homes, and by which title they are now generally referred to by travellers and archaeologists. We give an illustration of some of the masonry (Figs. 3, 4, 5) used in the walls at the large Bonito Pueblo in the Chaco Valley; and this again has a curious interest from its scientific bonding and its resemblance to European types of masonry. The art-reliefs found in connexion with these dwellings include pottery, of superior make to that of the mounds, and occasionally rather elaborately ornamented, and various drawings on the rocks of men and animals, not unlike those of the South African bushmen, some illustrations of which are placed side by side with the American examples for comparison.

The far more elaborate remains of Mexico and the adjoining portion of Central America, which plainly speak of a rich though barbaric

civilisation (if such a contradiction in terms may be allowed), are described at length by the Marquis de Nadaillac, with the aid of considerable number of illustrations, accompanied by what we should describe as a great deal of romancing, or possible history but on remnants of blind tradition. This must be taken with a great many grains of salt; but the actual description and illustration of many of the ruins and sculptures is of much interest and forms a very good outline of the subject for those who wish for some general information thereon. Nothing in the whole range of architectural antiquities is more extraordinary than these artistic remains of the ancient inhabitants of Mexico, so elaborate and profuse in the sculptured decoration, so barbaric in style in most instances, and which have left us so tired without reliable information as to the people who executed them. There is a certain parallel between these Mexican ruins and those of Cambodia; both are sumptuous and barbaric remains found in the midst of a forest, the witnesses of some race in its day of power and wealth, but which has fairly died out of the face of the earth; both strongly recall Indian types of art in many particulars; but the place to be assigned to the builders of Palenque, Uxmal and Yucatan, in artistic and general history is perhaps a more bewildering puzzle than that presented by Cambodia. For in the midst of the generally Oriental characteristics of these buildings, we come on quite Greek ornament over and over again. In the *Casa del Gobernador* (so-called) at Uxmal, find a building profusely ornamented on the exterior wall surfaces, at least on the upper portion of them, which is divided by a very classic-looking cornice from the plain basement walls, and above this is what our art-calls a "frieze" (though we should not give that name,—it is a wall-surface) "presenting a series of curved lines, arabesques and ornaments of every kind of execution, as capricious as it is grotesque. Amongst these ornaments Greek frets are prominent; this type of ornament, so common for centuries in Europe, furnishes yet another proof of the similarity of genius of man, everywhere and at all times as manifested in the least important of works." Why "least important" we do quite see; "even in the least important" probably meant; but this does seem to



the explanation in this case. For these are not remains that belong to any extreme, remote, and really prehistoric antiquity. The times in which these Mexican buildings were executed, though "prehistoric" as far as regards America, were not prehistoric in the wider sense: no geographical connexion between America and Europe existed, other than the present exists. Yet we have not only this use of the square fret, in much the same way as the Greeks used it on buildings, but we have a more curious coincidence, not noticed by the author, in the illustration of a portion of the elaborately-carved door-limbs from what is called "the Castle" at Michen-Itza, which we reproduce (fig. 6). This is obviously one of the later works of a class, and must have been executed since the Christian era, and by people who could at that time have no possible communication, we would imagine, with Europe. Yet there, an ornament on the helmet of the figure, is a Greek honeysuckle type in almost complete and finished form. What is the solution that puzzle? Is the honeysuckle ornament so, like the square fret, a natural proclivity man in all parts of the world? These are only a small portion of the considerations suggested by this book, which, though not written in a specially scientific manner, ought to be very useful and interesting, bringing together in a readable form, and with numerous illustrations, the main outlines of one of the strangest chapters of archaeology.

RECENT EXCAVATIONS IN THE PEIRÆUS.

THE excavating work undertaken at Athens during the past year has issued in the discovery of a building the purport of which is at present somewhat problematic. A full account of the work done, and the conclusions arrived at, appear in the *Τεύχος πρώτου δέσμευον* of the *Εφημερίς ἀρχαιολογική* for 84, which, like most important archaeological periodicals, appears as a rule from six months to a year late. Some workmen engaged in digging for the foundation of a new theatre, lighted on a whole collection of ancient walls. Notice was given to the Government, and at once measures were taken to lay the whole site bare. It was at first hoped that the building was a temple to Dionysos, but, as the work went on, it became abundantly evident that the ruins belonged to no temple at all. What appeared was the foundations of what seemed to be a large dwelling-house and a large courtyard surrounded by a colonnade. The modern inhabitants of Peiræus are not so zealous about antiquities, and were not, it seems, to be balked of their new theatre. The work of building it has had to go on, but under careful restrictions as to the preservation of such as possible of the old structure. A plan of the foundations was promptly made by Bruns and Dörpfeld, and this plan appears the 3rd Heft of the *Mittheilungen* of the German Institute at Athens for 1884; to the plan are added drawings of many architectural details. Dr. Dörpfeld says that the building consists of an entrance-hall, an atrium, and a number of lesser rooms, to which is attached a great court, surrounded by the colonnade. The arrangement is best seen on Dr. Dörpfeld's plan. In the entrance-hall the basis of an altar has been found, the pavement of the forum is admirably preserved, and at the west end the remains of a large cistern. At the south-west corner is a deep well. Now, the discovery of an ancient Greek dwelling-house would be a matter of subordinate interest, but the puzzle about these foundations is that they are in evident connexion, by means of steps which still remain, with the large courtyard surrounded by the colonnade. What is the object of this, and what the purport of its juxtaposition with the dwelling-house? Probably the mystery would never have been solved but for the happy discovery of some inscriptions. These inscriptions are published, with certain emendations, and discussed by Dr. Köhler, in the same number of

the *Mittheilungen*. They appeared first, but without interpretation, in the *Εφημερίς ἀρχαιολογική*, 1884, p. 39. Fortunately from these inscriptions (three in number), a clear picture of the purport of the collection of buildings can be gathered, and their date is in one direction secured. The inscriptions, Dr. Köhler shows, place us in the first half of the second century B.C. They relate to an association of worshippers of Dionysos, made up of well-to-do Athenian citizens, and at one time fifteen in number. The head and priest of this association was at the time of the inscriptions a certain Dionysios, and the office appears to have been hereditary. It is the private house of this Dionysios that has been discovered. He, it appears from one of the inscriptions, had deserved well of the god. He had founded and adorned a temple close to the spot where the inscription was set up. Out of his wealth he had dedicated costly vessels, and, finally, a second statue of the god. In reward for this heroic honours are decreed him after death by the Association, or, as it is practically called, the "thiasos." The plinth in which the stele with these inscriptions were set up has been found; the conclusion, therefore, is certain, that somewhere near to that plinth must have been the Temple of Dionysios. It is mentioned in one of the inscriptions that Dionysios erected a building for the accommodation of gatherings of the Association. This is, in all probability, the colonnade that has been discovered. It has been suggested that he built it round the temple. The temple, then, has to be looked for in the courtyard round which the colonnade runs. It will be the work of the present year to lay bare this court and verify the conjecture, a work the results of which will be eagerly looked for.

NOTES.

THE speech of the chairman at the Brighton Railway meeting gives unpleasant foreboding of a war of rates between the three southern and eastern railway companies. There is a tendency, when such strife is pending, to regard the interests of the public as served by the sacrifices made by the companies. It rarely happens that such can be permanently the case. It is true that the competition of the London and North Western, the Midland, and the Great Northern lines, has reduced the first-class fares by more than 80 per cent. as compared, for example, with those of the Great Western. But the great length of these lines is such as to afford a gross revenue of 14,000l. per annum on a capital cost per mile of 120,000l. Taking the three together, and with a sound system of accounts, both the shareholders and the travelling public might find their interests safe under such terms. If the traffic were exclusively in passengers and goods, without minerals, the net revenue would be more than eight per cent. all round, at actual freights and fares. But the enormous cost of the London terminus, spread over only 850 miles of line, has raised the aggregate cost per mile of the three south-eastern lines to considerably more than double that of the three northern trunks. The aggregate gross receipts of the three short lines, in 1878, were only 6,230,000l. on an aggregate capital of 88,000,000l. The low co-efficient of working cost which the absence of mineral traffic enables the London and Brighton, and the South-Eastern lines to maintain, has been such as to compensate to some extent for the high cost of construction. But, if war break out between the lines, working percentage will increase, while gross revenue will diminish. A mere glance at the above-stated amounts of capital and revenue will be enough to show how small a chance of dividend would then remain to the owners of the 26,000,000l. of ordinary capital in the three lines.

COLONEL A. S. JONES, V.C., and Mr. Bailey Denton have addressed a rather notable joint memorial to Sir Richard Cross in reference to the purification of the Thames. They refer to a remark in the Commissioners'

Report that "some process of deposition or precipitation" near the present outfalls might possibly be adopted "to separate the solid from the liquid portion of the sewage, but that "even then the liquid so separated would not be sufficiently free from noxious matters to allow of its being discharged as a permanent measure" without being subsequently purified by application to land. They suggested that if such land could not be found near the present outfalls the sewage liquid should be carried down to a point lower than Hole Haven, at the same time suggesting that the separation of solid and liquid might perhaps be better carried on at that lower point. In their report the Commissioners also refer to the fact that Canvey Island, which is separated from the mainland and the Thames by Hole Haven Creek, had attracted the notice of several experienced engineers, who had sketched out plans for the clarification of the sewage at this place, and the Commissioners added, "we may fairly infer that a good and practicable scheme of the kind might be devised."

IN accordance with the above suggestions of the Commissioners, Colonel Jones and Mr. Bailey Denton have boldly offered to take in hand the London sewage at Canvey Island, if Sir J. Bazalgette's proposed new outfall sewer to Thames Haven be extended one mile further on to Canvey Island. They propose to clarify the sewage upon the island, by mechanical deposition and chemical precipitation, and to apply the liquid to the land by filtration or irrigation so as to produce an effluent that may safely be admitted into tidal waters: the solid portions to be converted into saleable manure as far as possible, or to be buried in the soil or burned. The island is at present a low flat protected by sea walls, and the memorialists think that it has capacity to receive the sewage of London for 100 years to come, on the method by which they propose to treat it. Their terms are a subsidy of 110,000l. a year for forty years (less than 1d. in the pound on the rateable value of the metropolis) with the proposal that the works shall then become the property of the Board of Works without further payment. Here is a spirited offer to slay the modern dragon, and we hope the knights who make it will at least meet with serious consideration at the hands of the authorities.

IF there is one thing upon which the English nation prides itself, it is its practical and matter-of-fact character, and its readiness to deal with any inquiry of a utilitarian nature. It is all the more surprising, therefore, that until now the urgency of overhauling and conserving our supplies of timber has never been seriously acted upon, although frequently pressed upon the notice of the powers that be; and we hail with pleasure the appointment of a Forestry Committee, under the presidency of Sir John Lubbock. The time is almost gone by for the preservation of English forests, for, with a few exceptions, they are things of the past; but, as we have no reason to expect that the world will end with us, we are bound to consider our successors, and to take every possible means to renovate the tree treasures which we have so recklessly neglected. Nor is it England only that has been despoiled, but, by our ignorance and carelessness, we have sent forth Englishmen to our colonies who have done the same thing, though in this case earnest attention has been drawn to the subject, before it is too late. In New Zealand the valuable Kawri pine was fast becoming exterminated, until Dr. Hector pointed out that the average annual destruction varied from 23 to 28 per cent.; while, throughout the whole of Australia, the evils of rapid deforestation are plainly manifested in increased dryness of climate, more bush-fires, and longer droughts. It is a singular fact that forestry education has been more neglected here than any other branch, and that we do not appear to be aware of its immense importance. Not so our friends across the Channel. France possesses two or three special forestry schools, besides several agronomic establishments in which



forestry is taught. Austria has nine schools, the chief of which, the Imperial High School at Vienna, has six professors and 329 students; and are three in Prussia, and one each in Saxony, Wurtemberg, Baden, Bavaria (with six chairs of forestry in the University of Munich), Hesse-Darmstadt, and Saxe-Weimar. Russia has four schools; and Switzerland, Italy, Spain, Denmark, and Sweden, each one. America is adding forestry to her scheme of instruction in most of her agricultural colleges, and particularly in Michigan, while Great Britain has the proud pre-eminence of being lag-last of all the countries in the world, and of having wasted her most valuable treasures with a persistence and ignorance that can only be called idiotic.

AS time goes on, the development of electricity gives rise to new applications hitherto undreamt of and unexpected. This has been remarkably illustrated by some recent experiments by Professor Lodge, of Liverpool, on the best means of getting rid of smoke or dust. He filled a bell-glass with magnesium smoke, and noticed what a long time it took to settle if left to itself; but, by introducing a metallic point connected with one of the poles of an induction electrical machine, the smoke dispersed almost instantaneously, whirling about in large flakes, almost like a snowstorm. The same thing happened when the Professor enlarged his sphere of operations from the bell-glass to a room, the smoke with which the latter was filled disappearing as though by magic; and the application is now being extended to practical metallurgy, and particularly in the case of lead-fume condensation, which is one of the chief difficulties attending lead smelting. Mr. A. O. Walker, a smelter at Bagillt, in Flintshire, at present manages his fume condensation by a series of flues and chambers nearly two miles in length, which, to say the least, is cumbersome and unsatisfactory; and he, therefore, determined to avail himself of Professor Lodge's experiment. Along closed flue, filled with a still fume, presents the appearance of a thick cloud that takes hours to disperse; but the electric application was immediate in its results, and still more so when the fume was in motion. The utility of this fact in certain industries, such as lead smelting, the reduction of arsenic or the condensation of zinc oxide, will be of the first importance, not only by doing away with the necessity for costly and extensive flues, but by preventing the formation of those unsightly and dangerous masses of vapour which are so prejudicial to the health of the population, and so destructive to plant and tree life.

THOSE who are capable of seeing would see in Mr. Alma Tadema's pictures good evidence that he has a sound and even thorough knowledge of Greek architectural ornament and detail which would do credit to any architect, and a power of designing it that but few, at any rate, of the present generation could emulate. It is very pleasant to find that he is not above benefiting the world by turning this knowledge to practical account in another way. Messrs. Johnstone & Norman have on view at the present time at their show-rooms in Bond-street a portion of the elaborate and beautiful furniture which they are making from Mr. Tadema's designs for the music *salon* of a client in New York. A large cabinet, two settees, and several other pieces of furniture, are already finished, and others, of which the chief is a grand piano, are in course of construction. The principal material used is ebony, and combined with it in the ornaments and mouldings are ivory, cedar, box, and mother-o'-pearl. The ornament of the settees and chairs, which consists principally of foliage and scroll patterns in ebony and ivory, is inlaid in a veneer of cedar nearly  $\frac{1}{2}$ -in. thick, from which it projects about the same thickness,—the raised parts being carved. Most of the legs of the furniture terminate in lions' claws, and the elbows and other similar portions are finished with swans' heads and wings cut out of solid ebony. The mouldings of the cabinet and the backs of

the settees are consistently severe in outline, and the delicacy and good taste of the design excludes any suspicion of that vulgarity which too often characterises modern work on which great wealth of material and labour has been lavished. The silver grey silk cushions and hangings are ornamented with bands of hand embroidery in keeping with the rest. It is only fair to add that the finish of the work, much of which is of a very difficult character, leaves nothing to be desired, and that Mr. Coleman is the artist who has worked out the details under Mr. Tadema. It is proposed that the piano standards shall be of bronze, and we understand that Mr. Gilbert, the sculptor, is at present engaged upon a model for them, the design of which is based upon those lovely marble table standards which all visitors to Pompeii know so well. Mr. Tadema himself will paint the lid of the instrument. The *salon* in New York for which this costly and beautiful work is destined is said to be worthy of it, a statuary marble frieze for it being at present in the hands of a celebrated sculptor at Rome, and a painted ceiling in those of Sir Frederick Leighton here. Really one could put up, after all, with being a millionaire!

THE abrupt closing of that sorely tried Institution, the Alexandra Palace, from the bankruptcy of the lessees, is just what might have been expected, nor is it altogether to be regretted, for it shows the low status to which the trade of exhibition-mongering has been reduced, and may perhaps lead to a decisive check to these rapidly increasing though dubious experiments. The Alexandra International Exhibition was purely an adventurer's scheme, and has failed as such; and, as no educational or international end was served by it, it is just as well perhaps. England is not the only country to which the infection of holding exhibitions has spread so greatly as to become a nuisance and a source of danger: for the New Orleans affair of last winter and spring has also ended with unmistakable loss, and doubtless many others are not far from the same plight, if the truth was known. It becomes a somewhat serious question for manufacturers of this and other countries to consider whether the exhibition game is worth the candle, and whether they, who are the real mainstays of these affairs, have not become, to a considerable extent, the catspaws of the clever promoters, who hope to get either money or kudos from the concern. Few people believe in the purely educational character of these undertakings nowadays, and without supplementary amusements of some kind no exhibition, however interesting in itself, would attract sufficient visitors to make it pay. What is really needed is the establishment of technical museums, not agglomerated in one huge Government building, far from where it is wanted, but dotted over the industrial centres of our great towns; though of this realisation there seems no hope at present. Such a scheme would be of incalculable benefit to the industrial learners and workers, but it would not present sufficient prospects of fashionable publicity to tempt the exhibition *entrepreneurs*.

AT the recent Conference of the "Funeral and Mourning Reform Association," Mr. Seymour Haden exhibited what was described as a *pulp* coffin, but which to all appearance was a wooden one. The bottom was of deal, and the corners and edges were strengthened with wood, and the whole covered with the usual cloth, but without the usual superfluity of nails. The merit of the material employed is that it quickly decays in the earth, and that consequently the sanitary processes of nature are not retarded, while there is no such outrage upon conventionalism as an open wicker coffin involves. The general feeling of the Conference was that cremation,—however "beautiful" in its results, as Dr. Campbell observed,—was outside the region of practical economics, and that the public had better be first instructed in the elements of sanitation, and in the close connexion between the cheapening and the Christianising of funerals.

FROM the *Berliner Philologische Wochen-schrift* we learn that two interesting pieces of mosaic pavement have recently been discovered at Saint Colombe les Vienne. One of the mosaics, three yards long by two wide, has a design with a vase in the middle and fishes round about. The other is a larger and also finer piece of work, about four yards by three. The design consists of birds only, among which are a number of brilliantly-coloured parrots. On the banks of the Rhine, opposite Saint Colombe les Vienne, were a number of Roman villas: from one of these in all probability the mosaic must have come. It was discovered 8 ft. below the ground during the planting of some trees. With the mosaics were found a quantity of fragments of glass and pottery and a number of coins and bronze ornaments. The land belongs to M. Chaumartin, who was himself fortunate enough to find during the excavation of the pavements a fine head of Minerva in mosaic.

THE Palazzo Fava at Bologna, which is as well known on account of the fourth side of its cortile being carried on fine stone brackets, has just received a splendid coating of whitewash, the brick shafts, terra-cotta mouldings, and stone corbels alike being covered. Bologna, however, in spite of such Vandalisms as this, remains a very fine city, and its new streets, which are rapidly, for Italy, on the increase, are not so glaringly offensive in their architecture as many of those which have been opened or rebuilt of late years in London. The main idea of arcades running along the streets is carried throughout in the new work.

THE restorations of the Ducal Palace at Venice are proceeding,—as do most restorations here,—with great deliberation. To judge by results, however, this is a fault on the right side. The celebrated cap at the south-west angle, and the pier supporting it, have been replaced and coloured with so much adroitness that it requires very close examination to detect it. The facade next the Piazzetta which has been for some time free from scaffolding, is a marvel of skilful restoration. The river facade at the east end is now undergoing the same careful treatment. The shoring used to sustain the building, whilst the defective piers and caps on the ground stage are replaced, is very ingenious. The restoration works are open to visitors at certain hours. Many of the old caps are badly crushed, and it is a matter for wonder that one or two which have been placed in the courtyard have not succumbed before. The opposite rule seems to hold good in St. Mark's, where the pavements, especially under the restorer's influence, are rapidly losing their old charm of colour. Bit by bit the scaffolding is being removed both from the interior of the loggia and the exterior and what is revealed,—after looking at the mellow tones of the old work,—appears hard and garish to the eye.

BY permission of the Syndicate of Venice, and under the direction of their engineers, excavations have been made by an American travelling student, Mr. Blackhall, for the purpose of finding out something about the foundations of the Campanile of St. Mark's. What has been discovered has been kept a profound secret, except that certain indications of the ancient level of the piazza have turned up.

THE courtesy of officials and of Italians generally to strangers wishing to sketch is very noticeable, and, though one has to blush to admit it, is a pleasant contrast with what occasionally occurs in England. Chairs, and even tables, are brought out by tradespeople and others, if they see any one standing sketch-book in hand. Academy students who intend visiting Italy should always carry their ivory tickets with them, as these are always ready means of procuring free admission, with permission to sketch, to all galleries, museums, churches, &c., and are everywhere recognised by the authorities.



THE Building Societies' Association seems to have been much exercised by clause 13 of the Land Salubrity Bill for amending the dwellings of the working classes, which they aver would make all purchasers of houses liable for damages to the tenant for any defect in the drainage or otherwise of which the owner had no knowledge. The following is the clause referred to:—

"Whereas by existing law there is implied a condition on letting a furnished house that it is reasonably fit for human habitation, and it is expedient to extend such implication to the letting of unfurnished houses: be it therefore enacted that—

In any contract for letting for human habitation an unfurnished house or part of an unfurnished house, there shall be implied a condition that the house is in all respects reasonably fit for such habitation; and in the event of a breach of such condition as above mentioned, in the case either of a furnished or unfurnished house or any part thereof, any inmate of such house who suffers any loss by injury to health or otherwise in consequence of such breach shall be entitled to recover damages from the person responsible for such breach."

At a meeting on Friday last week, to consider the subject, it was resolved that the clause throws the responsibility of sanitary defects "upon innocent leaseholders and mortgagees," and it was stated that it would be injurious to the building trade as a whole, "no one would purchase under such conditions." Certainly, under such conditions it would be a disadvantage to the purchaser to ascertain that the property was in a sanitary condition, and the owner would have difficulty in selling unless he knew all about his property and had kept it in a proper condition; and the clause seems to us very well adapted to bring about at a desirable state of things. As to the purchaser—" caveat," that is all.

#### THE DERBY MEETING OF THE ROYAL ARCHAEOLOGICAL INSTITUTE.

In selecting Derby as the head-quarters of this year's Congress of the Royal Archaeological Institute, the Council made choice of a district rich, while rich in archaeological remains, and picturesque in its scenery, has not been very frequently traversed by bodies of antiquarianists. Bearing this in mind, and remembering also that few districts are better served with every facility, it might reasonably have been expected that, with the fine weather with which the first two days of the meeting were favoured, there would have been a larger attendance of members and their friends than usual; but in fact of numbers this year's meeting is only an average one. The programme of the first day's proceedings was not completely carried out, owing to the unavoidable absence of several gentlemen who had been expected to take part in the proceedings. In the first place, the appointed "President of the Meeting," the Earl Carnarvon, was precluded from attending, owing to the pressure of official duties which came upon him since the arrangements for the Congress were made. The Mayor was unable to receive the members of the Institute owing to indisposition; and Mr. Beresford-Hope could not be present to give his opening address as President of the Architectural Section, which was deferred to a later

The formal proceedings of the Congress commenced at noon on Tuesday, when the President (Mr. Percy) and members of the Institute were duly received in the Art Gallery of the Free Library by the Deputy-Mayor (Mr. Alderman Gibson) and other members of the Corporation. The Deputy-Mayor, in the course of some words of welcome, pointed out that since, thirty-four years ago (i.e., in 1851), the town and county have been visited by a kindred society, the British Archaeological Association, a flourishing local society had been established, viz., the Derbyshire Archaeological and Natural History Society. The Town Clerk (Mr. H. F. Gadsby) next read a formal address of welcome expressive of the Corporation's appreciation of the work of the Association, and promising all useful help and encouragement in it. Earl Percy, in replying on behalf of the Institute, expressed the hope that the present meeting would be fraught with instruction and benefit to local antiquaries no less than to the members of the Institute at large. Incidentally he referred to the report of the Select Committee of the House of Commons

with regard to the "restoration" of Westminster Hall as suggesting, to those who had votes, the consideration whether their representatives in Parliament did not require some little education yet,—at any rate from an antiquarian point of view. It was to be regretted (he added) that the increased enlightenment of the age did not prevent the perpetration, even by those in authority, of acts which might, without undue harshness, be described as deeds of Vandalism. The Hon. F. Strutt read a telegram from the Bishop of the Diocese (Southwell), and on his behalf and in the name of the Derbyshire Archaeological Society welcomed the members of the Institute to Derbyshire. A formal address of welcome and congratulation from the local society was then read by Mr. Arthur Cox, and this also was acknowledged by Earl Percy. After luncheon the members visited St. Peter's Church, and then proceeded to All Saints' Church, under the guidance of Mr. W. H. St. John Hope. With regard to St. Peter's, it may be observed that this is the only pre-Reformation parish church (fabric) in the town. The north aisle, with its propped-up roof, is in special need of repair at the present moment, and steps are being taken to raise funds for the restoration of the church. (Mr. S. Barton Eckett, *Advertiser* office, Derby, is the hon. sec. of the committee.) Later in the afternoon an excursion was made to Kedleston Hall, where the visitors were invited by Lord Scarsdale to take tea. Kedleston Hall is a mansion built (on the site of a former house) by Sir Nathaniel Curzon, and finished about 1765. The architect was Robert Adam. The saloon, circular in plan, 42 ft. in diameter and 55 ft. high, with domed roof, is a fine apartment. The hall is graced by a series of twenty alabaster columns, each 25 ft. high. Kedleston Church was also visited, and the monuments of the Curzon family inspected. The church, which is cruciform, is now being restored by Mr. John Oldrid Scott, at the cost of Lord Scarsdale, who is in orders and holds the living himself.

The first of the sectional meetings to be opened was that of the Antiquarian Section, which met in the Art Gallery of the Free Library at eight o'clock on Tuesday evening, when the President of the Section, the Rev. J. C. Cox, LL.D., delivered his opening address, which was mainly confined to an interesting and suggestive enumeration and examination of some of the place-names and field-names of Derbyshire. He pointed out the great value of the preservation of local names, and remarked on the light which their study was capable of throwing on the historical, social, and industrial aspects of the localities to which they were attached. They also afforded indications of the flora and fauna of bygone ages. It was true that the study of place-names led one into the thorny paths of etymology, and that wide differences often prevailed amongst etymologists as to the derivation of place-names. Nevertheless, in spite of its difficulties, the study of this subject was exceedingly interesting and inviting. Much valuable information was often to be gleaned from ancient parish maps, which were not always to be found in the possession of their lawful custodians. He had discovered some in lawyers' offices, and in one case that he knew of the map had been placed in the hands of the sexton, a man whose bibulous propensities had led him to deposit the map with the village beer-shop-keeper as some security for the settlement of his "score." Field-names, no less than place-names, were full of significance to those who had looked into the subject. Some were indicative of the foolish way in which special crops were attempted to be forced by law upon the people; for there were few parishes that had not a "flax-piece," bearing witness to the futile legislation of 24 Henry VIII. Others, again, told of trades now extinct, or of metals long worked out. Having regard to the ethnological aspect of place-names, instancing only the Norse invasions and incursions, Derbyshire was remarkable for the admixture of its nomenclature. The two chief divisions of the Norsemen who settled in England were the Danes and the Norwegians,—the former chiefly on the east coast, and the latter on the north-west coast, having sailed round Scotland. Taking the commonest of their distinguishing place-terminals, it was found that whilst *thwaite*, the distinctive Norwegian suffix, occurred forty-three times in Cumber-

land, it was found not once in Lincolnshire; on the other hand, *thorpe*, one of the chief Danish test words, which occurred sixty-three times in Lincolnshire, was found only once in Cumberland. In Derbyshire, alone in England, these suffixes were blended. Having touched on the place-names and field-names of Derbyshire which were of ecclesiastical or religious interest, Dr. Cox concluded by entering a plea for conservatism in the matter of the retention of old names. There might, he contended, be Vandalism with regard to the names of places as well as in connexion with the fabrics of buildings. In an interesting book lately published,\* the author had shown what irreparable mischief had been done by changing the names of London streets. The Corporation of Derby had been good enough, earlier in the day, to express their interest in the work of the Archaeological Institute, and therefore he hoped that the governing body of the town would speedily restore to Derby the name of one of its oldest streets, viz., "Bag-lane." For that name, which had existed since the time of Edward II., the Corporation had substituted the cognomen of "East-street." He believed that it had even been proposed that the new name should be "Commercial-street," apparently because it was supposed that the old name had some connexion with bagmen.

Mr. R. S. Ferguson, of Carlisle, in proposing a vote of thanks to Dr. Cox for his paper, referred to the meaningless substitution of new names for old which had taken place in London, as, for instance, the changing of "Grub-street" into "Milton-street." The same sort of thing, he regretted to say, had taken place in Carlisle, where the old names of "Bull-ring" and "Glover's-row" had been replaced by "Green-market."

The Rev. Prebendary Scarth having seconded the vote of thanks, Dr. Cox briefly replied, instancing, as another needless change of name, the recent substitution by the Corporation of Derby of "Great Northern-road" for a street the old designation of which was "Dog Kennel-lane."

A paper on "Roman Nottingham," announced to be read by Mr. W. T. Watkin, was postponed, and the opening of the Architectural Section was also postponed, owing to the unavoidable absence of its President, Mr. Beresford-Hope. The proceedings of the Antiquarian Section were therefore continued, and

The Rev. Prebendary Scarth read an interesting paper, entitled "Notes on Roman Derby and the Roman Stations and Roads in Derbyshire, and on the Traces of Ancient Mining." He observed that the town of Derby, situated in the ancient territory of the Coritavi or Coritani, owed its name, and probably its origin, to a Roman station on the eastern side of the River Derwent. *Derbentio* was one of the names on the Ravenna list, and that name came from the river on which it was situated, the Derwent, and the river preserved the old British appellation, "*Dur*" being the Celtic name for "water." Thus "*Derbentio*" was the station on the *Dur* or water. That it was a station of importance might be inferred from its being the central point of five Roman roads. The remains of the station or camp were to be seen at Little Chester, half a mile from Derby. The camp was examined in 1721 by Dr. Stukeley, who traced its walls, and described them as forming a square or quadrangular figure, 500 ft. by 600 ft., enclosing an area of about seven acres,—not an unusual size for a Roman fortified camp or city. Within the walls foundations of houses were to be traced, and also in the fields outside the castrum, where the traces of streets were to be seen in Stukeley's time. According to Mr. Llewellyn Jewitt, the coins found on the site would indicate that the station was occupied during nearly the whole period of the Roman power in Britain. Mr. Thompson Watkin, in a very clear and able paper on the Roman stations in Derbyshire, mentions that, in the winter of 1873-4, a former vicar of St. Paul's, Derby (the vicarage of which is at Little Chester), excavated portions of a raised bank which runs along one side of the vicarage garden, and in it he discovered a great quantity of all kinds of Roman pottery. The finding of three pigs of run lead in 1873, two on Matlock Moor and one on Cromford Moor, all having inscriptions, is indicative of the working of the mines of Derbyshire in the

\* Mr. Laurence Hutton's "Literary Landmarks of London."



Roman period. These pigs of lead are now in the British Museum. The subject of Roman mining in Britain is one which is full of interest. Derbyshire, as well as Shropshire, Somersetshire, Yorkshire, the Forest of Dean, and North Wales, bear testimony to the extent to which lead and iron ore were worked in Roman times. Of places of note in Roman Derbyshire, Buxton, the ancient *Aqua*, and known for its warm springs, must hold the chief place. Here remains of an ancient bath have been found. *Aqua* is mentioned in the *Ravena* list next to *Norio*, and portions of a military, or Roman milestone, discovered some years since, settles the position of the latter place. This interesting fragment is now in the museum of the Natural History Society at Derby. There is another Roman camp of importance which must be noticed in treating of the Roman occupation of Derbyshire, and that is Melandra Castle. It is situated in a commanding position at the junction of two streams, the Edrow and the Dinting Brook, and is a parallelogram in form, measuring about 122 yards by 112 yards. The ramparts can be clearly traced, and are about 6 ft. or 7 ft. high, and about 9 ft. in thickness, the hewn stone remaining. The ditches were also traceable when the Rev. J. Watson described the remains to the Society of Antiquaries in 1792. These were only needed on two sides. Remains of buildings were formerly to be traced; these are now removed. The four gateways are distinct, in the centre of the four sides, and the foundations of a building, 25 yards square, are to be seen in the area on the south-west of the station. It is much to be regretted that a careful record has not been kept of the Roman remains found at Buxton, which must have been a place of resort for health, like Bath. It is not known if Buxton was a fortified city in Roman times, similar to Bath, where the foundations of a Roman wall have been traced, or whether it was an open, undefended town, similar to that lately discovered in France, near to Poitiers. It is not probable that, in a wild country like that of the Coriari, a warlike people who could have been only partially subdued, the town was undefended. Derbyshire is known for its iron workings, in very early times, as well as for its lead mines, but no Roman pigs of iron are recorded to have been found, so far as the lecturer could ascertain. The ironstone district extends northward from Dale Abbey through the hundred of Scarsdale into Yorkshire. Iron was as much in request among the Romans as lead, and this may be seen by the workings left by that people in the Forest of Dean, in Gloucestershire, where pigs of Roman iron have also been found. Traces of a very primitive population still exist in Derbyshire, and iron as well as lead may have been worked by them.

With a vote of thanks to Prebendary Scarth for his paper, Tuesday's proceedings came to a close.

On Wednesday, a party of about 100 ladies and gentlemen started in breaks and wagnettes for Ashburne, thirteen miles by road from Derby. Proceeding to the very interesting parish church, with its fine tower and spire, locally known as "the Pride of the Peak," the visitors were very kindly received by the energetic vicar, the Rev. F. Jourdain, and by him conducted over the church, which has several peculiarities. Built in the form of a cross, it consists on plan of chancel, north and south transepts, and nave with a south side aisle, or, as it is sometimes called, a double nave. From the centre piers rises a bold tower, surmounted by a spire which attains to an elevation of 210 ft., according to Cox's "Churches of Derbyshire." Some idea of the general proportions of the church may be gathered from a statement of its principal dimensions. The chancel is 65 ft. by 25 ft.; the total length of the church is 180 ft.; the transepts, which are double, being divided by piers and arches, are 85 ft. by 40 ft.; and the height of the nave is 55 ft. Of the Norman church no remains exist, save a few stones found during the restoration. The chancel and transepts are of the Early English period, though not all of one date. There is evidence, however, that they must be prior to 1241, in which year the church was consecrated and dedicated to St. Oswald, king and martyr. The ground plan was completed in the Decorated

period by the rebuilding of the nave, adding to it a south aisle, and erecting the central tower. During the Perpendicular period the walls were raised by the addition of clearstories. All the important monuments in the church are now placed in the north transept and its aisle. They are nearly all to members of the Cockayne family. The earliest is an altar tomb, with fine alabaster effigies of John Cockayne (not in armour), who died in 1372, and his son Edmund, killed at the battle of Shrewsbury in 1404. In the north transept, with the Cockayne monuments, is Banks's famous figure of Penelope Boothby, who died in 1791, at the age of seven. The vicar, the Rev. F. Jourdain, in conducting the visitors over the church, pointed out the nature of the extensive restorations which he has carried out within the last six or seven years, restorations which, it appears, have been carried out under Mr. Jourdain's personal superintendence, without the help of a professional architect. Although, in one or two matters, exception might be (and was) taken to what has been done, the general opinion expressed by the visitors on Wednesday was that the vicar was entitled to thanks for the conservative and intelligent manner in which, on the whole, he has carried on the work of restoration. On Mr. Jourdain's advent, the church was hideously deformed, mutilated, and hidden from view by galleries and other erections of more than usual extent and unsightliness. Some of these monstrosities were not swept away without protests on the part of the Society for the Protection of Ancient Buildings, who put in their well-worn plea that to remove them was "to interfere with the history of the building." Among other good things done by Mr. Jourdain is the restoration of the west doorway, which, he informed the visitors, was entirely closed up so late as 1839, "because of the draught to Sir William Boothby's back." The doorway, as it now exists, was stated to be a faithful reproduction of the feature as it existed prior to 1839. Some interesting traces of frescoes were found during the restoration, and drawings of these were exhibited. One of the lancet windows in the north transept is filled with thirteenth-century glass. The chancel was restored in 1866-7, under the direction of Sir Gilbert Scott, who considerably raised the level of the floor (as may be seen by the proximity to it of the old piscina), thereby covering up, Mr. Jourdain feared, some interesting monumental slabs. At any rate, he knew of one instance, and he thought there must be others, for, although the church was obviously one of very considerable importance, very few slabs of note had been found in the course of the more recent works.

Luncheon having been partaken of in a tent in a meadow overlooking the churchyard (with none the less zest because of the announcement that the half-crowns paid for it would all go towards defraying the cost of the restoration, the parishioners having given all the viands), Earl Percy, the President of the Institute, tendered the thanks of the members to the vicar for the kindness he had shown to them. Mr. Jourdain, in a few words of reply, expressed his gratification at the interest which the visitors had taken in the church, and referred to the valuable assistance he had received in the work of restoration from the late Mr. Abbott, from his churchwardens, and from his parishioners at large, who, irrespective of creed, had co-operated with him in his desire to see the church restored to a condition worthy of itself,—a state of things which not only speaks well for the parishioners, but bears testimony to the personal qualities of the vicar.

Again taking their seats in the carriages, the visitors proceeded to Norbury, a village five miles to the south of Ashburne, containing two buildings of great interest, the church and the manor-house. The church, which is dedicated to St. Mary-the-Virgin, consists of chancel, nave, north aisle, and tower, the latter being somewhat remarkable for its position between two chapels on the south side of the nave. The chancel is unusually large, in proportion to the rest of the building, the length of the nave being 49 ft. 3 in., and that of the chancel 46 ft. 6 in.\* The church is of Late Decorated date, with somewhat singular details. The nave arcade is of Decorated work, but the aisle was rebuilt by Nicholas Fitzherbert before

1473. He also added the clearstory. The tower and adjacent chapels are somewhat later. The church is noteworthy for the number and beauty of its monuments, and also for the amount of old glass it contains. The Rev. Dr. Cox conducted the visitors over the church, and, in reference to the tombs of the Fitzherberts, pointed out the large slab in the floor of the chancel, with a brass to Sir Anthony Fitzherbert, "one of the King's Justices of the Common Bench," who died in 1538. It is a curious instance of the irony of fate that, though this same Sir Anthony Fitzherbert strongly protested against the despoiling of the monasteries, and particularly enjoined that none of his descendants should hold lands which had been filched from the monks, his memorial brass at Norbury, a palimpsest, has been taken from the tomb of a monk, as an inscription and figure on the under side of it clearly showed. Mr. St. John Hope having said a few words about the monuments, the visitors proceeded under the leadership of the Rev. Dr. Cox, to the old manor-house. At first sight the building, which is situate close to the south-west corner of the church, looks like an ordinary farmhouse about 150 years old; but an inspection of the interior of the building will show that the remains of a far more ancient structure are incorporated with it, being in great part concealed externally by the comparatively modern casing of red brick. The manor was originally given by Henry de Ferrers to Tutbury Priory, circa 1080, but in 1125 the Priory gave Norbury in fee-farm to William Fitzherbert at a yearly rental of 100s. It was thus held till 1444, when the Fitzherberts obtained it absolutely by exchange. Of the original manor-house practically nothing is known. It was entirely rebuilt by Sir Henry Fitzherbert, who succeeded as fifth Lord of Norbury in 1267, and was living in 1310. The new building consisted of two courts, outer and inner. The only parts remaining are the south and east sides of the inner court. The latter part comprises the great hall. Dr. Cox quoted further particulars from an interesting paper published by him entitled "Norbury Manor-house and the Troubles of the Fitzherberts," and many of the visitors afterwards inspected an upper room, known as Sir Anthony Fitzherbert's study, in which there is some good oak panelling, some of the panels bearing painted black-letter texts from the Vulgate.

Resuming their seats in the carriages, the visitors were next driven to Longford, where the interesting church, dedicated to St. Chad, was inspected. It consists of chancel, nave, with aisles and south porch, and a western tower. Of the church that was erected here circa 1100, there are considerable remains. The arcades between the nave and aisles were curiously treated in the fourteenth century. One pointed arch and a respond at the west end are of Decorated date, the remaining Norman arches being left untouched; but, on the south side, the Norman capitals of the pillars were rather clumsily cut into Decorated mouldings, from which, and from two responds of that period, spring four pointed arches. So says Dr. Cox in his "Churches of Derbyshire," and he repeated the statement on Wednesday; but it was pointed out by one of the visitors that the pillars on the south side must either have been smaller originally than those on the north side, or they must have been reduced in diameter when the capitals were altered, for they are certainly smaller now. There are some good monuments in the church, but they have been most capriciously moved about from time to time. Of the series of Longford knightly effigies, the earliest is that now in the south aisle; the arch under which it lies is not, however, its original place.

Leaving the church, the visitors took to the carriages again and left for Derby, a distance of ten miles from Longford. This, the last part of the day's round, was accomplished amid many difficulties, owing to the tired and "done-up" condition of the horses. It would surely be well in future, especially where such hilly districts as Derbyshire have to be traversed by road, not to attempt to cover too much ground in one day, for where such attempts are made there is not sufficient time to examine the buildings visited; moreover, the horses should be considered. Those which were employed to draw the wagnettes on Wednesday must have travelled between 35 and 40 miles. The weather was all that could have been desired.

\* "Notes on the Churches of Derbyshire," by the Rev. J. Charles Cox, LL.D. London and Derby: Bennet & Sons.

\* This (as stated in the very useful "Notes on Places to be Visited," prepared for the members of the Congress, by Mr. W. H. St. John Hope, M.A., F.S.A.) is a peculiarity found in several of the Derbyshire churches, e.g., Dronfield, Sandiacre, Tidewell, and St. Peter's, Derby.



consequence of the delayed return of the Unionists, the opening meeting of the Historical Section of the congress, over which the Dean of Lichfield presides, was held nearly an hour late. The Dean, in an eloquent address, dwelt on the great value of the labours of the epigraphist to the historian. The Rev. Prebendary Scarth having made a few observations on the paper, the Rev. Sir Talbot Baker moved, the Rev. Dr. Cox seconded, a vote of thanks to the Dean. Professor E. C. Clarke, of Cambridge, followed with a learned paper on Romano-Greek Inscriptions found in England, which was discussed at some length by the Rev. Father Hirst (who expressed his satisfaction that the study of epigraphy was at last beginning to receive attention in England), Mr. Hilton, F.S.A., the Rev. Prebendary Scarth, the Rev. G. F. Browne. Thanks having been given to Professor Clarke, the meeting adjourned at a late hour on Wednesday evening. We shall continue our special report of the proceedings next week.

#### LETTER FROM PARIS.

Last week we have lost two artists of great merit, who leave general regrets behind them; Magne, Honorary Inspector-General of Architectural Works of Paris, and M. Schœnewerk, the sculptor. The first died at the age of 70, after a short illness; the second committed suicide. This latter calamitous event seems to have been owing to the disheartening effect arising from an idea of the want of success of his career. Schœnewerk was in full possession of his powers, and in more than usual circumstances. Unhappily, his wife had been obliged to be confined in a lunatic asylum, and the poor artist, left a prey to sombre meditations, has been the victim of a mental aberration.

Schœnewerk was a pupil of David d'Angers and of Triqueti. He obtained numerous Salons medals, and was "décoré" in 1873. More recently, he completed, for the grand staircase of the Hôtel de Ville, a group in stone, symbolising "Instruction," and which is remarkable for the simplicity of its lines and the grace and elegance of the figures.

Magne leaves a considerable amount of work behind him. After having studied at the École des Beaux Arts, in the ateliers of Lepin and Debret, he obtained, in 1858, the Grand Prix de Rome, and various awards at the Salon, especially the "première médaille," in 1878, and was named Officer of the Legion of Honour in 1879. Among his principal works may be mentioned the Église St. Bernard (XVIIIth Arrondissement), the École d'Angers, the new Horse Market, and the Gare de Vandœuvre. His son, M. Lucien Magne, is also an architect, who has made a careful study of archaeological restorations, and is about to produce a work of great interest on the subject of the restoration of the windows.

Paris is by this time itself again. The last provincial trains have taken away the last of provincial visitors; and the vestiges of the annual fête, including the innumerable shows which have for a month past turned the town into a vast fair, are everywhere disappearing. The streets and the public monuments have recovered their usual physiognomy, and too late to speak of the 14th of July, of which the programme is necessarily the same every year. We may say once more, however, the Palace of the Trocadéro lent itself admirably to the effect of the coloured illumination which made the salient point in the amusements of the evening. When the gas outlined the lines of the superimposed arcades of galleries and the silhouette of the canopies and dome, the ungraceful and incommensurable work of the late M. Davidoud, and, in this apothecia, an unexpected scenic effect, worthy of the Arabian Nights, and this time the art of the engineer corrected the errors of the architect. We announced in our last letter, that the annual Fête had served as the pretext for a series of inaugurations; at Paris, statues of the late Béranger, and the "alienist" Pinel; statues, that of the mathematician Bezout; the statue, that of the Abbé Grégoire. We sufficiently given our appreciation of the statue, so far as the work of the sculptor is concerned; as for the pedestal designed by Formigé (who, by the way, is to receive a

decoration) we regret that we cannot praise that either, unreservedly; the lines are simple and severe, but it is out of scale, and the architect has not sufficiently taken account of the restricted space and of the height of the wing of the Institute which forms a background to it. The only thing one can thoroughly praise is the conciseness of the inscription, which stands thus,—

VOLTAIRE  
1694—1778.

for, however we may dissent from him, Voltaire is one of those names which can dispense with long and formal inscriptions.

Much better, to our mind, is the statue of the popular "chansonnier" which rises in the Square Du Temple. Its author, M. Doublemard, has been able to produce, from his personal recollections, a likeness striking both in feature and attitude, to all those who, like the present writer, knew Béranger in their boyhood. The pedestal, designed by M. Yvon, the architect, is simple and of perfect proportion, and decorated with attributes in bronze, also designed by M. Doublemard.

We may take occasion from this double ceremony to notify to tourists and amateurs of historic relics that the Musée Camargolet preserves piously the *fauteuil* on which Voltaire died, and the last-worn garments of Béranger, his cane, his snuff-box, and the memoranda-books in which he wrote his private notes.

The monument to Pinel is a creditable but rather dry production of M. Ludovic Durand, who has represented the "benefacteur des aliénés" at the moment when he is breaking the fetters of a young lunatic woman seated at his feet, and who offers him flowers. The pedestal, the work of M. Menjou de Dammarin, architect, is adorned with allegorical figures, and the whole constitutes a group sufficiently decorative in effect, rising before the gate of the Hospice de la Salpêtrière.

Let us not forget one more inauguration, that of the "École Normale Supérieure," a monument to the memory of Louis Thuillier, the young savant who died two years ago at Alexandria, a victim of cholera, and whose bust in bronze, a work of the lamented Idzac, rests on a marble console, decorated with a commemorative inscription. We may add that, much as "statue-mania" has been abused among us of late years, no one will criticise an act of public homage which has the advantage of being apart from political pre-occupations. Thus all parties joined also, without hesitation, in sanctioning the action of the Municipal Council in ordering for the Hôtel de Ville a bust of Sergeant Bobillot, who fell gloriously at the siege of Tuyen-quan. The execution of the work has been intrusted to a young sculptor, M. Henri Dubois.

There is talk, also, in official circles, of presently inaugurating various buildings for public instruction, on the left bank of the river. There is, first, a new school of medicine which occupies an area of about 7,000 mètres between the street of that name and the Boulevard St. Germain, where it develops into a monumental façade decorated with two Caryatides by Crank, symbolising "La Médecine" and "La Chirurgie." Then, there is the "École Pratique de Médecine," which comprises, in its enclosure, the Musée Dupuytren and the ancient "Cloître des Cordeliers." When these works are complete, the habitations placed at the disposal of the Faculty of Medicine for all purposes of instruction will have an extent of more than 40,000 square mètres, while, before 1870, the Faculty possessed only a space of 7,000 mètres, with buildings in a deplorable and very insanitary condition. We can safely affirm that the two buildings are highly creditable to M. Ginain, their architect, who has contrived in the face of many difficulties to complete this work, without which the studies of the medical pupils might any day have been interrupted.

We must also notice the approaching inauguration, at Sceaux, of the Lycée Lakanal, a building planned by M. Baudot, under special conditions in regard to hygiene, comfort and complete scholastic arrangement. We may speak later of this model school.

As to the laying of the first stone of the Sorbonne, which is to take place on Monday, the 3rd of August, as this coincides with the distribution of prizes for the general competition of the "Lycées" of Paris, the Municipal Government intended to give to that ceremony an exceptional solemnisation.

If the artistic level of the works exhibited this year left something to be desired, at least the financial results of the Salon have been most practically satisfactory. The total receipts, which in 1884 were only 290,000 francs, have this year reached 350,000 francs, without counting the extra sum from the new entrance-fee charged on "varnishing-day," which made up a purse of 25,000 for the relief of the wounded at Tonkin.

At this time of year there is little artistic news. The great public works still hang fire, and as the Government will come to no decision in regard to the Metropolitan Railway and the Exhibition of 1889, and as on its side the municipality seems to hesitate about proceeding with the decoration of the Hôtel de Ville, our news is reduced to a small budget.

We will confine ourselves to the announcements:—(1) That MM. E. Barrios and Antonin Mercié are intrusted by the Committee of the Jockey Club with composing the models of the two works of art intended to be reproduced in silver, and presented as prizes at the approaching races.

(2) That the Municipal Council of Paris has authorised the construction of a "maison de retraite," for which M. Galignani left to the city of Paris a considerable sum. This foundation is intended to receive, according to the will of its generous benefactor, 100 persons of both sexes, over sixty years of age and without means of subsistence. This edifice, the cost of which will exceed 1,200,000 francs, will be constructed at Neuilly on the Seine, on a large plot of land, also left for this object by M. Galignani, whose name will become as popular in Paris as that of Sir Richard Wallace.

The art journals give a lamentable description of the present state of the Fort St. Denis, which, some days since, disappeared behind the scaffolding erected with a view to its restoration. It was high time. It is said even that it is already too late, and that it is in an alarming condition. It will be necessary, it appears, to replace many of the figures and a portion of the ornaments. If the remedy is applied too late, it is certainly not for want of previous warnings to which the Ministère des Beaux Arts has paid no attention.

We may terminate this letter by remarking on a new example of the unfortunately too common carelessness of the Commission des Monuments Historiques. In the last number of the *Builder*, under the title "Vicissitudes of a Royal Château in France," a picture was drawn of the state to which the Château of Villers-Cotterets is reduced, in becoming an asylum of vagabonds and mendicants. As a pendant to that act of administrative vandalism, according to certain journals, the Administration de la Guerre is taking possession of the Château of Fontainebleau, and installing there its school of "application du génie." If the "Direction des Domaines Nationaux" do not look after the matter, the whole château will soon be transformed into a military school, and the ancient forest will be no more than a shooting-range and an exercising-ground. Certainly no school more deserves our sympathies; but, while giving them freely all the land they want, would it not be as well if the military authority were to consult the "Commission des Monuments Historiques" in regard to their projected gifts?

Let us hope that in view of the just demands of the Parisian press the Government will show a little more care in regard to its artistic riches, and that it will leave to tourists, painters, and archaeologists the Château of Fontainebleau, its curiosities, its relics, its gardens, and the picturesque views in its marvellous forest.

#### ROYAL ACADEMY STUDENTS.

ADMISSIONS TO ARCHITECTURAL SCHOOL,  
JULY, 1885.

*Students of Upper School.*—Messrs. H. A. Satchell, J. E. Sears, J. M. Townsend, F. W. Troup, W. H. Woodroffe, and E. Woodthorpe.

*Students of Lower School.*—Messrs. W. Alford, A. E. Barnsley, F. D. Bedford, T. Davison, C. D. Fitzroy, P. N. Ginhann, J. E. Inglis, F. J. James, G. L. Jones, G. F. McCombie, and R. F. Macdonald.

*Probationers.*—Messrs. S. H. Barnsley, W. R. Butler, C. J. H. Cooper, G. W. Cooper, W. F. W. Cooper, A. A. Cox, A. H. Hart, C. S. Haywood, J. A. Morris, R. L. Pearce, S. Piper, F. C. Ryde, A. D. Shortridge, A. E. Vickers, T. L. Worthington, and A. N. Wilson.



# THE ARCHITECTURAL ASSOCIATION. VISIT TO CROYDON.

THE Architectural Association, on Saturday, the 25th of July, made an excursion, in the first instance, to St. Michael's, Croydon, the fine church, built in 1882 from the designs of Mr. Pearson, R.A., at a cost of 16,800l. The plan of the church is cruciform, with apsidal chancel, with ambulatory round it. On the south side of the choir is the morning chapel, which is the most charming feature of the church. The chapel is separated from the choir by a narrow aisle, and the east wall of the transept is pierced with an arcade of three arches. The vaulting of the chapel is carried on four columns, which range with the columns in the aisle and transept. The organ occupies the corresponding position in the chapel on the north side of the choir, and is placed in an organ-chamber on the triforium level, the space underneath being vaulted. The width of the nave is 25 ft., and the height to the boss of the vaulting ribs, 69 ft. The entire church is vaulted with stone ribs and stock bricks similar to the walls. The west end has a small gallery. The church will, when the permanent benches are provided, seat 900. The building is complete as far as the church is concerned, with the exception of the benches. The vestries, and south porch, and tower have yet to be built. The proposed tower and spire are about 217 ft. high.

Externally the church is faced with red bricks and tile roofs, the east end having two bold turrets. The design of the church is Early English in character, the detail being very like that of the Yorkshire abbeys. After leaving the church the members walked by the side of the Wandle to Beddington Church and Hall. The present church was built in the early part of the fifteenth century, and was restored by Mr. J. Clarke in 1868. The interior has been elaborately decorated by Messrs. Clayton & Bell. The Carew Chapel contains some interesting monuments. One to the memory of Richard Carew, who died in 1520, has been illustrated in Pugin's examples, as well as the oak-screen separating the chapel from the chancel. There is also a handsome Elizabethan monument to the memory of Sir Francis Carew in the chapel. The only portion of the original building of the Carew mansion now existing is the hall, which is used as the dining-hall of the Orphan Asylum, which has been built to it. The roof of the hall is a very fine, bold hammer-beam roof, the old panelling and screen illustrated in Nash's book have been removed. In the hall is an old lock, which has been illustrated by Pugin in his examples. After having seen the church, the members went into the park, and Mr. Leverton gave a short account of the Carew family.

There are two manors mentioned in Doomsday book under the name of Beddington, and which appear to correspond with this, afterwards called Home Beddington or West Court, and Huscroft Manor.

In 1345 the manor of Home Beddington was in the possession of Sir Richard de Wyloghby. He had an only daughter, Lucy, whose second husband was a Nicholas Carew. Carew succeeded to his father-in-law's estate, and shortly afterwards purchased the adjoining property of Huscroft Manor, and so united the two, and they remained in the possession of the same family (excepting a short period) until very recent times.

This Nicholas Carew seems to have been a man of considerable talent. In 1362 he was a Knight of the Shire for Surrey, and in 1372 was made Keeper of the Privy Seal by Edward III., and subsequently made one of his executors. It is supposed that the present church was built during his time. This surmise is corroborated by a bequest of 20l., which he made. The Carew chapel was built some time about 1520. Nicholas died in 1432, and was succeeded by his son, and subsequently grandson and great-grandson, all of whom were named Nicholas. The last of these died in 1456, leaving an only son, a minor. He died without issue, and the manor passed to his cousin Richard. Richard distinguished himself at the Battle of Blackheath, in 1497, and was made a knight banneret. He afterwards held the high office of Lieutenant of Calais during the reign of Henry VII., and, Henry VIII. dying in 1520, he was buried in the church, and the monument erected to his memory which Pugin illustrated.

His son, another Nicholas, succeeded, and was also appointed to his father's post of Lieutenant of Calais. He became a very great favourite of Henry VIII., and was appointed Master of the Horse and a K.G. Notwithstanding these favours, he appears to have joined in a conspiracy with a number of zealous Catholics to overthrow the Government, and place Cardinal Pole on the throne. The plot was discovered, and the conspirators were all executed. Sir Nicholas was beheaded on Tower Hill, and buried in St. Botolph's, Bishopsgate. Some accounts say that he was not really concerned in the plot, but he had the misfortune to incur the king's displeasure on account of some jest or game in which his Majesty's came off second best. The estates, being forfeited, were seized by the Crown, but in 1554 Sir Francis, the son of the conspirator, obtained the favour of Queen Elizabeth, and had them restored to him. Sir Francis built the mansion, the only remains of which now are the hall, and had the honour of being twice visited by his sovereign. A quaint story is told in connexion with one of these visits about a cherry-tree. It is said that a canvas screen was placed over the tree, and by constant wetting the ripening of the fruit was retarded. A few days before the Queen arrived the canvas was taken off, and the fruit ripened rapidly, and the tree was covered with fine cherries more than a month after all others had lost their fruit.

The first orange-trees ever seen in England were raised by Sir Francis from seeds brought over by Sir Walter Raleigh, who married his niece. The orangery in turn became very famous, and one year upwards of 10,000 oranges were picked; the trees were all destroyed by frost in 1739. Sir Francis died unmarried in 1611, aged eighty-one, and was succeeded by his nephew and adopted son, Sir Nicholas Throckmorton, who assumed the name and arms of Carew. The monument in the Carew Chapel to Sir Francis was erected by Nicholas, and the figures in front are supposed to represent the latter and his family. The manor passed on regularly from father to son, and nothing of importance happened till 1707 when the entire house, with the exception of the hall, was rebuilt by Nicholas Carew. Soon after, the interior of the north wing was destroyed by fire, and was never restored. This Nicholas was created a baronet in 1714 by Queen Anne; he died in 1726-27, and was succeeded by his grandson, on whose decease the property passed to his only surviving daughter, Catherine; at her death it passed to Richard Gee, of Orpington, Kent, a descendant of Philippa Carew, an aunt of the Sir Nicholas who rebuilt the house. There is a brass of this lady's in the church, which also commemorates her thirteen brothers and sisters. Richard Gee assumed the name of Carew by a special Act, and after him the property passed to relations more or less remote. In 1828 Admiral Sir Benjamin Halliwell, who distinguished himself at the Battle of the Nile, came into possession, and, following the practice of his predecessors, assumed the name and arms of Carew. The property passed out of the family in 1864, and very soon afterwards the whole of the house, except the Elizabethan hall, was gutted by a great fire. The house has now been converted into a female Orphan Asylum.

The park, now the property of the Rev. Canon Bridges, is thrown open to the public, and has some charming lodges from the designs of Mr. J. Clarke.

## THE NATIONAL COMPETITION EXHIBITION OF 1885.

THE national competition for medals and prizes offered by the Science and Art Department to all the art schools and classes which are in connexion with that department has just concluded; and the premiated drawings, models, and paintings numbering some 450, are displayed in the lofty cross-lighted central block of buildings in which the National Portrait and Scientific Collections are exhibited. The collection of students' work, cramped into screened crowded together, deserves better treatment than this, and it is to be hoped that some place more suitable than that assigned to it this year may be found for the exhibition in the future. The special interest of this annual collection of art students' work, which from time to time has been commented upon in the *Builder*, lies in the

fact that it represents the yearly outcome of the State-aided system, in the upper branches of instruction in art, as regards the whole of the United Kingdom. The highest numbers reached of students' works submitted for examination has been touched this year. 255,000 of such works have been sent to St. Kensington. A preliminary examination of them was held, with the result that some two hundred of them were chosen to be put forward for the national competition. Of twelve hundred, 451 have won the distinction of awards of gold, silver, and bronze medals and national book prizes. The awarding of these medals and national prizes was undertaken by a committee of examiners composed as follows:—Mr. G. D. Leslie, R.A.; Mr. V. Yeames, R.A.; Mr. H. S. Marks, R.A.; Mr. H. H. Armistead, R.A.; Mr. Hamo Thornycroft, R.A.; Mr. W. Morris; Mr. G. Aitchison, R.A.; Mr. J. J. Stevenson; Professor W. Uwin; Mr. Walter Crane; Mr. Alan S. C. M. T. Armstrong, director for art; and Mr. A. Bowler, assistant director for art.

We propose to briefly notice those drawings and models which have an application to architecture and decoration. Of these, the following analysis of the list of rewarded works may have some interest for our readers. Taking sections of awards as set out in the public list, we commence with the gold medals. Twelve gold medals have been given for the best twelve works in the most advanced class of study, and three of the twelve are awarded for subjects germane to this notice. Will Moore, of Grosvenor, receives a gold medal for design in outline for a ceiling. And Erskine, of Manchester, receives a silver award for a set of designs for a cathedral church, and Edward Taylor takes a medal of the same grade for designs for the interior decoration of a building. Out of the sixty-six silver medals awarded, eighteen are given for architecture and decorative designs and measured drawings, executed from buildings or monumental subjects. In the special division of honorary awards to students of the Training Class at South Kensington, twelve silver medals are made for the same class of work. Henry Collins, of Reading, gains a silver medal for his design for a grand pavilion for the honorary awards of this grade are made. John Lee for a design for a school of art, exhibition, and picture galleries, and to Alfred Harcourt for a design for a public school building, modelled panels and friezes, silver medals for honorary awards have been gained by Richard Ferris, of Glasgow, and John Cassidy, of Manchester, and by the following students of the Training Class,—Edward Crompton, Edy Toft, Alexander Fisher, and John Fisher (for models for panels). John Willdigg's column, from Hanley, earns a silver medal; the corresponding honorary award is carried by William Busk, of the Training Class, for design for a bronze and marble fountain. Students of the Leicester School of Art, Eric Gimson and Samuel Pick, earn silver medals for their designs for furniture and chimney-pieces, and Edgar Turner, of the West London School of Art, has a similar distinction for design for a frieze of this grade for wrought-iron gates come from Manchester School of Art, and are by John Macfarlane and Francis Moore, who each receive a silver medal. Furniture textiles, Sidney Mawson and Constantine Procopides, of Manchester, as well as Henry Holdsworth, of Halifax (for carpet), have won silver medals. Richard Cadness, of Manchester, has the prize for a design for a stained-glass window. Four students equally distinguish themselves by their execution of pen-and-ink drawings done from specimens of architectural decorative structures, the details of which have been carefully measured and worked out to scale. Charles B. Howdill and F. Mitchell Leeds, have produced drawings of the chancel-screen in St. John's Church, Leeds, a fine Jacobean carving, dated 1635, and is apparently quite unappreciated by, if not unknown to, the numerous writers of guide-books and treatises about Leeds and the architecture of its neighbourhood. Hallam Fegg, of Nottingham, sends a set of measured drawings, with sections showing the profiles of columns and mouldings done from the choir-screen of Southwell Minster, and Herbert Tooley, of Great Yarmouth, made a set of capital measured drawings from the Nelson Room of the Star Hotel at Great Yarmouth. All these have been rewarded with



er medals. The number of bronze medals in this year is 109, of which twenty-six fall architectural students and students of decorative design, as follows:—Alonzo Widlake, for a design for a church and a design for a free library, public-hall, and art museum; Bert Cooke, of Maidstone, for a design for a concert hall; Edward Maidman, of North London, a design for an artist's studio and house; J. Baron, of Sydney (South Australia), for a design for a city club-house; A. Hewitt (honorary) of the Training Class for a design for a public school building; Mand Raymond, of Newcastle, for a modelled design for a vase; Edward Nicholls, Francis Read, and Peter Smith, of Lambeth, for modelled designs for a panel; Arthur Hind of Leicester, for a design for a frieze; Charles Eaton, of Manchester, for a design for a frieze to be carried out in plaster work; Frederick Fisher (hon. award), of the Training Class, for a figure design for a frieze; John Hermer (hon. award), for a wax-modelled design for a panel and a clay-modelled panel as well; James Barfield, of Leicester, for a happily conceived design of hanging tankards and crosses for the wall paper of a "country public-house"; Arthur Jackson, also of Leicester, for a wall-paper design; Thomas Kerry, of Macclesfield, for design for tiles; Henry Penison, of Leamington-Trent, for design for encaustic tiles; J. N. Hollins, of Warrington, for a design for wall tiles; and Agnes Guest, of West London, designs for wall tiles; Lehman Oppenheimer, of Manchester, for mosaic floor design; Virginia Mair, of St. Thomas's, for stained-glass design; Frank Steeley (hon. award), of the Training Class, for a stained-glass design; James Blain and Richard Dickinson, of the Technical School, Manchester, for designs for future textiles; and Jesse Singleton, of Leamington, for design for a carpet. For engraved drawings from buildings in bronze medals have been awarded to James Tonge, of Weymouth, for a comprehensive set of drawings from St. Mary's Abbey, Furness; to Adam Footitt, for similar work, from Bishop Cleeve's Chapel, Lincoln; to Herbert Reid, of Sheffield, for measured drawings from the gratefully-ornamented fireplace and oak chest, chiefly a mixture of sixteenth-century details, adding a quaintly rich coat of royal arms, the dragon as one of the supporters, the dining-room in Flockton Manor; to the baronets, of South Kensington, for measured carefully-tinted drawings of the lately-destroyed west end of Grosvenor House, abutting on Park-lane, which subject has also been awarded by Robert B. Dawson, John O. Poole, Tracy Trotman, all of the Training Class, whom hon. awards of bronze medals have been made. The winners of national book number 181, but out of these only thirty are concerned with architecture and decoration, whilst seven out of the thirty-nine hon. awards of this class of prize made to students of the Training Class are made for similar work.

The display of architectural and decorative studies in this year not as strong numerically as in some previous years, though the one of studies from buildings, and measured drawings, is larger than usual. This sort of work is evidently of much use to students in training their observation, and in cultivating speed and deliberate drawing. The original designs cannot, perhaps, be expected to show high originality or merit, and the ambitious attempt by students of large subjects for treatment is not the most useful tendency to encourage in the student. A wider practice in overcoming, or in making suggestions of methods for overcoming difficulties in construction, in planning houses, and smaller ones than great visionary Gothic cathedrals, should be encouraged by the teachers of schools of art. And, as regards studies of architecture, ornament, and decorative work, the available ample supplies of casts and photographs of actual works from all parts of Europe and the world should prove a fortuitous purse of ideas to the student who at present appear to be too prone to depend half a dozen text-books on the subject. Modelled ornament in the National Competition is distinctly good in many specimens, as, for instance as Cassidy's (Manchester), which has gained the first prize of the Plasterers' Company. This is far better than the usual, if clever, performance of Toft, of the Training Class, who has carried off the second prize of the Plasterers' Company. Two Caryatids

at the entrance to the exhibition, are highly commendable in spite of a manifest want of simplicity in treatment.

Upon the wall opposite the first range of screens are hung charming water-colour sketches of some half-dozen highly-decorated buildings at Rome, Florence, Milan, Mantua, and elsewhere, chiefly of the middle and late Sixteenth Century, which have been done by Mr. A. Wheatstone—the holder, in 1884, of a travelling studentship established for the benefit of students at the West London School of Art, by the Painters' Company. No better or more enjoyable work could be found for a deserving student than this set of sketches indicates. It is understood that the winner this year of the travelling studentship is Mr. Taylor, whose scheme of decoration, which gains a gold medal, we have referred to above. Three or four kindred scholarships have lately been established for the students of the Training Class at South Kensington; but, if they have been awarded, their holders make no show of work corresponding with Mr. Wheatstone's.

#### COMPETITIONS.

**Fulham Vestry-hall Competition.**—We are asked to call attention to the fact that the time for sending in drawings has been extended from September 21st to November 2nd of this year. The committee propose to request the President of the Royal Institute of British Architects to nominate a member of the Institute to assist them in deciding on the merits and cost of the several designs.

**Slough Public Hall and Institute Competition.**—In answer to advertisements for the above, twenty-six sets of designs have been received. The committee appointed Mr. F. W. Albury, F.R.I.B.A., architect, of Reading, assessor. The first premium of 25*l.* has been awarded to Mr. H. H. Cheers, Waldegrave Park, Tooting; second premium, 15*l.*, to Mr. Thos. H. Richards, 17, King-street, Cheapside; and the design under motto of "To-day" was placed third. Mr. F. Hemmings, Finchchurch House, Finchchurch-street, being the author. The designs will be exhibited in the Board-room next week, from August 6th to 12th, instant.

#### CHELSEA PARK DWELLINGS COMPANY (LIMITED).

On a site in King's-road, Chelsea, formerly occupied by some cottages which had been condemned as insanitary, this company has just built a quadrangle containing sixty tenements, to be let as labourers' dwellings. Some trees on the site have been preserved, a central garden has been formed, and an effort made, by adopting a rural style, to avoid the barrack-like appearance too common in industrial dwellings.

The side facing King's-road contains the arched entrance gateway, six shops with basements and first-floor rooms for the shopkeeper, while two upper floors are occupied chiefly by rooms which are approached by balconies, and can be let singly or in groups of two, three, or four, to suit the varying needs of tenants. This side has a flat roof of Portland cement concrete to be used as a drying-ground.

The rear block, which is parallel to the one just described, consists of two and three-roomed tenements with sculleries, etc.

Connecting front and rear blocks are one and two-storied building, containing three-roomed tenements, sculleries, and sheds for storage and business purposes.

All floors are of iron girders and concrete. York stone has been used for staircases and balconies, the front of the latter being enclosed with Lascelles slabs. Red brick is the material used for walling, relieved with rough cast and tile hanging. Manholes give access to the drains at all junctions, which are thus accessible at any time.

Cast-iron pipes, jointed in lead, have been used where a drain passes under any building.


The drinking-water is drawn direct from the mains without the intervention of a cistern.

Laundry arrangements are provided for all tenements.

Doulton's Lambeth water-closet apparatus has been used throughout, and Barnard's diamond ranges. The buildings have been executed by Messrs. Mowlem, from designs by Mr. E. Hoole, and will be ready for occupation this week.

#### Illustrations.

##### ACCEPTED DESIGN FOR THE NEW R.C. CHURCH, SPANISH PLACE.

 WE give this week the interior and exterior perspective views and a plan of the accepted design for this church, by Messrs. Goldie, Child, & Goldie. We commented at some length on all the designs in an article in the *Builder* of July 18th, and it is unnecessary, therefore, to make any further comments here, except that we may add that in one particular respect the design complies more fully than any other with the requirement that the church should be "in the Early English style of architecture as practised in the twelfth and thirteenth centuries," a requirement which, in some otherwise able designs, was curiously ignored. It is intended that the church should be executed as a stone-faced building within and without; within in ashlar work, with Purbeck marble shafts; without, in Yorkshire shoddy, or some analogous material. Some modifications will probably be made in the design, internally at all events, but these are not yet entirely decided on.

##### LEICESTERSHIRE FONTS.

The fonts illustrated by the accompanying sketches belong, with one exception, to the Early English period, which, according to Mr. Rickman, is less well represented in this respect than any other period.

The arrangement of detached shafts grouped round a central cylinder supporting the bowl of the font, no less than the characteristic dog-tooth ornament,—remarkable in the Twyford and Burrough fonts for its exposed position,—and the conventional leaf-carving, indicate the Early English style. Water was constantly kept in the fonts; they were, therefore, usually lined with lead and provided with wooden covers fixed with iron staples. The removal of these latter has in many cases broken away the stone, as at Twyford and Ashby Folville.

The capital of the nave arcade at Twyford is interesting. It seems possible that it and the well-known capital of Oakham Castle are the work of the same hand. They are of foreign rather than English design.

Some of the above fonts are figured in Simpson's "Ancient Baptismal Fonts" and Paley's "Baptismal Fonts."

Mr. Rickman gives the following dates:—Ashby Folville, c. 1160; Twyford, c. 1200; Burrough, c. 1250.

##### EAST WINDOW IN ST. MICHAEL'S CHURCH, BOURNEMOUTH.

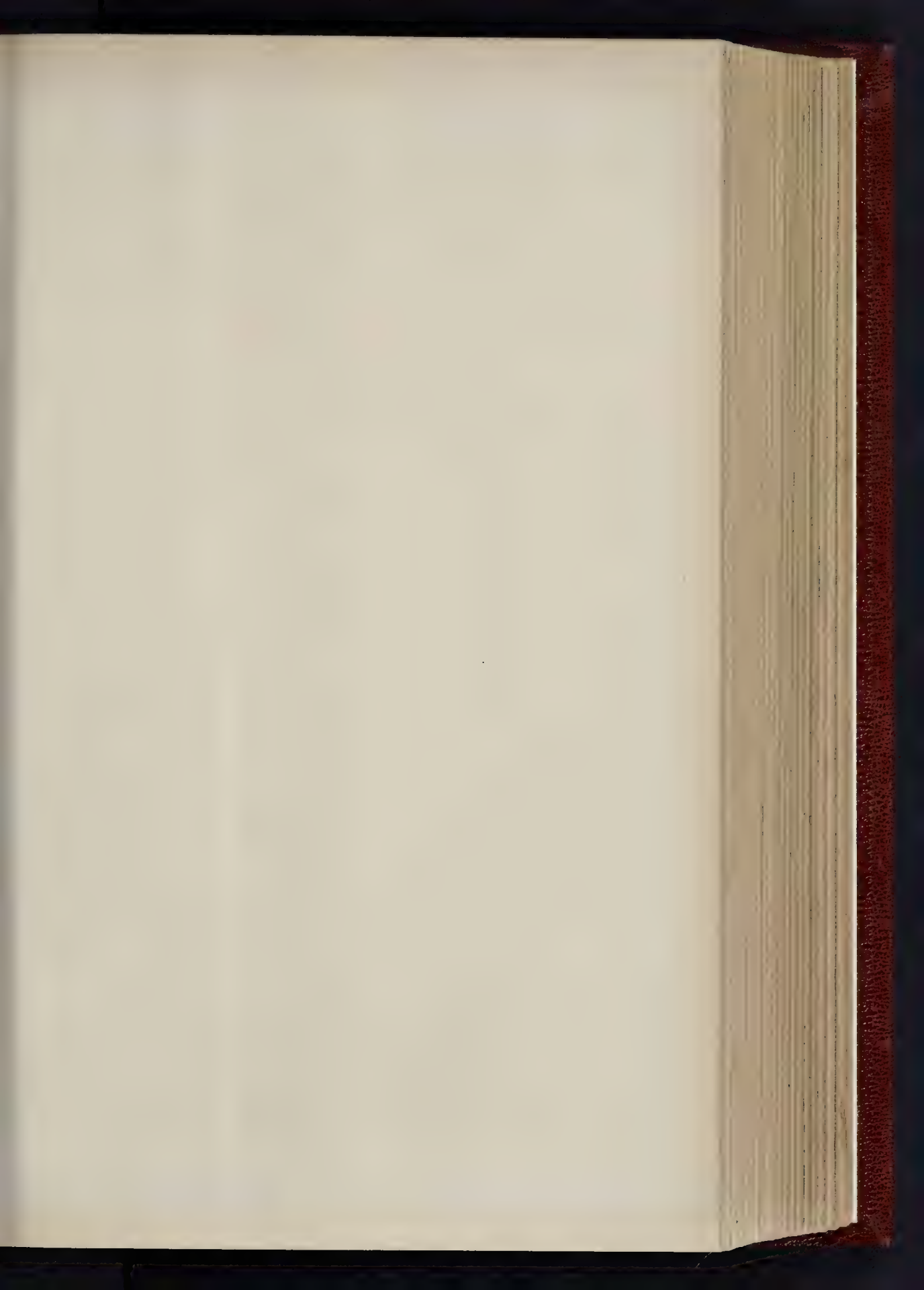
This illustration represents a stained-glass window, executed by Messrs. Mayer & Co., of Munich and London, in memory of the late Mr. George Durrant. The subject is taken from the text of Matth. xi., 28, "Come unto me all ye that labour and are heavy laden and I will give you rest." The design differs in style from what is usually understood by Munich stained-glass. It is free from any enamel or attempt at perspective, but all the glass used is of the best sparkling pot metal. The canopy work has been designed to be in harmony with the architecture of the church. The window is designed by Mr. F. Mayer.

##### Electric Lighting at Marlborough House.

On July 24th the Electrical Power Storage Company fixed a temporary installation at Marlborough House. The total number of lamps fixed was 340, of which 280 were of 20-candle-power, in frosted globes, and sixty were of 10-candle-power. In the ball-rooms some of the lights were attached to the existing candelabra, and others were fixed round the cornice. In the Indian-room 10-candle-power lamps, silvered on one side, were placed inside the cases to illuminate the Indian jewels. The saloon was mainly lighted by lamps suspended from the existing fittings, but effect was obtained from a row of lamps placed out of sight at the foot of the pictures. The lamps in the conservatory, music rooms, and passages were placed in tinted shades. The whole of the current for the lamps was supplied from accumulators placed in a tent in the garden, the cells being brought, ready charged, from the works of the Electrical Power Storage Company at Millwall, a distance of about six miles.







THE BUILDER, AUGUST 1, 1885.





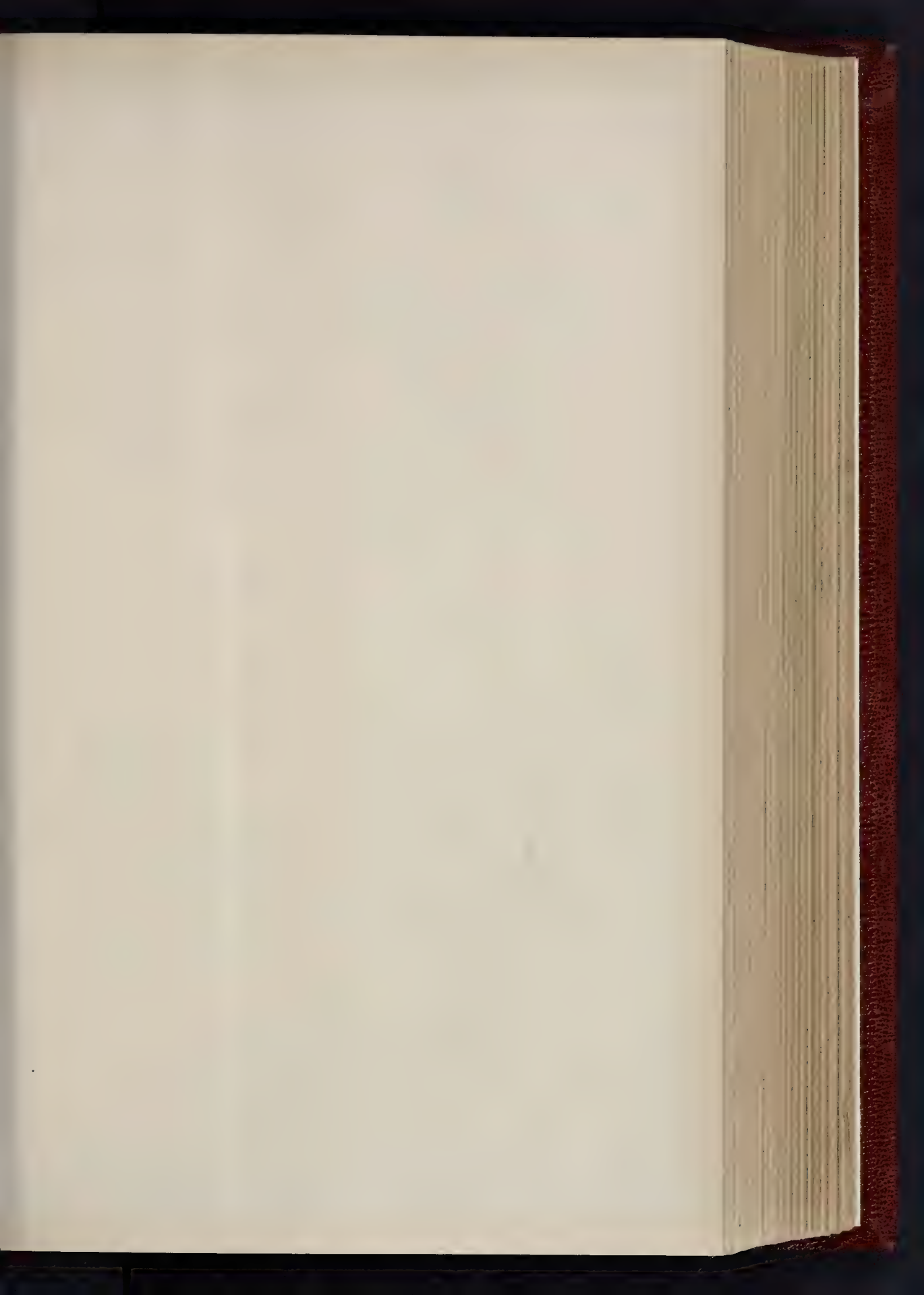


ACCEPTED DESIGN FOR THE PROPOSED ROMAN CATHOLIC CHURCH, SPANISH PLANT  
EXTERIOR VIEW

MESSES GOLDBIE, CHILD & GOLDBIE, ARCHITECTS







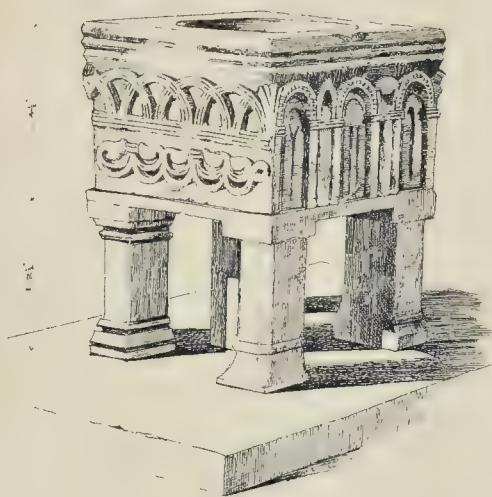
# Leicestershire Fonts.



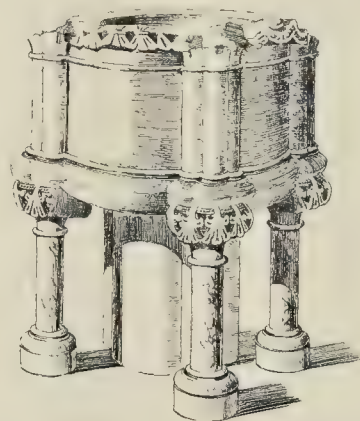
Twyford Church.



Capital to nave arcade  
Twyford Church.



Ashby Folville Church.

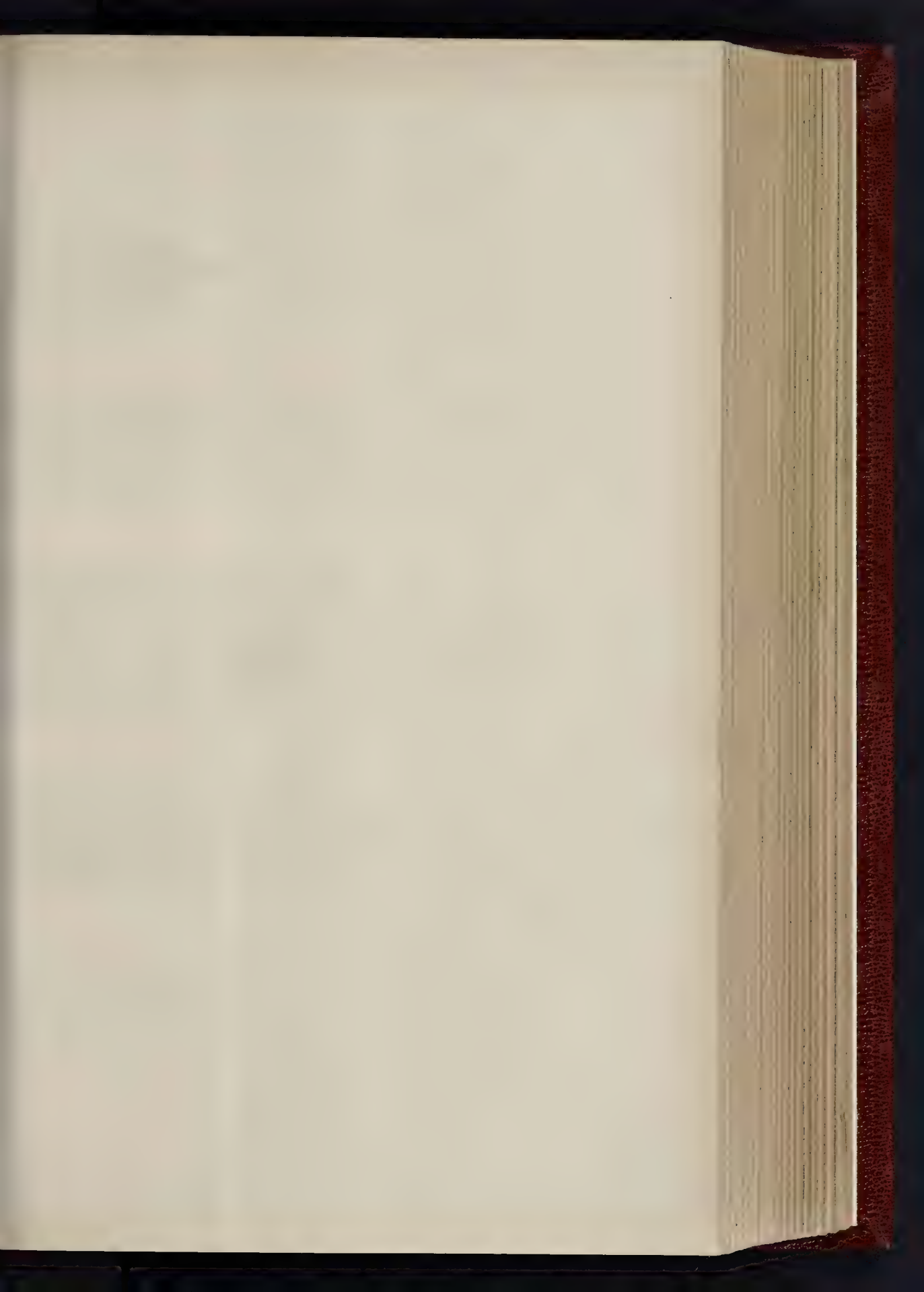


Rearsby Ch.

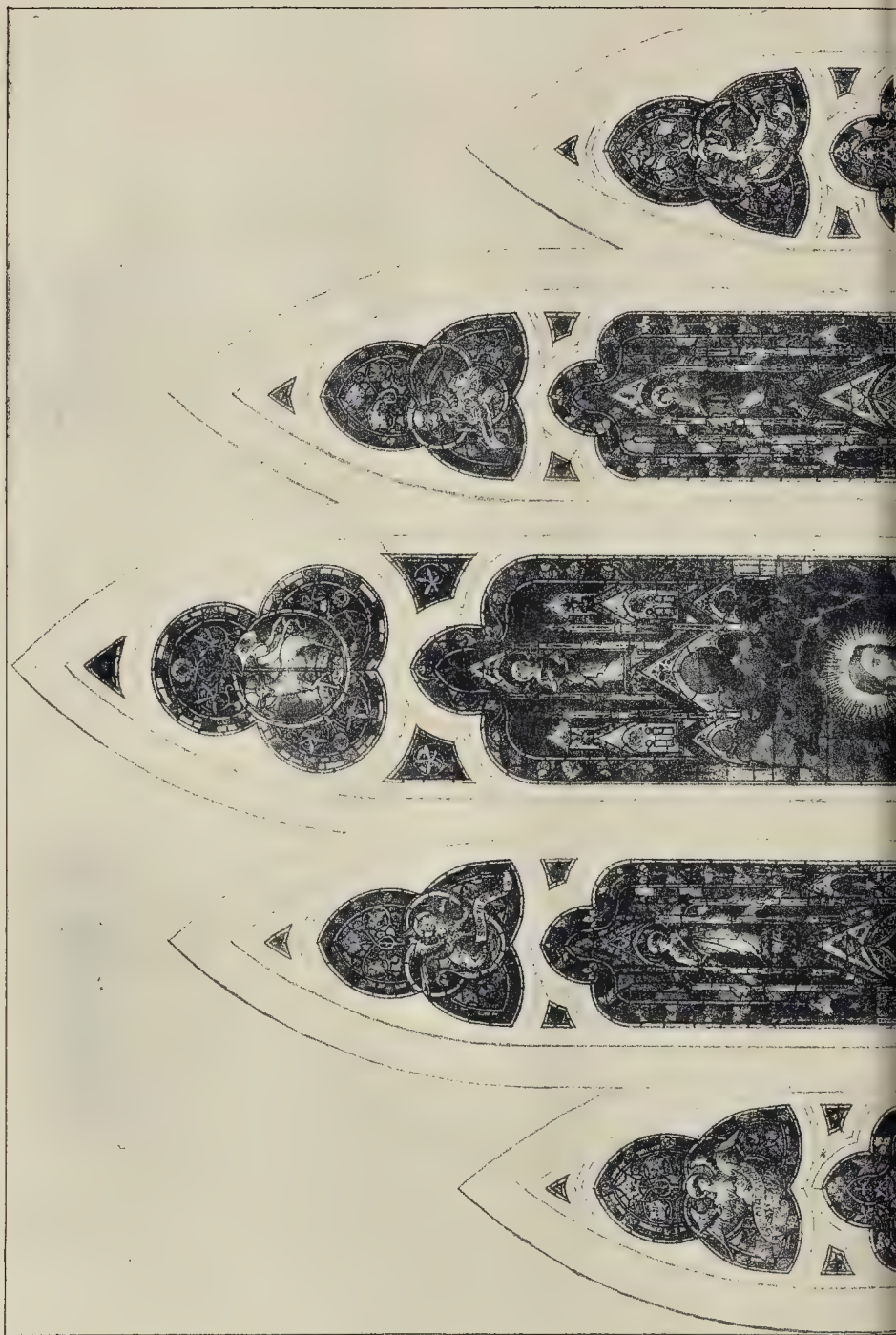
March 1885.

W. H. Didlake B.A. del.





THE BUILDER, AUGUST 1, 1885.







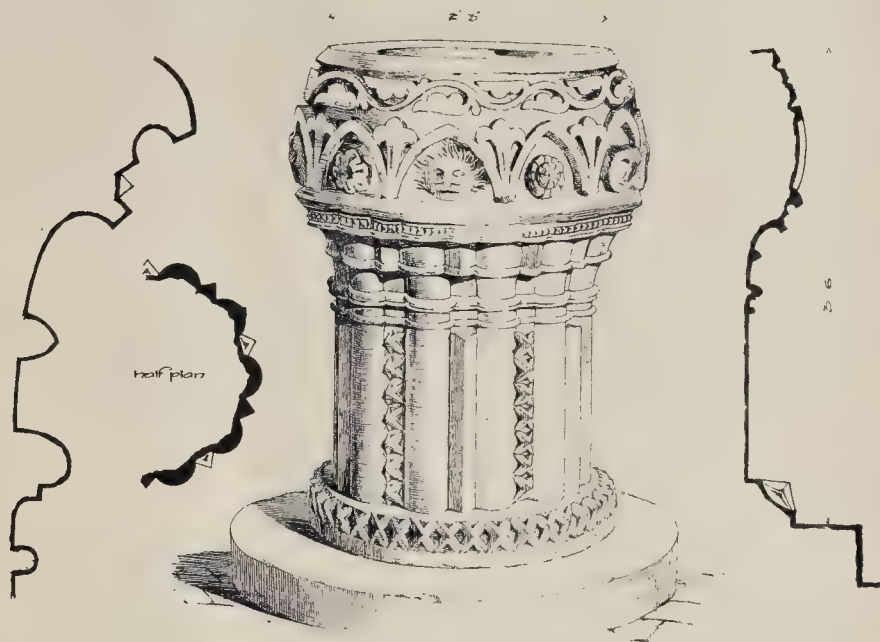
THE PHOTO. STAGG & LONDON

EAST WINDOW, ST. MICHAEL'S CHURCH, BOURNEMOUTH.  
EXECUTED BY MESSRS MAYER & CO





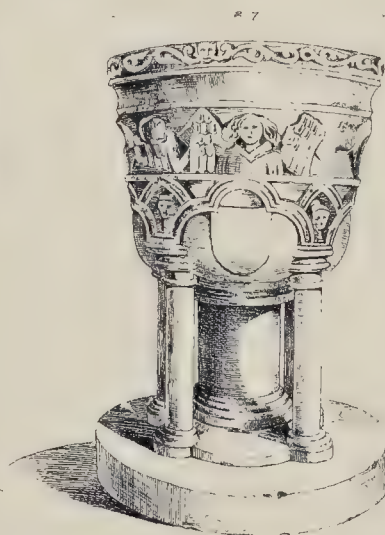
# Leicestershire Fonts.



Burrough Church.



All Saints Ch. Leicester.

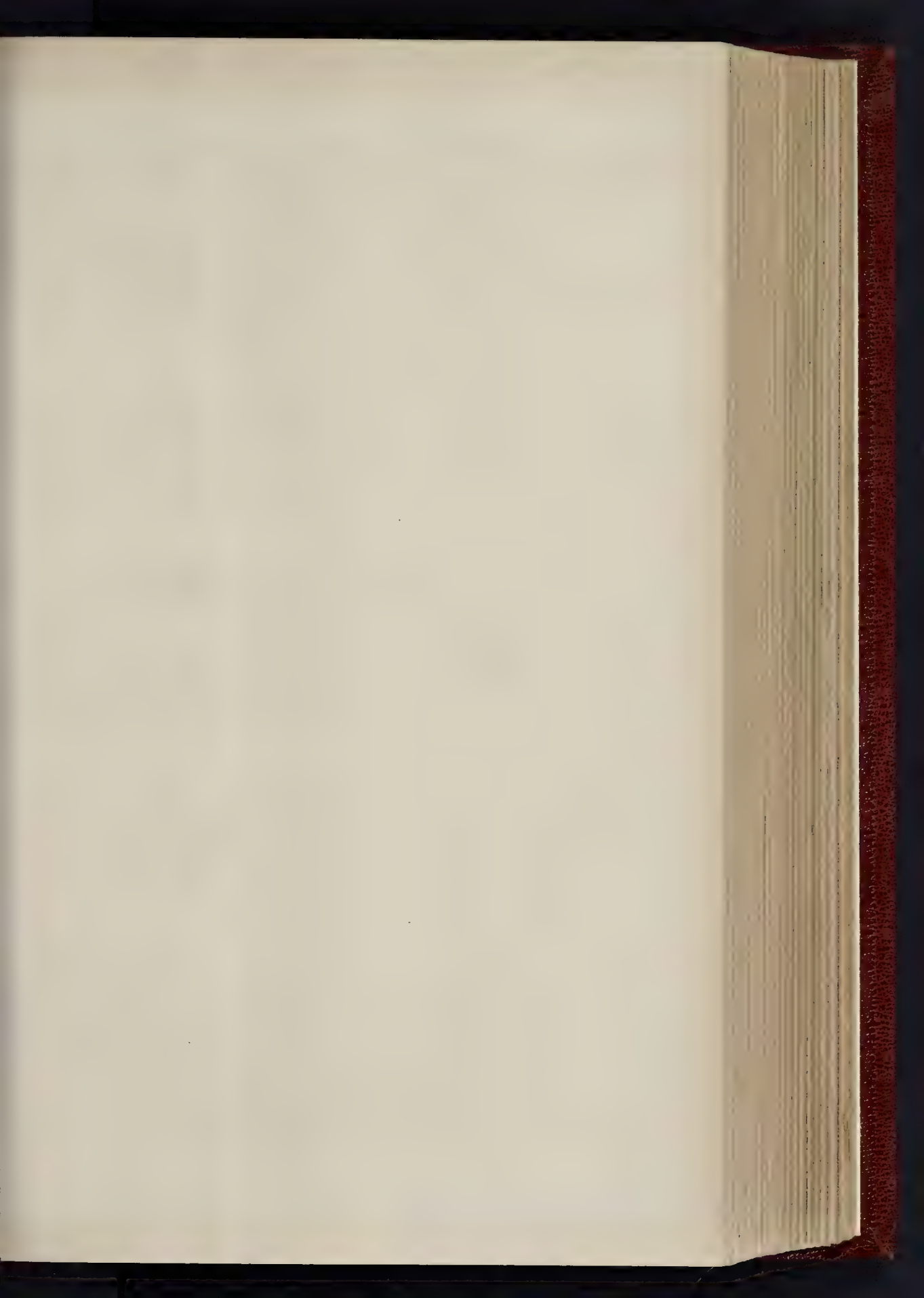


St Mary's Ch. Leicester.

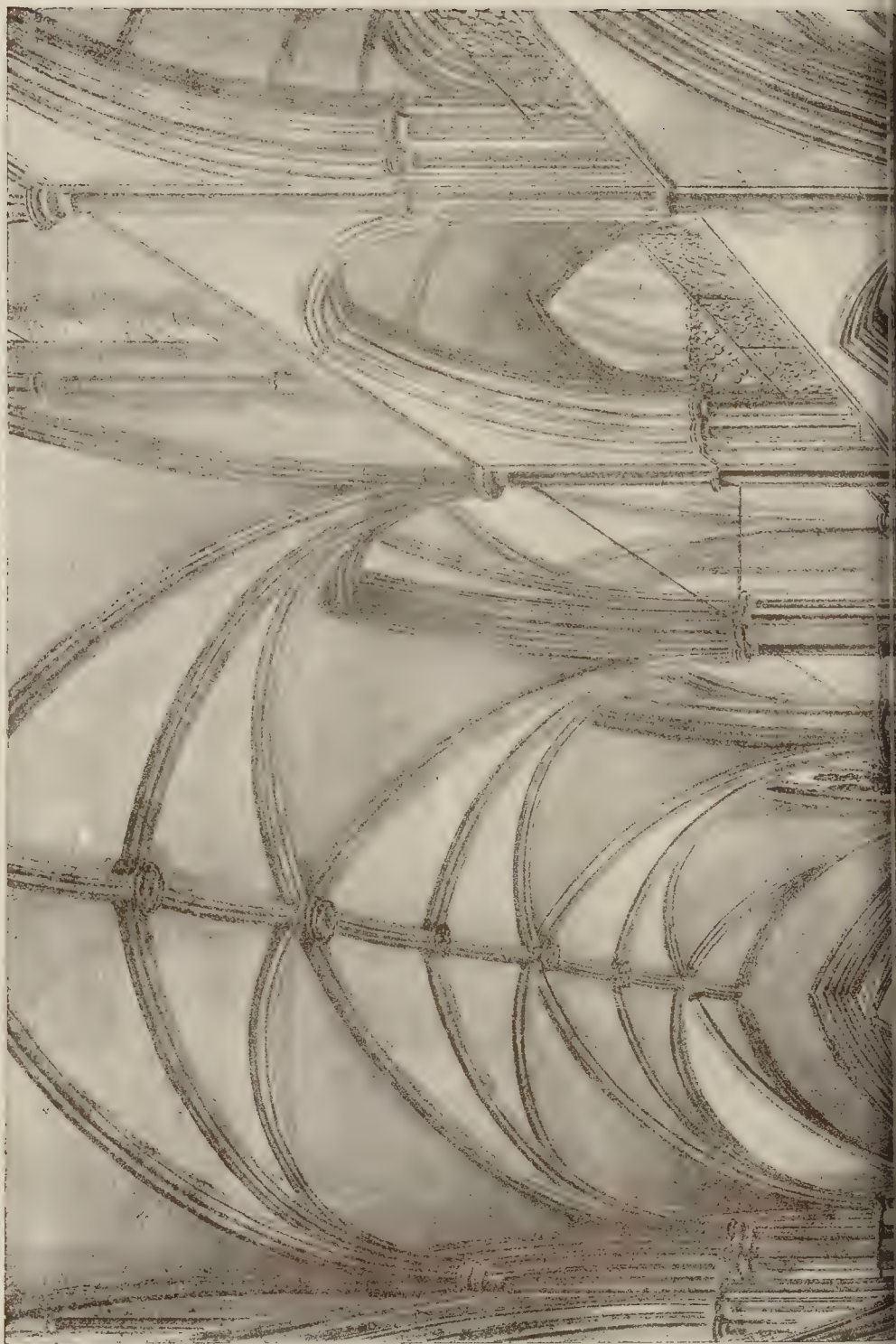
W. H. Bidlake P. A. dell.







THE BUILDER, AUGUST 1, 1885







ACCEPTED DESIGN FOR THE PROPOSED ROMAN CATHOLIC CHURCH SPANISH PLACE  
INTERIOR VIEW

MESSRS. GOLDBIE, CHILD & GOLDBIE, ARCHITECTS







THE HOSEINABAD CLOCK-TOWER, LUCKNOW. -- MR. R. R. BAYNE, ARCHTCT.









THE BARTON ALMHOUSES, TURVEY, NEAR BEDFORD.

## COMBINATION FURNITURE.

STR.—I am obliged by your calling my attention to Mr. Goodman's letter in last week's issue of the *Builder* [p. 138]. It never crossed my mind to claim originality for my furniture, and when the suggestion was made to me as a way of getting over a difficulty, I was told that it was no new idea, and had been adopted by several furniture-makers. If my combination has any merit, it is, I think, in the way it has been worked out in detail. If the idea of combining the three articles of furniture is Mr. Goodman's, by all means let him have the credit of it; but I must protest most strongly at the expression he makes use of, viz., that my design is evidently a revised copy of his sketch.

FREDK. PINCHES.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

2,176, Ventilators for Ships, Buildings, Carriages, &c. A. W. Kershaw.

Four or more concentric rings of vertical deflectors or plates are fitted with a cover on the shaft top, and provided with openings, each of which is opposite the plate of the next rim. The central shaft passes some distance above the ventilator base, or a rim is fixed on the base, so that the rain or seas striking the ventilator will pass through without being able to enter the central shaft. The deflectors may be arranged vertically, horizontally, or otherwise.

3,738, Bins, Canisters, and Fittings for the same. W. Parnall.

This relates to fittings of shops for grocers and similar trades, and the internal fittings of the cabinet are arranged in chutes or slides, so that the commodities may be quickly distributed. Various forms of the apparatus are devised for the different commodities and purposes for which they may be required.

3,766, Smoke-consuming Apparatus. H. H. Hazard.

The products of combustion from the fireplace are passed to a large chamber, and partly condensed, after which the remaining portion is either carried away by a flue, or passed through a box containing a mixture of caustic soda and lime. This method is applicable to all kinds of fireplaces and furnaces for consuming their own products of combustion.

4,031, Urinals. T. Waller.

A ventilating pipe is connected with an aperture on the top of the back plate of the urinal. The aperture is covered by a slanting plate, which serves to conduct a current of air into the pipe. Sometimes an additional air-space or tube is provided, leading from the bottom of the urinal into the ventilating pipe.

4,622, Preventing Contamination of Water Supply. C. Ridleigh.

The object is to prevent sewage gases being drawn into water-pipes when a temporary vacuum is produced in them. At every outlet or communication with water-closet, urinal, &c., a single or double iron return-valve is fixed. The main or branch water-pipes are connected with vent columns, such as lamp-posts. In each column is fitted a self-acting air-valve.

4,764, Holdfast for Pipes and Spouts. J. R. Johnson and W. Urton.

An iron spike is bent at right angles. Both extremities of this spike are tapered. One is driven into the wall. The other is fitted against the pipe, and a ring, embracing the pipe, is driven down upon it, being thereby wedged against the pipe, and holding it firmly.

5,931, Constructing Concrete Domes and Circular Buildings. R. M. Ormerod.

The vertical walls are struck by a mould at the end of an arm attached to a loose sleeve on a vertical bar. The concrete is added in layers until the springing of the dome is reached; a post is then substituted for the vertical bar, and an arm is attached to the top of the post by a universal joint. The building is continued in layers as before, a quick-setting mixture of plaster of Paris and haird lime being employed to form an inner shell of the upper part of the dome. To form elliptical domes the joint is lowered a suitable distance as each layer is complete, and to form Gothic domes the joint is supported at a short distance from the centre by an arm fixed to the post.

6,692, Girder. W. Campbell.

The usual top and bottom flanges are braced together by two rows of diagonal and vertical bars attached at alternate points to a longitudinal stringer bar about half-way between the two flanges.

APPLICATIONS FOR LETTERS PATENT.

July 17.—8,639, J. Lewtas, Securing Blinds to Window Frames and Sashes.—8,640, J. Richmond, Improvements in Register Stoves.—8,655, V. Kian and R. Seitz, Improvements in Sash Windows.—8,662, T. Weller, Improvements in Closet Fans and Souts.

July 18.—J. Hines, Improvements in Weigh-brides.—8,691, G. Otway, Improvements in Venetian Blinds.

July 20.—8,730, D. Crossley, Improvements in the Manufacture of Bricks, rendering them Porous

or Cellular.—8,735, C. Bauer, Room-door and other Locks.—8,737, W. Lake, Improved Paint or Pigment.—8,740, G. Raven, Smoke-consuming Furnaces or Fireplaces.—8,748, A. Reddie, Improvements in Rack Drills.—8,753, A. Cooper and T. Harbord, Improvements in Cooking Ranges or Stoves.

July 21.—8,763, W. Woods and H. Grimley, Making Terra-cotta Sepulchral Memorials.—8,772, E. Webb, Attaching and Adjusting Door-knobs and Handles to Spindles.—8,780, A. Pains, Apparatus for Flushing Water-closets, and Preventing Waste of Water.

July 22.—8,862, A. Deas, Service Cisterns and Valve Apparatus for Water-closets, &c.—8,868, C. Sims, Mechanism for Opening and Closing the Doors or Covers of Cabinets, &c.—8,873, J. Wellett, Improved Drawing-board and Set Square.—8,874, R. Stanley, Improve Method of Preparing and Burning Bricks, Tiles, &c.

July 23.—8,876, J. Hookham, Improvements in Water-closet Pans.—8,877, J. Sturrock, Apparatus for Flushing Water-closets.—8,889, E. Cohen and D. Boetel, Seats of Water or Dry Closets.—8,900, D. Boetel, Actuating the Flushing-valves of Water-closets, &c.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

6,837, J. Corbett, Jointing and Connecting Lead or other Metallic Pipes without the Use of Solder.—7,033, G. Hookham and W. Tonks, Lines or Cords for Suspending Window Sashes, &c.—7,082, J. Ebner, Anti-dry-rot Waterproof Material and Method of Securing Parquet Flooring to Stone, Concrete, Wood, &c.—7,456, C. Bailey, Fixing Closet Pans to Traps, and Supply Pipes.—7,467, H. Buchan, Improvements in Water-closets.—7,552, J. Sharp, Window Sash Fastenings.—7,724, J. Macneil, Ventilators.—8,044, E. Stewart and others, Affording Ingress to and Egress from Rooms or other Parts of Buildings.—6,639, F. Lyte, Manufacture of Rectangular Bricks, &c.—6,633, V. Blackwell, Improvements in Window Sashes.—6,930, A. Allen, Draining and Cleansing Public and Private Swimming Baths.—7,409, J. Brooke, Oval or Elliptical Siphon Machine.—7,475, E. Dutton, Improved Bench Vice.—7,485, A. McLean, Manufacture of Pigments.—7,900, H. Cooper, Ventilating Private Houses and Public Buildings.—7,965, W. White, Fire Grates and Stoves.—7,983, W. Cook, Improved Bakers Oven.

## COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.  
11,640, G. Jameson, Improved Trap for Pipes.—12,244, F. Wilkins, Asphaltic Pavement.—13,147, E. Oakley, Apparatus for Ventilating and Warming Buildings.—13,355, W. Smith, Waterproof Cement.—13,492, A. French and J. Hannay, Apparatus for the Manufacture of White and other Lead Pigments.—7,576, G. Redfern, Flushing Cisterns and Water Waste Preventers.—10,801, H. Owens, Securing Door Knobs to Spindles.—12,067, J. MacLaren, Composite Pavement Block.—12,889, W. Smith, Improvements in Bricks, Tiles, Stones, or other Building Materials.—13,377, J. Kemp and F. Fiesi, Sanitary Pipe Connections.—15,871, W. Whittington, Improvements in Water-closets.—2,767, E. Reynolds, Siphon Water Waste Preventer Cisterns.—4,830, W. Stanley, Improvements in Protractors.—6,315, E. P. Forster, Improvements in Kitchen Ranges.—7,148, C. Wilkes and W. Millar, Metallic Compound for Flooring, Paving, &c.

## RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

July 10.  
By Messrs. Conn.  
Teynham, Kent—The freehold residence, "The Walnuts" ..... 2,630  
Two cottages and orchard land, 10 acres ..... 2,790  
Two cottages and a plot of land ..... 305

July 11.  
By Messrs. Conn.

Near Hythe, Kent—"The Royal Oak" public-house, and 8a, Or. 15p. freehold ..... 2,100  
Enclosures of land, 18a, Or. 13p., freehold ..... 970  
A cottage and 6a, Or. 28p., freehold ..... 120  
"Westenanger Farm," and 3/8a, 2r. 12p. .... 15,030  
Two cottages, and 4a, 3r. 24p., freehold ..... 560  
Enclosures of land, containing 46a, 3r. 10p. .... 1,395

July 13.  
By P. D. TUCKERT.

Arlington, Surrey—Freehold house and fa. 3r. 24p. .... 1,250  
Shalford—Enclosures of land, 1/4a, 2r. 35p. .... 1,410  
Three freehold cottages ..... 360  
"Poplar Farm," containing 31a, Or. 30p. .... 3,060  
Freehold house and 13a, 2r. 35p. .... 830  
Three freehold cottages, with gardens ..... 825  
Several cottages, and 5a, 1r. 14p. .... 1,505

July 20.  
By Messrs. J. & J. JAMESON.

Highbury—8 and 9, Highbury Road, and ground-rents of 2l. a year, term 24 years ..... 1,470  
By MURRAY & SCOBELL.  
Highbury—44, 46 & 48, Hamlet-on-road, 74 years, ground-rent 20l. .... 1,665  
Brixton-hill—39, Tregenna-street, 70 years, ground-rent 6l. .... 260

By TUCKLEY & CO.

Islington—43, Barnsbury-road, 5 years, ground-rent 10l. 10s. .... 55

By J. MORGAN.

Sutton—"The Grange," and 31a, freehold ..... 4,903

By DEBBENHAM, TEWSON, & CO.

Kensal-green—Ground-rent of 80l., reversion in 81 years ..... 2,700

Holborn—A profit rental of 345l. 10s. a year, term 34 years ..... 4,120

Blacfrans—53 and 55, Stamford-street, 37 years, ground-rent 2 l. .... 1,220

Portland Town—55 to 61 odd, High-street, 16 years, ground-rent, 15l. 12s. .... 2,135  
St. Mary Cray—6 and 7, North-street, 86 years, ground-rent 6l. .... 425  
Kilburn—26, Cambridge-road, 73 years, ground-rent 11l. .... 500

Kensington-square—No. 11, freehold ..... 1,500

By Messrs. J. & J. JAMESON.

Brookley-road—14, New, Harrington, Moulton

Chelsea—13 and 14, Blenheim-street, 83 years, ground-rent 8l. .... 560

By S. & G. KINGSTON.

Hunts, Ac.—The Manor of Stragrand, with its rights, &c. .... 400

The Manor of Whaplode Abbatis, with its rights, &c. .... 1,268

By Messrs. J. & J. JAMESON.

Bewdala, and a moiety of the Manor of Moulton Dominorum, with their rights, &c. .... 1,000

By W. H. MOORE.

Euston-road—46 and 47, Hastings-street, 21 years, ground-rent 14l. .... 450

By Messrs. J. & J. JAMESON.

Windsor, Bucks—"The Selby Lodge Estate" of 167 acres, and premises, and 3a, 1r. 35p., copyhold ..... 17,500

By Messrs. J. & J. JAMESON.

The freehold residence, and about 20 acres ..... 18,000

Wandsworth-road—A profit rental of 261l. a year, term 16 years ..... 1,600

New Cross—2 to 5, Chalmers-street, 76 years, ground-rent 16s. .... 700

14 to 24 even, Clubworthy-street, 76 years, ground-rent 24l. .... 1,100

Clapton—110, Rushmore-road, 31 years, ground-rent 4l. 10s. .... 130

By E. SMITH & CO.

Kensington—7, Overton-square, 73 years, ground-rent 5l. .... 1,900

By G. DICKERSON.

Notting Hill—5, Silchester-street, 78 years, ground-rent 6l. 10s. .... 255

July 23.

By Messrs. F. & S. FLEMING, ELLIS, & CO.

Strand—34, Cockfield-street, freehold, and about 1/4a, 2r. 35p., freehold, and 3a, 1r. 35p., with early reversion ..... 1,840

A ground-rent of 8l. a year, with early reversion ..... 780

A ground-rent of 12l. a year, with early reversion ..... 475

By Messrs. J. & J. JAMESON.

Clapton—63, Cricketfield-road, 73 years, ground-rent 7l. 15s. .... 350

Delton—42, The Grange, 36 years, ground-rent 6l. .... 285

Edgware, near—A plot of freehold land, 6a, 3r. 35p. .... 800

A plot of freehold land, 35a, 1r. 35p., and 3/4a, 2r. 35p., with early reversion ..... 1,400

A plot of freehold land, 23a, 3r. 11p. .... 400

By Messrs. FLOOD.

Chelsea—16, Markham-square, 80 years, ground-rent 4l. .... 590

Paddington—43, Chippendale-road, 78 years, ground-rent 4l. .... 1,085

45, Chippendale-road, 78 years, ground-rent 4l. .... 1,020

Putney—2/2, Upper Richmond-road, 76 years, ground-rent 6l. .... 530

South Norwood—Ground-rents of 27l. 10s., reversion in 95 years ..... 400

Ground-rents of 47l. 10s., reversion in 80 years ..... 1,020

Ground-rents of 11l., reversion in 13 years ..... 330

Five plots of freehold land ..... 65

By C. C. & T. MOORE.

Mill End—61 to 63 odd, Bridge-street, 22 years, ground-rent 28s. .... 830

Dagenham—Two freehold houses ..... 680

Bow—19 and 21, Canton-street, 66 years, ground-rent 8l. .... 650

By DEBBENHAM, TEWSON, & CO.

Hamwell—A plot of freehold land, 6a, 3r. 15p. .... 810

Stoke Newington—147, Church-street, copyhold, 1 to 4, Ellerslie-road, 33 years, ground-rent 3l. .... 555

By NEWBORN & HARDING.

Green-lanes—2, Stanley Villas, 87 years, ground-rent ..... 440

Islington 172a, 174 to 184 even, Holloway-road, freehold ..... 4,800

Homerton—100 and 102, Digby-road, 73 years, ground-rent 9l. .... 300

July 24.

By Messrs. J. & J. JAMESON.

Rudwig, Sussex—"Hermonger's Park," 274 acres, freehold ..... 12,000

Hampstead—6, Albion-terrace, freehold ..... 293

By F. LEWIS & CO.

Blackheath—A ground-rent of 26l. term 40 years, with reversion to rack-rents for 33 years ..... 550

A ground-rent of 25l., term 40 years, with reversion to rack-rents for 33 years ..... 530

Holborn—20, East-st., the lease of, term 30 years ..... 360

By G. A. WILKINSON.

City—8, Newgate-street, freehold ..... 7,500

10, Warwick-square, freehold ..... 3,460

Finbury—Ground-rent of 68l. 8s., reversion in 27 years ..... 2,400

Ground-rent of 8l., reversion in 34 years ..... 300

Baronsbury—30, Albion-grove, 59 years, ground-rent 31. 10s. .... 555

Brixton—84 and 86, Loughborough-road, 37 years, ground-rent 12l. .... 725

Austin Friars, E.C.—Land-tax of 122. 16s. a year ..... 330

By Messrs. Conn.

Meopham Green—A plot of freehold land, 1r. 27 p. .... 190

A plot of freehold land, 4a, 2r. 32p. .... 230

By W. B. HALLIERT.

Holloway—1 and 3, Darnley-street, 73 years, ground-rent 13l. .... 510

7, Darnley-street, 73 years, ground-rent 6l. 10s. .... 655

Highbury—32, Hamilton-road, 73 years, ground-rent 7l. 15s. .... 380

St. Pancras—A profit rental of 49l. a year, term 21 years ..... 215

Tottenham-court-road—9, Francis-street, the lease of ..... 60

Upper Holloway—21, Wedmore-street, 25 years, ground-rent 10l. .... 80



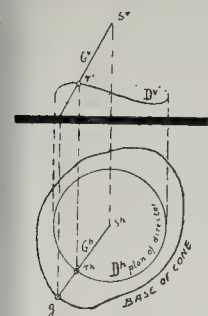


Fig. 135.

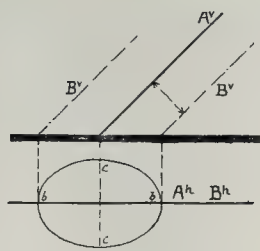


Fig. 136.

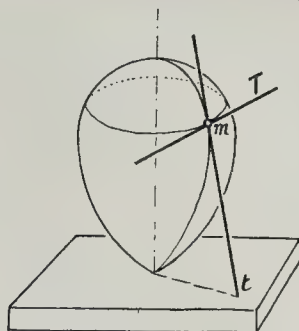


Fig. 138.

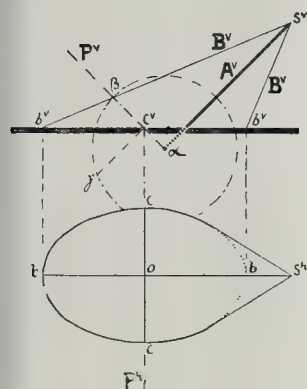


Fig. 137.

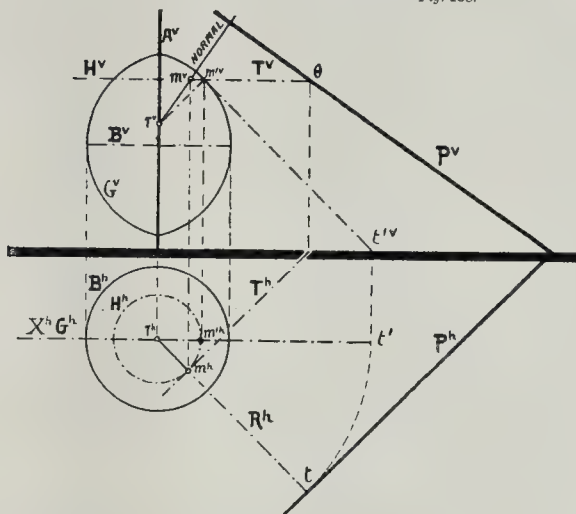


Fig. 139.

# The Student's Column.

## DESCRIPTIVE GEOMETRY.—PART II.

cone be given by its apex S and a directing line D in space, find its base.

Take on the directing line a point r, through the elevation and plan of which we draw G<sup>v</sup> and G<sup>h</sup>, the projections of a generator of the cone, and the point of foot of the generator belongs to the base of the cone which is of irregular shape. (See fig. 135.)

the base of a cylinder of revolution given by its axis A and its radius.

First make a new elevation of the cylinder that its axis be parallel to the elevation. We know that the base is an ellipse, for the intersection of a right cylinder by a plane. The major axis of the ellipse is b b, the minor axis is c c, equal to the diameter of the cylinder. (See fig. 136.)

the base of a cone of revolution (right cone) given by its axis A, and the angle the generators form with the axis.

According to the inclination of the axis, the cone might be any of the three conic sections, ellipsis, hyperbola, or parabola. All bases can be found by first drawing the sections of the circular section formed by a perpendicular to the axis of the cone, and using that circular section as a directing line. We can find the base of the cone as we did in fig. 135. When the section is an ellipse a shorter operation is feasible, we make a elevation of the cone on a plane parallel to axis A, on which we draw the outlines B B.

We have at once the major axis b b of the ellipse, in the centre, O, of which we have only the minor axis, c c, to be able to complete the

base. If we consider c c as the horizontal trace of a plane P perpendicular to the axis A, we know it will cut the cone according to a radius a b, and therefore c<sup>v</sup> γ will be the length of half the minor axis, which we have only to carry in O C, for C<sup>v</sup> γ is the intersection of the circle on plane P by the plane of the plan. (See fig. 137.)

### Surfaces of revolution.

Surfaces of revolution are, with the exception of planes, the surfaces most commonly used in architecture, as columns, cupolas, vaults; it is therefore highly important for us to master the methods to deal with them, either for delineating their shades and shadows, or for setting out masonry, carpenters and joiners' work relating to them.

Draw a surface of revolution, a plane tangent to it in the point m, and also a normal (perpendicular line) to the surface in the same point.

We shall assume that the axis of the surface be vertical. If it be not, we can make it so by changing the projection planes.

If we carry through the axis a vertical plane, X<sub>1</sub> parallel to the elevation, the section G made by that plane is a meridian of the surface, and we have it in its real shape on the outline of the elevation. Every horizontal section of the surface will have a straight line, H<sup>v</sup>, for its elevation, and a circle, H<sup>h</sup>, for its plan. These horizontal sections of the surface of revolution are called parallels; such are, for instance, the degrees of latitude of the earth's surface. B, the largest of these parallels, gives the outline of the revolving surface on the plan, and any plane tangent to a point thereon is vertical.

If m be a point of the surface, given m<sup>h</sup> we shall be able to find m<sup>v</sup> by the following method:—We revolve round the axis the plane R of the meridian on which m is situated until it be parallel to the elevation; m<sup>h</sup> will reach m<sup>h</sup> by an arc of a circle; m<sup>v</sup> will be on the

meridian and on a vertical line above m<sup>h</sup>; this determines m<sup>v</sup>. When we revolve back the meridian to its former position m<sup>v</sup> travels along a horizontal line, and we can mark thereon m<sup>v</sup>. (See fig. 139.)

We find the plane P tangent to the surface in the point m, by taking through m two curves of the surface and the tangent to each curve in that point. P is the plane which contains these two tangents. (See perspective sketch, fig. 138.)

The curves selected are the parallel and the meridian. The tangent T to the parallel is horizontal, and its plan is tangent to circle H<sup>h</sup>; as the line T is contained by the plane P, we know that P<sup>h</sup> will be parallel to T<sup>h</sup>. If we revolve the meridian R and make it parallel to the elevation, we shall find the elevation of the tangent to the meridian will fall on m<sup>v</sup> t<sup>v</sup>, revolving back we find t the foot of the tangent to the meridian. We can now draw P<sup>v</sup> for it passes through t, foot of the tangent to the meridian, and is parallel to T<sup>h</sup>, plan of the tangent to the parallel or horizontal section. We can draw also P<sup>v</sup> as it passes through the point θ, where the tangent T enters the surface of the elevation.

A normal to the surface in the point m is a line passing through m, and perpendicular to the plane P tangent to the surface in that point; it is the position that the joints of the stones of a vault should have, and therefore of importance to us.

The normal to the surface is contained in the meridian plane R, and therefore cuts the axis; it is also evident that the normals to the points all along the same parallel will all cut the axis in the same point. To draw the projections of the normal in m, we need only draw the line m<sup>v</sup> r<sup>v</sup> perpendicular to the meridian outline, and then join r<sup>v</sup> to m<sup>v</sup>; the line r<sup>v</sup> m<sup>v</sup> will be the elevation of the normal, and its plan falls on R<sup>h</sup>. (See fig. 139.)

## Miscellanea.

**Builders' Clerks' Benevolent Institution.** At a special general meeting of the donors and subscribers of this Institution, held at the offices, 21, New Bridge-street, Blackfriars, on Tuesday last, Mrs. Martha Emma Hamilton was elected a pensioner on the relief fund. At the close of the business a vote of thanks was presented to Mr. James Greenwood, the president (who was supported by Mr. E. Brooks, treasurer, Mr. C. K. Turpin, Mr. E. Pitta, Mr. W. D. Gilbert, and other gentlemen), for his kindness in presiding on the occasion.

**Messrs. John Mowlem & Co.'s Summer Excursion.**—On Saturday last, about 190 of Messrs. Mowlem & Co.'s staff and out-door foremen, with a few friends, made an excursion to Swanage, by the new line of rail recently opened. A stop was made, and a visit paid, en route, to the castle ruins at Corfe (one of the stations on the new line), and at Swanage a steamboat trip and a dinner, provided and presided over by Mr. Burt, one of the senior members of the firm, and whose residence is at Swanage, served in the new Town Hall, which he has built, formed part of the programme. At the latter Mr. Hall, one of the staff, proposed "Prosperity to the Firm of John Mowlem & Co.," and congratulated Mr. Burt upon the completion of the railway which he had so long striven to obtain for his native town. Mr. Burt, in reply, expressed, on behalf of the firm, his thanks for the terms in which the toast had been proposed. Tea was served later in the garden of Mr. Burt's house.

**Wanstraw Water Supply.**—These works were formally opened a few days since, and the event was celebrated by holding a public tea meeting in a field near the church. The works have been carried out by the Frome Rural Sanitary Authority, from plans prepared by their surveyor, Mr. William Adams. Messrs. Wilcox & Sons, Leigh-on-Mendip, were the contractors. The works have been carried out at a cost of about 500*l.*, including the price of the spring. The water is conveyed from a spring on Dursley-hill to the village by 3-in. cast-iron pipes, all coated externally and internally with Dr. A. Coith's patent solution. One of Macfarlane's patent drinking fountains, with a tap fitted under, for filling buckets, is fixed at the Brunton cross-roads, and four other taps are placed at convenient points in the village. About twenty houses are provided with a private supply on the premises. The cattle supply in the fields from the spring to the village is well provided for, by having nine of Macfarlane's patent water-troughs fixed on brick piers, with self-acting ball-taps.

**Brighton.**—In the article upon the growth of Brighton, in the last week's number of the *Builder*, p. 111, it should have been stated that the system of groyne for the protection of the shore, now adopted by the Corporation, is that of Mr. A. Dowson, C.E., the principle of which is the substitution of open groyne instead of the usual solid ones. These latter obstruct the sea so as almost invariably to cause a backwash, which may carry away in one tide the shingle accumulated during several months. Another advantage of Mr. Dowson's groyne is that they can be put up very rapidly, while they cost much less than those under the old system.

**Birmingham Architectural Association.** The members of the above Association made a visit on Saturday last to the new church now in course of erection in Bristol-street, Birmingham. Among the members present were Messrs. J. P. Osborne, W. H. Kendrick, T. W. F. Newton, A. Hall, Franklin Cross, H. H. McConnell, W. G. Mantle, J. Goodman, several visitors, and Victor Scruton (hon. sec.). In the unavoidable absence of the architect (Mr. J. Cosins), the clerk of works, Mr. H. Hackett, exhibited the drawings, and, with Mr. Sapcote, conducted the members over the church, congregational room, and classrooms, &c.

**District Surveyors.**—The Works and General Purposes Committee of the Metropolitan Board of Works have put the following recommendation on the paper at its meeting this Friday, July 31st, viz.,—"That the new District Surveyors for the Northern Division of St. Marylebone, and for Bethnal-green East and South Bow, shall be prohibited from carrying on the business of an Architect or Surveyor for works within the boundaries of their own districts."

**Employers and Employed.**—At the Crystal Palace on Saturday, July 25, a dinner was given by Messrs. Hobbs, Hart, & Co., on the occasion of what may be termed the silver wedding since Mr. Hobbs's retirement and the taking over of the business by Mr. J. M. Hart, by whom the whole of the staff were invited, and mustered to the extent of 327, and 25 visitors. After the usual loyal toasts, there followed the toast of "The Founder of our Business at the Great Exhibition, 1851,—Alfred Charles Hobbs, esq." The chairman (Mr. Hart) exhorted all the employees to maintain in strict integrity the motto or trade-mark of the firm, "Protectors and Progress," so that the name of Hobbs & Co. shall be accepted like sterling metal throughout the world. The toast of "The Executive Staff" was proposed by the chairman, who remarked that it was most gratifying to him to render honour to those to whom honour was due, and earnestly impressed on them to follow the lines laid down as a basis with the establishment and development of the business, namely, "perfection of construction in its integrity of scientific principles," and never to accept business, even of the most lucrative character, unless in accordance with the teachings of experience in the highest class of construction. He reminded the heads of the executive staff, as an example, of his refusal to tender for a strong-room, 50 ft. long, 10 ft. high, and 12 ft. deep, because the principles on which the room was to be constructed were totally impracticable; and he offered 500*l.* if any manufacturer could construct the room as laid down in the specification by a shipbuilder with keyed rebated angles as shown in the drawings. This offer has never been accepted or refused, although the offer was made on December 24 last, and still remains open.

**The National Association of Master Builders of Great Britain.**—This Association held its half-yearly meeting last week at the Royal Hotel, Bristol. Mr. W. H. Cowlin, the president, presided, and there were representatives of local associations present from Bradford, Birmingham, Bristol, Bolton, Cardiff, Doncaster, Derby, Hull, London, Liverpool, Leeds, Lincoln, Walsall, Warrington. After the introductory remarks of the president, the half-yearly report, and accounts were read and adopted. An account of the masons' strike at Bradford was submitted, and it was decided to give the employees there all the support the circumstances required. It was also resolved to ask the Government to receive a deputation to give evidence on the Royal Commission to be appointed to consider the general depression of trade. In the evening the representatives were entertained at a banquet by the Bristol Master Builders' Association, and on Wednesday they accompanied the members on the annual excursion, and spent a most enjoyable day in the Valley of the Wyre and Dean Forest.

**A Birthday Commemoration.**—In celebration of the eightieth birthday of Mr. Joseph Edge, of the well-known firm of Malkin, Edge, & Co., of Burslem, about 300 of the employees of the firm recently had an excursion to Rudyard, where they were entertained by the firm. In the course of the day Mr. Edge was presented, by Mr. William Steele, on behalf of the men, with an album containing the photographs of all his workpeople, and bearing the following inscription:—"Presented to Joseph Edge, esq., J.P., on his attaining his eightieth birthday, by the employees of the Newport Earthenware and Tile Works, as a token of their respect and high esteem, and for his benevolent character and invariable kindness." Mr. Edge has pursued a most active and useful career, and we join with his employees in wishing him "many happy returns of the day."

**Liverpool Architectural Society.**—The fifth meeting of the Junior Debating Club in connexion with this Society was held at the Rooms, Cook-street, on Monday last, Mr. Richard Holt in the chair. Mr. E. Percy Hinde read a paper on "Architectural Education." Messrs. Hinks, Rathbone, Mercer, Field, Nicholson, and the Chairman joined in the discussion that followed. It was announced that the next meeting would take place on August 10th, when Mr. James Dod (visitor) will read a paper on the "Box-Sextant, and some of its uses."

**Cabmen's Shelter Fund.**—We understand that the thirty-seventh shelter of the Cabmen's Shelter Fund, situate in Piccadilly (opposite Charing-cross-street) was declared open on Thursday at 5.30 p.m. by the Baroness Burdett Courts.

**Freckenham (Suffolk).**—On December 29, 1882, the lofty ancient tower of this church gave way, the whole falling to the ground, a serious damage also to other portions of the fabric. The damage has now been repaired, and the tower gradually re-erected, its completion being celebrated by a special service on the 14th inst. The work has been ably carried out, at a cost somewhat exceeding 1,000*l.* Messrs. Rattee & Kett, of Cambridge, from the drawings and under the superintendence of Mr. J. Drayton Wyatt, of Holloway, London, the consulting architect to the Church-building Society of the Archdeaconry. As much as possible of the old materials and details have been re-used, and the original design of the tower has in all respects been faithfully adhered to. Towards insuring this result some photographs of the previous work, which fortunately existed, proved very serviceable. The west window has now been filled with stained glass, in memory of the late rector, by his five surviving children.

**Proposed Changes at the Guildhall.**—It is proposed to reconstruct the whole of the offices for the permanent staff at the Guildhall, and to erect a new chamber for the Court of Aldermen. A proposal to this effect will shortly be submitted to the Court of Common Council. The scheme will involve an expenditure of a sum little short of 150,000*l.*—*City Press.*

**Faulkbourne (Essex).**—Funds are being raised for the restoration of the little parish church here. The interior is stated to be in a very dilapidated condition, while there are settlements in two or three places. Plans for the necessary works have been prepared by Mr. A. W. Blomfield, M.A. The estimated cost is 1,100*l.*

**The Proposed New Law Court for the City.**—The *City Press* states that a deputation from the Law and City Courts Committee is about to visit the County Courts in some of the principal towns, with a view to getting information which may assist them in drawing up plans for the new City of London Court.

## PRICES CURRENT OF MATERIALS.

| TIMBER.                                    |               | £. | s. | d. |
|--------------------------------------------|---------------|----|----|----|
| Greenheart, B.G.                           | .....ton      | 6  | 10 | 0  |
| Teak, E.I.                                 | .....load     | 12 | 10 | 0  |
| Squid, U.S.                                | .....cub      | 0  | 2  | 0  |
| Ask, Canada                                | .....load     | 3  | 0  | 0  |
| Birch                                      | .....do       | 3  | 0  | 0  |
| Elm                                        | .....do       | 3  | 10 | 0  |
| Elm, Dantsie, &c.                          | .....do       | 1  | 10 | 0  |
| Oak                                        | .....do       | 3  | 0  | 0  |
| Canada                                     | .....do       | 6  | 0  | 0  |
| Pine                                       | .....do       | 3  | 10 | 0  |
| Pine                                       | .....do       | 3  | 10 | 0  |
| Lath, Dantsie                              | .....fathom   | 5  | 0  | 0  |
| St. Petersburg                             | .....do       | 5  | 0  | 0  |
| Walrus, High                               | .....do       | 3  | 0  | 0  |
| Deals, Finland, 2nd and 1st.               | .....std. 100 | 8  | 0  | 0  |
| 4th and 3rd                                | .....do       | 6  | 10 | 0  |
| Rigs                                       | .....do       | 7  | 0  | 0  |
| St. Petersburg, 1st                        | .....do       | 12 | 0  | 0  |
| 2nd                                        | .....do       | 8  | 0  | 0  |
| white                                      | .....do       | 7  | 0  | 0  |
| Sweden                                     | .....do       | 7  | 0  | 0  |
| White Sea                                  | .....do       | 8  | 10 | 0  |
| Canada, Pine 1st                           | .....do       | 18 | 0  | 0  |
| 2nd                                        | .....do       | 12 | 0  | 0  |
| 3rd, &c.                                   | .....do       | 7  | 0  | 0  |
| Spruce 1st                                 | .....do       | 9  | 0  | 0  |
| 3rd and 2nd                                | .....do       | 6  | 10 | 0  |
| New Brunswick, &c.                         | .....do       | 5  | 0  | 0  |
| Battens, all kinds                         | .....do       | 4  | 0  | 0  |
| Flooring Boards, sq. 1 in.—Prepared, first | .....do       | 0  | 9  | 0  |
| Second                                     | .....do       | 0  | 7  | 0  |
| Other qualities                            | .....do       | 0  | 5  | 0  |
| Cedar, Cuba                                | .....foot     | 0  | 0  | 3  |
| Honduras, &c.                              | .....do       | 0  | 0  | 3  |
| Australian                                 | .....do       | 0  | 0  | 8  |
| Mahogany, Cuba                             | .....do       | 0  | 5  | 0  |
| St. Domingo cargo av.                      | .....do       | 0  | 5  | 0  |
| Mexican                                    | .....do       | 0  | 0  | 4  |
| Tobacco                                    | .....do       | 0  | 0  | 4  |
| Honduras                                   | .....do       | 0  | 0  | 4  |
| Rose, Rio                                  | .....ton      | 7  | 0  | 0  |
| Bahia                                      | .....do       | 7  | 0  | 0  |
| Satin, St. Domingo                         | .....ft.      | 0  | 0  | 8  |
| Porto Rico                                 | .....do       | 0  | 0  | 8  |
| Walnut, Italian                            | .....do       | 0  | 0  | 4  |

## METALS.

|                           |          |    |    |   |
|---------------------------|----------|----|----|---|
| Iron—Pig in Scotland      | .....ton | 2  | 0  | 0 |
| Best, Wales, in London    | .....do  | 5  | 0  | 0 |
| " in Wales                | .....do  | 4  | 12 | 6 |
| " Staffordshire, London   | .....do  | 6  | 0  | 0 |
| Sheets, single, in London | .....do  | 7  | 10 | 0 |
| Hemp                      | .....do  | 7  | 0  | 0 |
| Nail-roads                | .....do  | 6  | 0  | 0 |
| Copper                    | .....do  | 47 | 10 | 0 |
| British, cke. and ingt.   | .....ton | 47 | 10 | 0 |
| Best selected             | .....do  | 49 | 10 | 0 |
| Sheets, strong            | .....do  | 55 | 10 | 0 |
| " India                   | .....do  | 52 | 10 | 0 |
| Australian, fine cast.    | .....do  | 54 | 10 | 0 |
| Chili, bars               | .....do  | 43 | 17 | 6 |
| Yellow Metal              | .....lb. | 0  | 4  | 0 |
| Lead—Pig, Spanish         | .....do  | 12 | 5  | 0 |
| English, com. brands      | .....do  | 12 | 12 | 6 |
| Spelter—                  | .....do  | 13 | 7  | 6 |
| Silesian, special         | .....ton | 13 | 12 | 6 |
| Ordinary brands           | .....do  | 13 | 12 | 6 |



| METALS (continued). |    | £. s. d. | £. s. d. |
|---------------------|----|----------|----------|
| Aluminum            | 94 | 0        | 94 10 0  |
| Aluminum            | 94 | 0        | 94 10 0  |
| Aluminum            | 95 | 0        | 0 0 0    |
| Aluminum            | 14 | 6        | 18 6 0   |
| Aluminum            | 21 | 0        | 25 0 0   |
| Aluminum            | 17 | 0        | 20 0 0   |
| Aluminum            | 26 | 6        | 27 0 0   |
| OILS.               |    | £. s. d. | £. s. d. |
| Aluminum            | 23 | 0        | 23 10 0  |
| Aluminum            | 32 | 10       | 0 0 0    |
| Aluminum            | 27 | 10       | 0 0 0    |

| OILS (continued).    |    | £. s. d. | £. s. d. |
|----------------------|----|----------|----------|
| Copra                | 28 | 0        | 28 10 0  |
| Palm, Lagos          | 29 | 10       | 30 0 0   |
| Palm-nut Kernel      | 28 | 0        | 0 0 0    |
| Rapeseed, English    | 28 | 10       | 0 0 0    |
| " brown              | 24 | 0        | 0 0 0    |
| Cotton-seed, refined | 22 | 0        | 23 10 0  |
| Tallow and Oleine    | 25 | 0        | 45 0 0   |
| Lubricating, U.S.    | 7  | 0        | 10 0 0   |
| " Refined            | 8  | 0        | 15 0 0   |
| TURPENTINE.          |    | £. s. d. | £. s. d. |
| American, in cks.    | 1  | 9        | 3 0 0    |
| Swedish              | 1  | 2        | 0 0 0    |
| Archangel            | 0  | 14       | 0 14 6   |

## COMPETITIONS, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITIONS.

| Nature of Work.                   | By whom required.        | Premium.                   | Designs to be delivered. | Page. |
|-----------------------------------|--------------------------|----------------------------|--------------------------|-------|
| For a Veterinary Hall and Offices | Parish of Fulham         | 75 gs., 50 gs., and 25 gs. | Nov. 2nd                 | ii.   |
| For a Library                     | Pennance Library Com.    | Not stated                 | Not stated               | ii.   |
| At Grove Park, Kent               | J. A. Hilliard, per Com. | do.                        | do.                      | ii.   |

## CONTRACTS.

| Nature of Work, or Materials.                      | By whom required.          | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page.  |
|----------------------------------------------------|----------------------------|-----------------------------------|--------------------------|--------|
| Sewer and other Works                              | Willenden Local Board      | O. Claude Robson                  | August 5th               | xxvi.  |
| Recesses, Manholes, &c.                            | do.                        | do.                               | do.                      | xxvi.  |
| Smoking and Paving                                 | Fulham Board of Wks.       | Official                          | do.                      | ii.    |
| as at Walworth                                     | do.                        | Lansdown & Harris                 | August 6th               | ii.    |
| de Repairs, &c., at School, Workhouse, and Offices | Mile End Guardians         | J. M. Knight                      | do.                      | ii.    |
| de Shop at Derby, several cottages, &c.            | Midland Railway Co.        | Official                          | August 7th               | ii.    |
| Iron Socket Pipes                                  | Oxford City Waterworks     | T. C. Hawkesley                   | August 8th               | ii.    |
| Library, Museum, &c.                               | Bootham Lincoln Cor.       | Official                          | August 11th              | ii.    |
| Cocks, Ferrules, and Surface Boxes                 | Southampton Corporate      | W. Matthews                       | do.                      | ii.    |
| Hints, &c.                                         | Southgate Local Board      | Official                          | do.                      | ii.    |
| ing and Forming Roads at Mesdval                   | Reigate U. S. A.           | Hornbrook                         | do.                      | xxvi.  |
| for Grade                                          | do.                        | do.                               | do.                      | xxvi.  |
| ing-Engines, Boilers, &c.                          | Petersfield Guardians      | H. Robinson                       | do.                      | ii.    |
| se and Boiler House, &c.                           | do.                        | do.                               | do.                      | ii.    |
| tion of Three Houses                               | C. Chambers                | Official                          | do.                      | ii.    |
| struction in Masonry of Piers of the               | Great Western Ry. Co.      | do.                               | August 12th              | ii.    |
| sk Viaduct                                         | Com. of H. M. Works        | do.                               | do.                      | ii.    |
| ional Story at Patent Office                       | do.                        | E. Cousins & Son                  | August 13th              | xxvii. |
| uge Works                                          | Kent Justices of the Peace | Official                          | do.                      | ii.    |
| iding Beckenham Village Bridge                     | Friern Barnet U.S.A.       | Baldwin Latham                    | August 26th              | ii.    |
| age Works                                          | Dublin Bd. of Public Wks.  | T. N. Deane & Son                 | Sept. 2nd                | xxvi.  |
| Science and Art Museum and National                | do.                        | J. C. Tryan                       | Not stated               | xxvii. |
| library, Dublin                                    | A. P. Kingcombe, Esq.      | S. J. Newman                      | do.                      | xxvii. |
| ration of Spire, Woodford Church                   | do.                        | do.                               | do.                      | xxvii. |
| o, &c., at Towcester                               | do.                        | do.                               | do.                      | xxvii. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment.             | By whom Advertised.    | Salary.    | Applications to be in. | Page. |
|------------------------------------|------------------------|------------|------------------------|-------|
| ys, Marylebone, Bethnal Green, Bow | Met. Board of Works    | Not stated | August 5th             | xvi.  |
| ctor of Nuisances and Surveyor     | Bridgton Un. R. S. A.  | 109l. 4s.  | August 7th             | xi.   |
| ing Foreman                        | Workbro' Lcl. Gov. Bd. | Not stated | August 10th            | xvi.  |

## TENDERS.

|                                                 |                                                                                                                                                       |          |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| alterations and additions to Mr. W. F. Wright's | For the erection of two houses in Hawthorn-road, Kettering, for Mr. Thos. Joyner. Mr. H. A. Cooper, architect. Quantities supplied by the architect:— |          |
| on—                                             | S. Beard                                                                                                                                              | 2440 0   |
| Varren, Stevenage                               | Manby & Colman                                                                                                                                        | 439 0    |
| William & Son, London                           | A. Barlow                                                                                                                                             | 426 0    |
| anston, Knarworth                               | T. Farley                                                                                                                                             | 420 10 0 |
| ended tenders for the above:—                   | C. & F. Henson                                                                                                                                        | 420 0    |
| anston                                          | H. F. Henson                                                                                                                                          | 420 0    |
| anston                                          | Dickens & Mutton                                                                                                                                      | 415 0    |
| anston                                          | C. Sherman                                                                                                                                            | 363 0    |
| anston                                          | S. Hulks (accepted)                                                                                                                                   | 389 0    |

|                                                                                                                                                             |                                                                                                                               |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------|
| camp-shedding and large bed at Westferry-road, all for Mr. J. P. Morton, under the superintendence of Mr. William Eve, Union-court, Old Broad-street, E.C.— | For the erection of new villa residence, "Smallfield," at Chislehurst, Mr. C. H. M. Mileham, architect. Quantities supplied:— |            |
| res & Son                                                                                                                                                   | Dove                                                                                                                          | 21,845 0 0 |
| Higgs                                                                                                                                                       | Lowe                                                                                                                          | 1,802 0 0  |
| Lawrence                                                                                                                                                    | Crosley                                                                                                                       | 1,028 0 0  |
| alt                                                                                                                                                         | Holloway Bros. (accepted)                                                                                                     | 1,686 0 0  |
| burnt                                                                                                                                                       | For rebuilding casual wards, Union Workhouse, Monmouth. Messrs. Muggerside & Powell, architects —                             |            |
| owns                                                                                                                                                        | Chas. Morgan                                                                                                                  | 2339 14 0  |
| arris & Wardrop (accepted)                                                                                                                                  | Wm. Simmonds                                                                                                                  | 335 10 0   |

|                                                                                                                                                                 |                                                                                                          |           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------|
| the erection of a warehouse and two houses at St. Peters, for Mr. C. P. Fennell, Mr. H. A. Cooper, architect, Kettering. Quantities supplied by the architect:— | For repairs to No. 2, Blackfriars-road, S.E., for Mr. Robert H. Barnes. Mr. H. I. Newton, architect:—    |           |
| Halford                                                                                                                                                         | Lambie                                                                                                   | 2316 0 0  |
| Barlow                                                                                                                                                          | Walker                                                                                                   | 300 10 0  |
| Bayes                                                                                                                                                           | Dixon & Jones                                                                                            | 288 0 0   |
| F. Henson                                                                                                                                                       | B. Cook                                                                                                  | 287 0 0   |
| Abbott                                                                                                                                                          | For painting and repairs to houses in Lyndhurst-grove, Peckham, under the direction of Mr. Alfred Fyfe — |           |
| Allen (accepted)                                                                                                                                                | C. W. Reading                                                                                            | 2225 15 0 |
|                                                                                                                                                                 | W. Langridge & Sons                                                                                      | 213 6 0   |
|                                                                                                                                                                 | Fussey & Lumley (accepted)                                                                               | 201 10 0  |

|                                                                                                                     |                                                                                                                                |          |
|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------|
| the erection of three cottages at Higham Ferrers, for Mr. G. Gadsby. Mr. H. A. Cooper, architect:—                  | For alterations at the "Lilliput Arms," Victoria Dock-road, Caenning Town, for Mr. Curtis. Mr. Aston, architect. Forest Gate:— |          |
| Bayes                                                                                                               | Whyte                                                                                                                          | 2847 0 0 |
| Halford                                                                                                             | Earl & Sons                                                                                                                    | 749 0 0  |
| Abbott                                                                                                              | Nicholls                                                                                                                       | 655 0 0  |
| Allen (accepted)                                                                                                    | Buckle, Stratford (accepted)                                                                                                   | 650 0 0  |
| the erection of new villa residence, "Burlingham," at Islehurst, Mr. C. H. M. Mileham, architect. Titles supplied:— | For the erection of a cottage at Higham Ferrers, for Mr. Geo. Hartwell. Mr. H. A. Cooper, architect:—                          |          |
| only                                                                                                                | C. Bayes                                                                                                                       | 2186 0 0 |
| ova Bros.                                                                                                           | S. Abbott                                                                                                                      | 185 6 0  |
| olloway Bros. (accepted)                                                                                            | A. Halford                                                                                                                     | 175 10 0 |
| owe                                                                                                                 | J. Allen (accepted)                                                                                                            | 164 4 0  |

For new premises, Dale End, Birmingham, for Mr. S. Mason. Mr. Oliver Essex, architect:—

|                          |            |
|--------------------------|------------|
| Wm. Bloore               | £4,950 0 0 |
| J. Bowen                 | 4,763 0 0  |
| Barclay & Sons           | 4,475 0 0  |
| Whitehouse & Jones       | 3,739 0 0  |
| W. T. Bennett            | 4,297 0 0  |
| W. Robinson              | 4,280 0 0  |
| T. Rowbotham             | 3,947 0 0  |
| J. Hartley               | 3,867 0 0  |
| Horsley Bros. (accepted) | 3,838 0 0  |

For alterations, repairs, and new buildings at Cresser Farm, High Wycombe, for the Right Hon. Lord Carington. Mr. J. Carter Jonas, surveyor, Cambridge:—

|             | First Contract. | Second Contract. |
|-------------|-----------------|------------------|
| C. H. Hunt  | 2698 0 0        | £82 0 0          |
| Geo. Gibson | 863 0 0         | 110 15 0         |
| Loosey      | 650 0 0         | 93 17 0          |
| H. Harris   | 622 13 0        | 84 10 0          |

For making new roads and laying down pipe sewers on the Berrymead Estate, Acton, for the Berkshire Estate Company (limited):—

|                  |             |
|------------------|-------------|
| Tallor           | £2,670 15 0 |
| Novell & Robson  | 2,478 0 0   |
| Nevins & Son     | 2,473 0 0   |
| Trehearne        | 2,412 0 0   |
| Wimpey           | 2,325 0 0   |
| Adams            | 2,191 0 0   |
| Trueman          | 2,220 0 0   |
| Bell             | 2,138 0 0   |
| Cock & Co.       | 2,103 0 0   |
| Catley           | 2,100 0 0   |
| Snee             | 1,992 18 0  |
| Nichols          | 1,877 0 0   |
| Hill             | 1,877 17 0  |
| Rowland Brothers | 1,869 0 0   |
| Pizey            | 1,865 0 0   |
| Saunders         | 1,733 0 0   |

For completing works according to original specification, with certain additions, at the St. James's Baths and Washhouses, Marshall-street, W.—

|                  |            |
|------------------|------------|
| Scrivenor        | £1,200 0 0 |
| Forley           | 1,197 0 0  |
| MacLachlan       | 1,070 0 0  |
| Braid            | 920 0 0    |
| Knight           | 875 0 0    |
| Beach (accepted) | 740 0 0    |

For additions to dwelling-house, No. 51, Keyford, Frome, for Mr. Charles Case. Mr. W. George Brown, architect:—

|                         |             |
|-------------------------|-------------|
| Barnes & Son            | £1,328 10 0 |
| T. Parfitt & Son        | 1,046 0 0   |
| F. J. Seward (accepted) | 960 0 0     |

[All of Frome.]

For new shop and bakehouse, at No. 75, Broadway, Frome, for Messrs. J. &amp; T. Baily. Mr. W. George Brown, architect:—

|                             |          |
|-----------------------------|----------|
| Hodder & Sons               | £361 0 0 |
| Barnes & Son                | 343 0 0  |
| F. J. Seward                | 340 0 0  |
| F. P. Brown                 | 312 10 0 |
| T. Parfitt & Son (accepted) | 305 0 0  |

[All of Frome.]

For the erection of a carcass at George-street, Croydon, for Mr. W. J. Bacon. Mr. James Webster, architect:—

|                                            |          |
|--------------------------------------------|----------|
| Doughty-street, Mecklenburgh-square, W.C.— |          |
| Fenn, Eitham                               | £720 0 0 |
| Taylor, Croydon                            | 650 0 0  |
| Redman, Brockley                           | 476 0 0  |
| Marriage, Croydon (accepted)               | 418 0 0  |

For additions and alterations at No. 113, Abbeon-road, for Mr. Thos. Whiting, under the superintendence of Mr. William Eve, Union-court, Old Broad-street, E.C.—

|                        |          |
|------------------------|----------|
| Higgs                  | £512 0 0 |
| Harris & Wardrop       | 673 0 0  |
| Aldridge & Jenvey      | 680 0 0  |
| Salt                   | 640 0 0  |
| Heisey                 | 621 0 0  |
| W. W. Exton (accepted) | 467 0 0  |

For the erection of warehouse, and stabling for 348 horses, at Allen-street, Goswell-road, for Messrs. Carter, Paterson, &amp; Co., under the superintendence of Mr. William Eve, Union-court, Old Broad-street, E.C.—

General Works.

|                                                              |            |
|--------------------------------------------------------------|------------|
| Messrs. Brass & Son, accepted on schedule of prices.         |            |
| Iron and Steel Work (except Iron Joists and small Castings). |            |
| Moreland & Son (accepted)                                    | £1,700 0 0 |

For warehouse at Westferry-road, Millwall, for Mr. J. T. Morton, under the superintendence of Mr. William Eve, 10, Union-court, Old Broad-street, E.C.—

|                             |            |
|-----------------------------|------------|
| Higgs                       | £3,780 0 0 |
| Brass & Son                 | 3,597 0 0  |
| Shurrun                     | 3,450 0 0  |
| Lawrence                    | 3,323 0 0  |
| Downs                       | 3,063 0 0  |
| Salt                        | 3,091 0 0  |
| Harris & Wardrop (accepted) | 3,064 0 0  |

For house, Church-street, Stoke Newington, for Mr. W. A. Morgan, under the superintendence of Mr. William Eve, 10, Union-court, Old Broad-street, E.C.—

|                   |            |
|-------------------|------------|
| Jackson & Todd    | £2,970 0 0 |
| Goodall           | 759 0 0    |
| Shurrun           | 749 0 0    |
| Hyatt             | 685 0 0    |
| Harris & Wardrop  | 634 0 0    |
| Aldridge & Jenvey | 657 0 0    |
| Salt              | 648 0 0    |
| Exton (accepted)  | 628 0 0    |

For the enlargement and improvement of Mr. J. Jones's gum paper factory, Peckham-grove, Camberwell, S.E. Mr. Robert P. Whellock, architect, Church street, Camberwell, S.E.:—

|                         |          |
|-------------------------|----------|
| E. Lawrence & Son       | £416 0 0 |
| W. Smith                | 405 0 0  |
| Alex. Mackie (accepted) | 343 3 0  |

For new schools, Catherine-street, City-road, for the  
Lion School Board. Mr. T. J. Bailey, architect:—

|                    |             |
|--------------------|-------------|
| J. Goodman         | £14,830 0 0 |
| W. Bruns & Son     | 14,800 0 0  |
| Atherton & Latta   | 14,279 0 0  |
| W. Tongue          | 14,187 0 0  |
| W. Oldrey          | 14,129 0 0  |
| C. Wall            | 14,084 0 0  |
| H. L. Holloway     | 13,961 0 0  |
| Wall Bros.         | 13,943 0 0  |
| W. Dows            | 13,860 0 0  |
| W. Shurmer         | 13,896 0 0  |
| H. Hart            | 13,884 0 0  |
| J. Holloway        | 13,850 0 0  |
| W. Johnson         | 13,774 0 0  |
| Howell & Son       | 13,715 0 0  |
| J. R. Hunt         | 13,709 0 0  |
| W. P. & J. Croaker | 13,638 0 0  |
| Stimpeon & Co.     | 13,663 0 0  |
| Kirk & Randall     | 13,331 0 0  |
| S. J. Jerrard      | 13,290 0 0  |

For the erection of industrial dwellings in Hanbury-  
place, Poplar, E., for Mr. W. H. Pettiver. Mr. T.  
Lawrie, architect, 14, Southampton-street, Strand. Quan-  
tities supplied by Mr. H. F. Foster:—

|                       |            |
|-----------------------|------------|
| J. Outhwaite & Son    | £3,644 0 0 |
| Patman & Petheringham | 3,685 0 0  |
| W. H. Wilkins         | 3,423 0 0  |
| W. Harris             | 3,360 0 0  |
| J. O. Richardson      | 3,210 0 0  |
| W. H. Holland         | 3,048 0 0  |

For pulling down and rebuilding two shops and business  
premises in Culver-street, for Mr. E. Scott, Colchester.  
Proprietor finding all bricks. Mr. J. W. Start, archi-  
tect, Colchester. Quantities supplied by the archi-  
tect:—

|                        |            |
|------------------------|------------|
| A. Gladwell            | £1,358 0 0 |
| E. Eade                | 1,187 0 0  |
| H. Ambrose             | 1,162 18 0 |
| G. Bowles              | 1,162 0 0  |
| F. Dupont              | 1,016 0 0  |
| A. Chambers (accepted) | 979 0 0    |

[All of Colchester.]

For pulling down and rebuilding No. 40, Great Prescott-  
street, Whitechapel. Messrs. Wigg, Oliver, & Son,  
architects:—

|                  |          |
|------------------|----------|
| Longmire & Burge | £883 0 0 |
| Sargent          | 815 0 0  |
| Little           | 740 0 0  |
| Estons           | 719 0 0  |
| Langread & Way   | 685 0 0  |
| Exton, Kingsland | 650 0 0  |

For new mission church, Chatsworth-road, Clapton  
Park. Mr. R. H. Hill, architect:—

|                    |            |
|--------------------|------------|
| Higgs & Hill       | £2,743 0 0 |
| J. T. Chappell     | 2,720 0 0  |
| Holloway Bros.     | 2,563 0 0  |
| J. C. Arnaud & Son | 2,598 0 0  |
| D. G. Laing & Son  | 2,544 0 0  |
| Harris & Wardrop   | 2,467 0 0  |
| O. Craike          | 2,467 0 0  |
| B. E. Nightingale  | 2,448 0 0  |
| W. Shurmer         | 2,448 0 0  |

For decorations, &c., at the Freemasons' Tavern, Great  
Queen-street, W.C., for Messrs. Spiers & Pond. Mr. S. F.  
Kemp, architect and surveyor:—

|                    |          |
|--------------------|----------|
| W. Read (accepted) | £477 0 0 |
|--------------------|----------|

[No competition.]

For alterations at 38, York-place, Baker-street, for Miss  
Poplett. Mr. H. J. Treadwell, architect, Agar-street,  
Strand:—

|                   |          |
|-------------------|----------|
| Fairchild & Co.   | £733 0 0 |
| Styles            | 612 0 0  |
| A. G. Holding     | 537 0 0  |
| Turtle & Appleton | 469 0 0  |

For alterations, &c., to stable premises, Kendall-mews.  
Mr. J. T. Walford, architect:—

|                   |            |                        |          |
|-------------------|------------|------------------------|----------|
| Robertson         | £1,708 0 0 | New roof<br>over yard. | £355 0 0 |
| Simpson & Son     | 1,378 0 0  |                        | 287 0 0  |
| Cock              | 1,149 0 0  |                        | 334 0 0  |
| Turtle & Appleton | 1,089 0 0  |                        | 269 0 0  |
| Holding           | 1,067 0 0  |                        | 269 0 0  |
| Holloway Bros.    | 1,047 0 0  |                        | 264 0 0  |

Accepted for alterations at the "Queen's Arms," Wind-  
mill-road, Croydon:—

|                      |          |
|----------------------|----------|
| W. Buckle, Stratford | £200 0 0 |
|----------------------|----------|

Accepted for building shop and house over, adjoining  
the new "Rodney's Head" public-house, for Mr. J.  
Wild. Mr. J. Laws, architect, Fellows-road, South  
Hampton:—

|                           |          |
|---------------------------|----------|
| A. G. Allard, Pentonville | £295 0 0 |
|---------------------------|----------|

[No competition.]

Accepted for the erection of Sunday schools and  
mission hall, for the Parish of St. Mary Magdalene,  
Addiscombe, Surrey. Mr. D. R. Dale, architect:—

|              |            |
|--------------|------------|
| Hoare & Sons | £1,400 0 0 |
|--------------|------------|

[No competition.]

New Bank Office, Lincolne, for the London and  
County Banking Company.—Messrs. Holloway Bros., of  
Victoria Works, Queen's-road, Battersea, write:—"In  
the list of tenders for the above in your last week's issue,  
the lowest tender is stated to be by 'J. Holloway'; it  
should have been our name."

**SPECIAL NOTICE.**—Lists of Tenders frequently  
reach us too late for insertion. They should be delivered  
at our Office, 46, Catherine-street, W.C., not later than  
Four p.m. on THURSDAYS.

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W. de G. B.—W. K.—W. A. S.—H. S.—C. S. (You forget that  
theatres are built with special regard to acoustic effect, which is  
interfered with by expanses of window; and as theatres are almost  
entirely used for night performances, it is not worth while to spoil  
their acoustics for the sake of windows. Ventilation should be pro-  
vided in other ways; we quite agree that it is deplorably deficient  
in most, if not all, London theatres.—Z. (It depends entirely on  
the provisions of the local by-law.—Short Lengths (we know of  
no one who makes such pipes; probably you could only get them  
made to order).—H. H. & Co.—C. J. F.—A. G.—W. W.—K.—H. R. E.  
T. G. (We cannot enter into a discussion on the subject).—W. E.  
C. B.—M. W. S. (received).—"Ignorant" (we should say that it  
would be a very dangerous proceeding in the case of competition  
tendering).

All statements of facts, lists of tenders, &c., must be accompanied  
by the name and address of the sender, not necessarily for publica-  
tion.

We are compelled to decline pointing out books and giving  
address.

**NOTE.**—The responsibility of signed articles, and papers read at  
public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters of communications beyond mere news-items which have  
been duplicated for other journals, are NOT DEEMED.

All communications regarding literary and artistic matters should  
be addressed to THE EDITOR; all communications relating to  
advertisements and other exclusively business matters should be  
addressed to THE PUBLISHER, and not to the Editor.

#### PUBLISHER'S NOTICES.

THE INDEX and TITLE-PAGE for Volumes XLVIII. (January  
to June, 1885) were given, as a Supplement, with the  
Number of July 11th.

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application at the Office.

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DOUGLAS FOURDRINER, Publisher,  
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Advertisements for the current week's issue must reach the Office  
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The Publisher cannot be responsible for DRAWINGS, TESTI-  
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cover the postage.

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manship, apply to JOHN HANN & SON, Quarry  
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necting Business Premises.

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# The Builder.

Vol. XLIX. No. 2518

SATURDAY, AUGUST 8, 1886.

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### London Gardens and Playgrounds.



There is one movement, more than another, that has made its mark upon latter-day London, it is that most excellent and practical philanthropy, which has resulted in obtaining and laying out open spaces for

the comfort and health of the five million inhabitants of the metropolis. Though that movement has been carried out in the most quiet and unostentatious manner, it has become patent even to those persons who usually go about with their eyes shut, but who can scarcely fail to notice that London at this day possesses far more air, light, flowers, and trees than was the case half a dozen years ago. We cannot all be possessors of land under the present dispensation, wherein each man may sit under his own fig-tree; but we may all, down to the very poorest and smallest amongst us, be sharers, to a more or less extent, in God's fresh air and sunshine; and we cannot doubt that, to enable the people to enjoy these at their own doors, is one of the highest forms of Christianity.

If we take an aggregate of London's open spaces, its parks, its gardens, and its squares, excluding, of course, everything to which the public has not free access, we shall find that this aggregate is as surprising as it is gratifying, and brings us to the conclusion that there is no city in the world which, in proportion to its size, is better off in this respect; and, although it is true that there are plenty of plague-spots to be rooted out, their evil influence is greatly neutralised by the near neighbourhood of verdure and flowers. Putting aside the question of actual sanitation, few will deny the moral effect produced by the possession of a garden; for even Bill Sykes would scarcely choose such a locality for hatching his burglarious schemes. Probably but few people have any idea as to the extent of London open spaces, and it may be worth while, therefore, to give a brief résumé of them, including those which, though outside the metropolitan area, are yet within the compass of a walk or a short railway journey. At the same time it must be remembered that the advantages of a thousand acres of the prettiest park, which it takes half an hour or so to reach, are not to be compared with the plot of garden five minutes away, where the weary mother may rest a while from her household troubles, and the children exchange the heated

air of the courts and alleys for something cooler and purer.

The London open spaces may be thus divided:—

- A. Public parks in and around London.
- B. Commons, greens, and squares.
- C. Cemeteries.
- D. Churchyards and disused burial-grounds.

Under the first two headings we find that there are over 15,000 acres, the principal items of which are as follows:—

| Parks.                                  | Acres. |
|-----------------------------------------|--------|
| W. Hyde Park .....                      | 390    |
| Kensington Gardens .....                | 310    |
| N.W. Regent's Park and Primrose Hill .. | 400    |
| N. Finsbury Park .....                  | 115    |
| S.E. Dulwich Park .....                 | 72     |
| Southwark Park .....                    | 68     |
| Greenwich Park .....                    | 174    |
| Kennington Park .....                   | 12     |
| E. Wandstead Park .....                 | 182    |
| West Ham Park .....                     | 80     |
| Victoria Park .....                     | 300    |
| S.W. St. James's Park .....             | 83     |
| Green Park .....                        | 71     |
| Battersea Park .....                    | 250    |
| Kew Gardens .....                       | 270    |
| Richmond Park .....                     | 2,255  |
| Bushey Park .....                       | 1,100  |
| Total .....                             | 6,127  |

The commons, most of which are under the care of the Metropolitan Board of Works, or the Corporation, are even more extensive, the largest acreage being found at

|                                       | Acres. |
|---------------------------------------|--------|
| E. Epping Forest .....                | 5,343  |
| Well-street Common .....              | 30     |
| London Fields .....                   | 27     |
| Clapton Common and Mill Fields ..     | 68     |
| Hackney Downs .....                   | 50     |
| W. Wormwood Scrubs .....              | 190    |
| Shepherd's Bush and Brook Green ..    | 14     |
| Ealing Common .....                   | —      |
| N.W. Hampstead Heath .....            | 240    |
| Stoke Newington Common .....          | 5      |
| Hadley Common .....                   | 250    |
| S.W. Tooting Beck and Eelbrook Common | 225    |
| Clapham Common .....                  | 220    |
| Wandsworth Common .....               | 160    |
| Wimbledon and Putney Commons ..       | 1,000  |
| Barnes Common .....                   | 100    |
| Steen and Ham Commons .....           | —      |
| S.E. Blackheath .....                 | 267    |
| Bostall Heath .....                   | 55     |
| Plumstead Common .....                | 110    |
| Croydon and Caterham Commons ..       | 847    |
| Peckham Rye .....                     | 64     |
| Total .....                           | 8,748  |

making, with the parks, over 15,000 acres.

Next in size come the greens, recreation grounds, and the gardens of those squares which, by the good offices of the Metropolitan Public Garden, Boulevard, and Playground Association, have been thrown open to outsiders, and which amount in the aggregate to some 100 acres or so. The value of these, however, must not be gauged by their in-

dividual size, but by their being dotted here and there around and throughout the metropolis. The chief of these are (S.W.) Parson's Green, Hampton Court, Chelsea Hospital, and Ebury-square; (N.) Canonbury-square, and Islington-green; (W.) Paddington-green, Leicester-square, the Embankment-gardens (13 acres); (S.E.) Camberwell and Goose Greens, Sydenham Recreation Ground (17 acres); (E.) Horsemonger Lane Gaol, Poplar Recreation Ground, Brewers'-gardens, Silver-street playground, Long-lane, Smithfield, &c.

The cemeteries, although undoubtedly coming under the head of open spaces, many of which are of great extent, can scarcely be included as places for popular recreation, partly from the nature of their contents and associations, and partly because they are more or less private property, to which the public is admitted by courtesy. Nevertheless, as areas upon which the profane builder cannot intrude, the cemeteries are most valuable as adding many hundreds of acres to the breathing capacity of London. The principal of these are at Hampstead, Highgate, Kensal-green, Abney Park, Camberwell, Hanwell, Brompton, Nunhead, Norwood, Southgate, and Finchley, that of Woking being too far to take into account as a London open space. It cannot be said, therefore, that the metropolis is deficient in popular areas, though it is true that these are not always to be found where most wanted. Here it is that Lord Brabazon's excellent society has done, and is doing, such admirable work, and more especially in ferreting out the numerous little burial-grounds and City churchyards, and transforming them from dark, dismal caverns into light and airy gardens, made gay with flowers and turf. A table compiled by Miss Gladstone, the honorary secretary of the Association, shows that there exist, or have existed, within the metropolitan area, no less than 404 burial-grounds, of which forty-two are open to the public during the day-time, being laid out as gardens or otherwise improved. The remainder are thus accounted for: (1) 27 are disused burial-grounds that have been turned into private gardens, store-yards for builders' materials, &c., or have been asphalted and taken for the playgrounds of special schools; (2) 97 have been demolished for the widening of roads and pavements, and the making of new streets, or else have been occupied by public buildings and railway lines; (3) five have been offered as building sites, but have not yet been built upon; while (4) 210 are closed to the public, though, of course, not now used for burial.

Under the category (B) of burial-grounds occupied by buildings, a good many are now covered over with railway stations or dock



premises, to which no objections could be raised on sanitary grounds, or else with public buildings, such as the Law Courts, the National Gallery, &c.; but it rather "gives us pause," when we find how many dwelling-houses, and those generally in the most crowded neighbourhood, have been erected on the sites of graveyards. In E.C. district, for instance, three separate portions of Queen Victoria-street are built upon the burial-grounds of St. Mary Mounthaw, St. Nicholas Olave, and St. Mary Magdalen. As the greater part of this street is used as shops and warehouses, and not for purely residential purposes, this does not so much matter; but other portions of the district are not so fortunate.

The Plague-pit in Cripplegate, the Friends' burial-ground in Bunhill-row, the Pest fields of Hand-alley and Old-street, are all covered with artisans' dwellings, and the same occurs frequently in E. district, where the Shoreditch burial-ground is occupied by almshouses, and the one in the Whitechapel-road by the workhouse. These conditions, it is to be presumed, cannot now be altered, and we would therefore turn with the greater satisfaction to the cases in which Lord Brabazon and his associates have been successful in letting in light and fresh air to some of the dreariest spots in London. The Horse-monger-lane Gaol, or rather, half of its site, was leased to the Metropolitan Public Garden, Boulevard, and Playground Association, by the Surrey magistrates, from January 1st, 1884, and laid out as a children's playground at a cost of 366*l.*, and an annual maintenance of 85*l.* It is pleasant to think that over 2,000 little ones daily amuse themselves on this spot, which was formerly a frowsy prison, in which the prevailing sounds were the oaths and the sighs of the inhabitants. Amongst the more prominent works of Lord Brabazon's Association, either finished or in progress, are the opening of the following churchyards, squares, and burial-grounds:—The churchyards of Christ Church (Battersea), West Hackney, St. Bartholomew's (Bethnal-green), St. Philip's (Avondale-street, S.E.), St. Clement Danes, St. Martin's Vintry, &c., Canonbury-square, Ebury-square, Carlton-square (Mile-end), Red Lion-square, Trafalgar-square (Mile-end), Northampton and Wilmington-squares (Clerkenwell), Hoxton-square, Soho-square, Walcot and St. Mary's squares, S.E., Trinity-square, E.C.; of burial-grounds, Paddington-street, St. Dunstan's (Stepney), St. Anne's (Limehouse), All Saints (Poplar), St. Luke's (Chelsea), Holy Trinity (Gray's Inn-road), St. James (Hampstead-road), St. Peter (Newington), St. James (Bermondsey), St. Mary-le-Strand (Drury-lane), St. Mary's (Lewisham), East London Cemetery, &c. The cost of these gardens, already incurred and for which estimates have been obtained, is considerably over 12,000*l.* Amongst some of the more ambitious undertakings set on foot by the Association and looming in the distance, are the formation of a boulevard on the Main Drainage Embankment at Stratford, and the obtaining of a public garden and park of the Ravenscourt Estate close to Hammersmith. Few people have the slightest conception of the difficulties that attend the throwing open of even the smallest and most insignificant burial-ground, of the existence of which probably not one person in half a million is aware. The finding out of the responsible trustees or owners, the investigation of the titles, the vested interests and complicated claims that have grown up in the course of centuries,—and, when all these are disposed of, the actual expenses (often very considerable) which attend the transformations,—are matters that demand the most extreme patience and perseverance on the part of those that have so willingly undertaken them. It is to be hoped that the last item, at all events, that of the money required for this good work, will never be allowed to languish until every churchyard and burial-ground in London is made into an oasis of light and brightness.

The British Association for the Advancement of Science will meet this year at Aberdeen.

## THE PROPOSED NEW CHARTER FOR THE INSTITUTE.

THE Council of the Royal Institute of British Architects have taken the important step of asking for the sanction of the general body of members to an application to the Crown for a new charter, the suggested form of which is now in the hands of members, accompanied by a circular letter from the secretaries drawing attention to and defining the reasons which have induced them to take this step.

The reasons for taking this step are thus set forth in the first paragraph of the secretaries' circular:—

"It has long been felt that the existing Charter is insufficient to satisfy or even meet the requirements of the present time, and this feeling has found expression on several occasions, more particularly among the Associates, many of whom, even from an early period of the Institute's existence, have complained of the restricted nature of their rights; while the desire of the non-metropolitan members to be placed on an equal footing with their London colleagues in respect to the exercise of voting powers has been often evinced. These and other important matters were discussed by the Special Committee appointed in 1875 to report on the financial condition of the Institute, and the best mode of increasing its efficiency. That committee, in a well-considered report, recommended that the status of Fellows should be raised, and that additional privileges should be given to the class of Associates,—that they should be allowed to vote at general meetings, and to be represented on the Council; also that in the election of the Council non-metropolitan members should be permitted to vote by proxy. The committee made it clear that the existing Charter interfered with all such suggestions, and that, were the Institute to adopt them, it would be necessary to apply for a new Charter."

The matter was carried no further at that time; but the consideration of the subject was further stimulated by a memorial in 1882 from the Manchester Society of Architects, praying "that means might be devised whereby the voice of non-present members might be heard at the general meetings in the annual election of officers, and in other matters of importance to the profession"; and the effect of this was supplemented last year by a memorial from 450 associate members, praying that the right of voting might be given to members of their class, and suggesting that the votes of non-metropolitan associates should be recorded by means of voting papers transmissible by post.

Of these two demands, the existence of which has mainly given rise to the feeling of the necessity for a new charter, the demand for a vote by country members who cannot attend the meetings seems to us by far the most important, and the one on which there can be the least difference of opinion; if, indeed, there can be any. The country members pay the same subscription as the town members, yet the part they can take in the actual affairs of the Institute is in most cases absolutely nil. Even on important occasions, it is not always possible for an architect in the provinces, however practically he may feel interested in the matter to be discussed, to leave his business and come up to town for the purpose of voting or (if he finds opportunity) speaking on the subject; and, if he does, he may very possibly find that the final consideration of the subject is adjourned to another evening, and that, even if he gets in his speech, he cannot give his vote without the expense of another journey up to town. So far from wondering that the Institute does not count a larger number of members among the provincial architects, we are rather disposed to wonder at the long-suffering of so many of the provincial members in year after year subscribing to a body in the procedure of which they are unable to have a voice, and which remains practically a metropolitan institution. The Council have frequently spoken of their desire that the Institute should represent the whole country, but it is not until now that they have seriously proposed the step which is the necessary preliminary towards rendering it so representative, that of enabling provincial members to give a vote in their absence. The precise method in which this reform is to be carried out is not indeed

specified in the proposed charter, but a clause is inserted to the effect that, "subject to the provisions of this Our Charter, By-laws shall define and regulate the mode, time, and place of summoning and adjourning General Meetings of the Royal Institute, and shall prescribe the mode of voting at such general meetings, whether in person, or by proxy or ballot, or by voting-papers or otherwise." We presume that the insertion of this clause in the proposed new Charter at all events means business, and that, if the new Charter be granted, this provision will be promptly acted upon.

The matter of allowing votes to the Associates is one on which there may be more reason for difference of opinion. The Associates are, numerically, a very considerable proportion of the members, and include among their members many men of high character and ability, to whom no one would grudge the right of voting, and who will, in process of time, join the ranks of the Fellows. But this division of the members also includes some who have hardly any claim to take an active part in regulating the concerns of the Institute. Some of the Associates are in fact, we have reason to know, of the opinion that they would prefer to renounce the right of voting themselves rather than see it conferred without reservation on the whole class of Associates. The proposition in the new Charter seems intended to fence this new voting power to some extent. It proposes that Associates and Honorary Associates shall have the right to vote at all general meetings, except in votes for the election of Fellows, or the "making, altering, revising, suspending, or rescinding of a by-law." With this limitation we think those who object to the extension of the vote to Associates should be content; and we think the leading Associates should also accept it. Without such a limitation it would be possible for an assistant in an office to sit in judgment on his principal's election as Fellow, and for by-laws to be supported or opposed by those who are not in such a position in the profession as ought to entitle them to interfere in and influence important regulations in relation to professional practice.

The proposed Charter, which has been printed for circulation among members, interleaved with the existing one, commences by a long paragraph reciting, under the cover of a "Whereas," the facts in regard to the evolution and the main conditions of the existing Charter, so that a continuity of history is preserved between the new document and the old. In addition to the two provisions to which we have referred, which constitute the most important and radical innovations, the new Charter contemplates the formal division of members into five branches, viz.,—Fellows, Honorary Fellows, Associates, Honorary Associates, and Honorary and Corresponding Members; classes which at present exist, but are not recognised in the Charter, which contemplated only three classes,—Fellows, Associates, and Honorary Fellows. It is proposed that by the new Charter Fellows must not only have been seven years in practice on their own account, but that they shall have reached the age of thirty years, and after a period of five years from the date of the proposed Charter they "shall have passed such examination or examinations as shall from time to time be required, the examination test to be dispensed with under exceptional circumstances." The examination qualification for Associate members is also, of course, formally incorporated in the new Charter. It is proposed to take powers also for granting a diploma to the Fellows under certain conditions to be prescribed by By-Laws, and also that every Fellow and Associate shall be entitled to obtain from the Council a certificate of membership.

The value of such diplomas and certificates will, of course, depend in great measure on the extent to which the Institute is supported by the whole profession, provincial as well as metropolitan. We have not thought it necessary, or even in every way desirable, to print the proposed form of Charter word for word while it is still *sub judice*. It is in the hands of all the members, and it is they alone who have



power to deal with it. When its form is finally settled and adopted in detail and the new Charter granted (as we have no reason to doubt it will be), then will be the time to bring its finally-settled provisions prominently and fully before the notice of "externs." But in the mean time we may draw attention to the fact that an important step is being taken to bring the powers of the Institute of Architects up to a level with the work which it aspires to accomplish, and to render the fact of membership a test of proficiency, as well as to place the advantages of membership more equally within reach of provincial as well as of metropolitan members. We hope its hands will be strengthened by the accession of many of those who have hitherto stood aloof, reminding them that in strengthening the hands of the Institute they are strengthening their own, as far as the relations of the profession with the public are concerned.

# THE LATE PROFESSOR DONALDSON.

**T**HE death of Thomas Leverton Donaldson, which took place on the 1st of this month, at his residence, 21, Upper Bedford-place, after a short illness, involves something more than the loss of an old and much-respected member of the architectural profession in this country. For Professor Donaldson in England, like his late friend Lesueur in France, was the last representative in his country of a race of architects who may be termed the "old gods," a race which represented architectural sympathies and an architectural culture widely differing from that of the present generation, and, in some respects, much broader, deeper, and more complete. They were a race whose thoughts were mainly directed not to the carrying-out of numerous buildings and the winning of numerous competitions, but to the study of architecture as a subject of intellectual interest from the highest point of view. They were familiar with the details of the works of classic antiquity as few are familiar with them now. The scientific and artistic restoration, on paper, of a Greek temple, was with them an object worth the expenditure of their best thought and energy. They regarded architecture as a grand whole; an art governed by the most refined æsthetic rules, yet based on practical and constructive conditions to be always kept rigorously in view. They had little sympathy with the modern escapades of Goths and Queen-Anneists,—those of them who lived to see these escapades,—and viewed them with little respect, as persons who looked down upon such vagaries from the higher standpoint of more strictly cultivated taste and more universal knowledge. "It may be tolerable," says Donaldson in his book of "Architectural Maxims and Theorems,"—"it may be tolerable to omit a usual member of architecture, but it is insufferable to put it in the wrong place." What a sweeping censure would this "maxim" be on many of the new London houses, or the competition designs of Queen Anne tendency, where details swept from all quarters of decayed Classic art are put together, all "in the wrong place," and the more so (apparently) the better, in the minds of the designers, who think to arrive at higher art by a neglect of all the logic of art, by producing works "wild without rule or art," as Milton says of the vegetation of Eden. If there were not in modern practical architecture a sufficient field for the development of a truly Classic and balanced architecture, this could at any rate be indulged in theoretic Classic designs; and Donaldson, who in early youth passed a good deal of time in the French *écoles* at Rome, had fully imbibed that peculiarly French taste for the working out of grand schemes of Classic restoration and Classic compilation. As late as 1876 he published one of those early studies, which had been talked over when he was living at Rome with the earnest band of French students, of whom Lesueur was the sole survivor at the date of this publication. This was the grand scheme for a "Temple à la Victoire," with all the edifices necessary for

the celebration of the ancient games of Greece, designed for a site adjoining Mount Ithome, and forming a "monumental" design in the French sense of the word. This essentially French architectural study was in fact published in Paris and the literary matter written in French, which was to Donaldson another mother tongue. We commented on the work at the time of its appearance.

But though Donaldson's executed works in architecture were few and unimportant, and though he thus delighted in indulging a Classic fancy in ideal designs, he was by no means a mere æsthetic architect. On the contrary, one of his special claims to respect lay in the complete and all-round nature of his professional knowledge, and in the comprehensive view which he took of the art of architecture, and the studies and attainments of the architect. And it was this comprehensiveness which gave him such weight and value as an architectural teacher: for it was in this capacity rather than in any other that he helped on contemporary architecture. He was on every possible occasion the eloquent advocate both of a high standard of professional knowledge, and also a high standard of general culture for the architect. In his opening address, preparatory to a course of lectures on architecture at University College (at which he was for a great many years Professor of Construction and Architecture), he distinctly laid down the principle that architecture and engineering were essentially connected—were portions of the same profession; and his lectures and published essays generally bore out this view. His lectures at University College were illustrated by a number of admirable diagrams and views, which subsequently, through his good nature and liberality, became a kind of common property for lecturers, and were borrowed and used over and over again. The versatility of his knowledge and interest on professional matters may be somewhat gauged by running over the list of his contributions to the Proceedings of the Institute of Architects, and to other periodicals, as given in the Library Catalogue. From a very long list we may extract, as indications of the variety of his range, "Examples of Doorways in Greece and Italy" (a separate illustrated work published in 1833); "Substance of an opinion delivered at a Court of Sewers for Westminster"; "Composition in Architecture"; "Geological Phenomena connected with the Origin and Sources of Porphyry, Sienite, Serpentine, and other Rare Marbles used in Architectural Embellishment"; "Observations on the Different Styles of Pelasgic Construction"; "Lime, Mortar, Stucco, and Cement" (Encyclopædia Metropolitana); "Manufacture of Glass, and its Adaptation to Architectural Purposes"; "Polychromatic Embellishments in Greek Architecture"; "Remarks on a certain class of Gallo-Byzantine Churches in and near Perigueux," &c. These form a very small part of the catalogue of subjects treated by him. Among larger works were the supplementary volume to Stuart & Revett's "Athens," in which Cockerell and Kinnaird also took part; a volume of great interest on "Architectura Numismatica," or architectural medals of Classic antiquity; the "Handbook of Specifications"; the "Maxims and Theorems" above mentioned; but the mere titles of these give a very inadequate idea of the mental activity which he brought to bear on the subject of his life's study.

Donaldson was born in the year 1795, and died therefore at the patriarchal age of ninety. He was more actively concerned than almost anyone else in the founding of the Institute of Architects, of which he was a Life Member, of which he was elected President in 1864, and from which he received the Royal Gold Medal in 1851, at the hands of the then President, Earl de Grey. He was an Honorary Member of Council of the Institute, and Foreign Associate of the Institut de France. He was for some time Honorary Secretary for Foreign Correspondence at the Institute, and his fluent command of French not only fitted him very well for this post, but also rendered him a very valuable personal representative of the English profession abroad; and as he was well known and

respected among the architects of several European capitals, probably the Institute of British Architects has never been so well, or so much, represented at foreign gatherings as during his hon. secretaryship.

A portrait published in the *Builder* for July 24, 1869, gives a very good idea of Professor Donaldson's personal appearance. He was an excellent speaker (an accomplishment not more common in the architectural profession than in most others), and very keen and trenchant in debate, possessing a good deal of that warmth of temper which often acts as a spur to eloquence, and which some junior members, who thought that, as Johnson said of Richardson, they "could make him rear," were rather disposed to seek opportunities of exciting, by way of putting animation into the debates at the Institute. They were seldom disappointed, at all events; but there was, if our memory serve us, a good deal more animation, *Consule Planco*, in the discussions in that room at 9, Conduit-street, than there usually is now. We want another Donaldson.

Since the foregoing was written we have gleaned the following particulars:—

Thomas Leverton Donaldson was born October 19, 1795, at Bloomsbury-square, London, his father being an architect and district surveyor, and heir of entail of Williamsshaw, in Argylshire, and a descendant of the Macdonalds of the Isles. He received a classical education at King Edward VI.'s Grammar School at St. Alban's, of which Dr. Bowen was the head-master. At the age of fourteen he went to the Cape of Good Hope, to the office of Mr. Robert Stuart, a leading merchant there. An expedition being then in course of fitting out to attack the French in the Mauritius, under the auspices of Colonel Butler, in charge of the 87th Regiment, he joined as a volunteer, and he was one of the forlorn hope; but the French capitulated, and bloodshed was averted. Disappointed in obtaining a commission in the regiment to which he had attached himself, he returned to England, and at the age of sixteen he began his architectural studies with his father, and, after studying in the Antique School of the Royal Academy, in 1817 he was awarded the Silver Medal. From the spring of 1818 to the autumn of 1819, he studied and measured the principal buildings at Florence, Siena, Camaldoli, Laverna, Vallambrosa, Assisi, and Naples. After visiting the principal monumental cities of Greece,—measuring, sketching, and taking notes,—he proceeded to Teos and Ephesus, whence he, with the view of fixing the sites of the most important edifices of those cities, returned to Athens. After having completed the measurements of the Athenian monuments, he proceeded to study the Temple of Ægina, and from thence went to the Morea, where he examined numerous places of interest, and his researches at Bassæ were afterwards published in Stuart's "Athens." He also joined in editing a folio work on the Ruins of Pompeii. One of the results of Mr. Donaldson's foreign study was his designing a Temple of Victory which met with the approval of Canova, then President of the Academy of St. Luke, Rome; and he was elected a member of that body, his diploma bearing the signature of Canova, as Prince of the Academy, and the date April 13, 1822. After an absence of some five years, occupied in foreign travel, Mr. Donaldson assumed the practice of his profession in London, and his first work was the Church of the Holy Trinity, South Kensington, he being the successful competitor. Amongst others of his works may be instanced the town mansion of Mr. H. T. Hope, in Piccadilly (now the Junior Athenæum Club); mansion for Mr. H. Hippisley, at Lambourn, Berks; re-fronting Sir John Hippisley's house, near Exeter; the erection of various other houses; University Hall, Gordon-square; Library and Laboratory at University College, and the arrangement of the dome for the Flaxman memorials; Gordon-street Church; Scotch Church, Woolwich; restoration of Lambourn Church; restoration of Wareham Church; the new Scottish Corporation Hall and buildings in Crane-court, Fleet-street; besides very many other works of more or less pretension. In addition



to Mr. Donaldson's strictly architectural pursuits, he devoted considerable time to the sanitary questions of his day, and was a member of a metropolitan Commission of Sewers which preceded the Metropolitan Board of Works. He was also District Surveyor under the Metropolitan Building Act in South Kensington. On his retirement from the professorship at University College a gold medal was struck in his honour by his professional brethren, and presented to him, while two silver medals (the "Donaldson medals") were founded, and are awarded annually to the most successful students of University College. On giving up the active practice of his profession, and ceasing to take an active part in the proceedings of the Institute of British Architects, he presented to that body a gold badge and chain to be worn as a symbol of office by all succeeding presidents. The late Mr. John Whichcord was, if we mistake not, the first President of the Institute to wear this chain.

The funeral took place on Thursday last, at Brompton Cemetery, and was very largely attended by personal and professional friends, among whom may be named, besides the members of the family, Mr. Ewan Christian, President of the Royal Institute of British Architects, Professor T. Roger Smith, Professor Kerr, Mr. William H. White, Sir Charles Hutton Gregory, and very many others. The Institute sent a large wreath of beautiful flowers to deck the coffin of its founder.

#### NOTES.

**A**FTER a contest which is said to be without a precedent in the annals of Parliamentary warfare the preamble of the Manchester Ship Canal Bill has been declared by the Select Committee of the House of Commons, which is the sixth Committee that has discussed the Bill, to be proved. Certain conditions, however, were insisted on by the Committee. Among these was the provision that the canal shall be dug through the land, after entering the lock at Eastham, and not partially reclaimed from the Mersey; the object, of course, being not to diminish, even in the slightest degree, the tidal contents of the estuary. The depth to be dredged is to be 15 ft. instead of 12 ft., a manifest improvement, in the interest of the future navigation of the canal itself. The sum of 1,710,000*l.*, being the purchase-money of the Bridgewater Canal and the Mersey and Irwell Navigation, is to be raised before the commencement of the works, in addition to the 5,000,000*l.* required for the capital of the canal itself,—another guarantee of the *bona fides* of the undertaking. Finally, the canal deposit fund of 276,539*l.* is left locked up, and the company are not allowed to withdraw it. This sop to the opposition is regrettable, as, now that the canal is sanctioned, it is the interest of all parties to facilitate its construction in every possible way. The battle of the opponents of the canal has chiefly been fought on the ground of apprehended damage to the navigation of the Mersey. It is to be regretted that a higher public ground was not taken, and that the occasion for sanctioning measures that should clear away the bar of the Mersey, and give a deep water channel up to Runcorn, has been allowed to pass by. To that the Canal Company will have to come, in order to reap the full advantage of their scheme; and in that Liverpool and all the ports of the Mersey are as much interested as Manchester herself.

**W**HATEVER may have been the nature of the measure Mr. Chamberlain promised to introduce dealing with the subject of preferential railway rates, that gentleman's successor has declined to entertain the question at present. In the meantime, however, several cases have been brought before the courts, and notably one by Messrs. Wilson & Co., of Hull, which raises the whole question of equal mileage rates. Messrs. Wilson do an extensive carrying business with the Continent, arranging through in-

clusive rates. Their traffic is conveyed *via* Hull, and they find that they are being charged higher rates in proportion from certain stations to that port than those in force between the same stations and other ports,—Newcastle, Sunderland, &c. They seek to have this inequality removed by lowering the Hull rates; and this, of course, touches the interests of the shippers at the other ports referred to. The latter have applied to be heard against the proposed reductions, but the Railway Commissioners have just decided that it is unnecessary to hear their arguments, having no doubt that all the facts of the case will be submitted by the original applicants. This incident serves to show the great difficulties to be overcome in dealing with the equal mileage rate question. It seems impossible for such a system to be introduced without revolutionising to a great extent the trade and practice of certain districts. Some would, doubtless, be largely benefited, while, on the other hand, many interests would be rudely disturbed and prejudiced by the change. Exceptional circumstances must necessarily have the effect of calling into existence exceptional rates, and it is useless to expect that all the rates should bear an equal proportion to each other, though, at the same time, it is notorious that many of the anomalies presented by existing rates are quite indefensible, and sadly need reform.

**A**LTHOUGH it is satisfactory to find that the grave question of colliery explosions is not being allowed to sleep, it is not particularly creditable to science that, in all the many years that the mines have been under Government inspection, no means have yet been devised to make underground workings even tolerably safe. It certainly is disappointing to note that mining lamps are really very little in advance of what they were a quarter of a century ago, for the Davy lamp, once the mainstay of English collieries, is now found to be almost worthless, while the newer inventions are equally unable to cope with any extraordinary outbreaks of gas, these being the very occasions on which a safe lamp is most needed. Deplorable as are the tragedies, such as the recent Clifton explosion, that form such gloomy landmarks in our death-rate, we are, nevertheless, slowly groping our way to better things, if only by the negative process of finding out what does not answer. In two ways, valuable observations have been made, which promise eventually to throw much light on the economics of colliery explosions. One is, the connexion of gas outbreaks with the tremors of earthquake action, and though, of course, these cannot be prevented happening, they can, to a great extent, be guarded against by carefully noting the barometer. The other is, that coal dust, always a plentiful accompaniment underground, is now recognised to be of a highly explosive nature; and it is quite probable that, even if an explosion is not initiated by it, it is very much aggravated. This danger can always be reduced to a minimum by keeping the galleries watered, and thus checking accumulations of dust. As to the lighting of the working faces, we see nothing for it but the electric light, which, in some of the large pits in South Wales, is already sufficiently developed to be a success. The difficulty of deciding which is the safest colliery lamp is an ever-present one with the coal owners, and is often greatly enhanced by the action of the workmen, who are frequently utterly unreasonable, as shown by a strike at a northern colliery a week or two ago, the graveness being an order that naked lights should not be used. Colliers are, as a rule, remarkably clamorous for more inspection and legislation, while, by their own recklessness and disregard of rules, they contrive to bring on catastrophes far beyond what would happen in the ordinary course of events. As long as some pits are allowed to be worked with naked lights, from their reputed safety, while others, being fiery, are obliged to use lamps, so long will these accidents occur; and we are convinced that, humanly speaking, the electric light offers the greatest immunity from danger.

**T**HE Vicar of All Saints, Clapton, has put forth an urgent appeal on the subject of the continued poisoning of the River Lea by the undiluted sewage of Tottenham. In presence of the ravages of the cholera, now claiming some 1,500 victims a day in Spain, the supineness of our legislature and administration, in allowing the continued pollution of the Thames and of this great affluent, is little less than an invocation of pestilence. Schemes like those mentioned in our last number, however feasible, entirely fail to meet a case of daily danger such as that described by the Rev. B. Meredith Kitson, in the *Standard* of the 31st ultimo. The direct and absolute defecation of the sewage, and the destruction of the morbid matter, is the urgent need of such populations as those on the banks of the Lea.

**T**HE Metropolitan Board of Works have adopted the resolution, which we mentioned last week was to be brought forward, to make it a condition of the appointment of the new District Surveyors for the Northern Division of St. Marylebone and Bethnal-green East and South Bow, which have been rendered vacant by the transference of Mr. Alexander Peebles and Mr. Thos. Blashill to the Districts of East and West Hampstead respectively, that they shall be prohibited from carrying on the business of an Architect or Surveyor within the boundaries of their own districts. This condition is, no doubt, a salutary one, and is calculated to raise rather than to depress the status of the District Surveyor, but it appears doubtful whether it is in harmony with the intentions of the Legislature, inasmuch as the 37th section of the Metropolitan Building Act, 1885, while forbidding any District Surveyor acting professionally and on his private account for any building within his district, provides that, in the event of his desiring to practise, he shall give notice to the Board, who, it is directed, shall then appoint some other District Surveyor to act in respect of such matter. It seems clear that at the time of the passing of the Act it was contemplated that a District Surveyor might practise within his district, and it may probably lead to inquiry as to the reasons which have induced the Board to depart from a custom which has worked well for a period of thirty years.

**H**UMPHREYS' HALL, Albert-gate, Knightsbridge, which was destroyed by fire on the 2nd of May last, is about to be rebuilt, under the superintendence of Mr. Spencer Chadwick, and the site of the Sun Music Hall adjoining to the westward added to the premises. At the inquest on the body of a Japanese who lost his life at the fire, the manager of the Japanese Village stated that as many as sixty persons slept in the building on the night before the fire. The Chairman of the Metropolitan Board of Works, on being questioned in the House of Commons by Mr. Onslow, who has always taken great interest in matters affecting the security of the public against fire, and to whom we owe the appointment of the Committee on the Metropolitan Fire Brigade, 1877, stated that on the premises being rebuilt the Board would spare no effort to secure protection for the public, both as regards construction and exits, and we trust that this promise has been redeemed on the part of the Board.

**I**T is proposed to build a new theatre on the site of the Occidental Tavern, Savoy-buildings, Strand, with an entrance from the Strand. The theatre will accommodate about 800 persons, and will have exits into Savoy-buildings as well as into the Strand. The architect is Mr. William Emden.

**T**HE extraordinary development of inland navigation in America, says an important trade journal, has sealed the fate of the trunk lines which come into competition with the water routes, and is at the bottom of half the railway troubles in the States. As this competition is in its infancy, speculators and investors in American railways will do well to ascertain which lines are duplicated by water



routes and which are not, as it is shown that water carriage costs less than one-third of the lowest-paying rate for carriage by land. In the case of the railways of the United Kingdom the managers have, at a very large expense, attained such a control of the through canal routes as to enable them to strangle the traffic. But the sea remains open, and the competition thus effected, although indirect, has somewhat the same effect as that of the improved inland water transport in America. It looks as if it could only be a question of time for the railways, in self defence, to throw the bulk of their badly-paying mineral traffic on the canals, where it would pay 5 per cent. to the canal proprietors at freights two-thirds lower than those at which it can be remuneratively carried by railway.

THE question of the National Portrait Gallery was the subject of some remarks in the House of Lords last week, when Lord Lamington objected to the proposal to take the pictures temporarily to Bethnal Green Museum, not because they would not be safe there, but because they would practically be considered as safely provided for there, and would never emerge. We fear Lord Lamington's fears are by no means groundless. Sir Richard Wallace's pictures emerged, but then they were private property. In the present chronic dread of our Government of spending anything on art or architecture, there is only too much reason to fear that once safely housed anywhere, however out of the way, there the pictures will be left for an indefinite period. Nevertheless, we shall be glad to see the national portrait collection (the artistic value of which, be it observed, is somewhat over-rated popularly) put in a safe place without delay, and not sorry that East London should have an opportunity of seeing more of it. But let it be fully understood that the expedient is only temporary, in order to secure the pictures from risk of fire, and that an adequate and safe gallery ought to be built for them.

THE Vienna *Zeitung*, of the 16th of July, reports that the preparations for an archaeological expedition on a large scale are just complete. The object of the expedition is to be the more detailed explorations of the regions of Taurus and anti-Taurus, which have already yielded an abundant archaeological harvest. Of Dr. Benndorf's work in Asia Minor and its splendid results for the Museum at Vienna we have repeatedly spoken. For the present expedition we may augur an equally successful issue. It starts under the conduct of the well-known architect and archaeologist, Dr. G. Niemann, Professor at the Academy of Sculpture. It is intended that the expedition shall explore the Taurus country thoroughly, and if possible extend its investigations as far as the source of the Euphrates. Whether, as before, it is supported by the liberality of private persons, or depends on a Government grant, the *Zeitung* does not say.

THE thermometric results attained by the German Government, in a boring that they are carrying on near Schladebach, have great interest with regard to the question of the depth to which it may be practically possible to carry the coal mines of the United Kingdom. At the Dukinfield lead mine, at a depth of 2,055 ft., the increase of temperature was 1° Fahr. for every 60 ft. At Rosebridge, near Wigan, is a shaft 2,376 ft. deep, and the temperature at that depth is 92° Fahr. At La Mouille-longe, near Creuzot, 3,017 ft. has been bored, and the resulting temperature is 110° Fahr. At Schladebach the unexampled depth of 4,565 ft. has been reached, and the temperature is 120° Fahr. At a depth of 50 ft. underground the temperature is held to be constant at 50·5° Fahr. The increase of temperature in the German boring is, therefore, at the rate of one degree for every 65 ft., against one degree for 60 ft. at Dukinfield, one degree for 56 ft. at Rosebridge, and one degree for 53·5 ft. at Creuzot. Considering the difficulty of an exact determination of temperature, and the probability that different conducting powers

characterise different strata, these results are remarkably consistent. At the German rate of increase, the temperature of boiling water would prevail at a depth of 11,067 ft. At the Creuzot rate of increase the temperature of 92° Fahr., which has been regarded as the highest at which anything approaching sustained labour is possible, is reached at a depth of 2,270 ft., or 176 ft. less than at Rosebridge; the latter mine may, therefore, still be taken as marking the lowest depth wrought or likely to be wrought by the miners.

AMERICA generally contrives to have something big on hand, whether it be a "boom," an exhibition, a tornado, or an engineering operation. The last-named is the sensation of the moment, the occasion being the blowing up of the Flood Rock, a dangerous reef at the entrance of New York Harbour, in the track of vessels coming through Hell Gate, where a similar operation was carried out a few years ago. The disposal of the Flood Rock is, however, a much bigger job, for nine acres have to be blown up, by means of 300,000 lb. of explosives, principally dynamite and "rackarock," another and very powerful form of material. The preparations for this wholesale business have been, as may be imagined, on a formidable scale, no less than 21,670 ft. of galleries having been cut in the reef, together with 13,700 holes, averaging 9 ft. each in length, to be bored upwards. Already 81,160 cubic yards of rock have been removed, the bottom of the main shaft being 50 ft. below the level of the river, with the galleries, from 6 ft. to 12 ft. in height, radiating from it. Considerable difficulty has been experienced in preventing the works from being flooded, at all events, until the proper time for allowing it, which is not until the whole of the mine is loaded with the explosive. This will be performed by packing the rackarock and dynamite into copper cylinders holding about 6 lb. each, the cylinders being then placed in the hole bored for its reception, ready for the firing. The whole of this gigantic blow-up is estimated to cost 1,000,000 dollars, an expense which will be amply compensated by freeing the harbour and entrance from the danger that has so long beset it.

ALL visitors to Bologna should make a point of seeing the Museum, which is one of the best of its kind, and contains many valuable antiquities from Etruscan tombs. Especially interesting to architects is a small courtyard on the ground floor, generally passed over by the unwary, in which is a very good collection of terra-cotta strings, mouldings, and other details. These are mainly portions from existing buildings, and it is possible to sketch in this courtyard most of the good terra-cotta work in Bologna, as it is all arranged conveniently for measuring.

THE mosaics in most of the churches at Ravenna are undergoing renovation; in fact, St. Apollinare Nuova and the Baptistery are the only ones in which a scaffolding is not erected for the purpose. And the latter of these two is threatened. The mosaics in it are not in a good condition, and appear to have been picked off as relics by visitors at their will. There is, and has been for some time (judging from the fact that it is reported in most guide-books), an idea of raising the whole building by machinery. At present it is what might be called an open sepulchre, only surpassed by the catacombs of St. Sebastian at Rome. Ravenna should not be visited by English travellers during the hot weather, as in most of the churches, in which places all the interest is centred, notably St. Vitale and St. Apollinare in Classe, there is stagnant water, which has a horrible putrid smell, within 18 in. of the surface. The drinking water, which is much the same, is also very bad, and if taken, even with wine, produces uncomfortable results.

IF there is to be any attempt to produce an adequate artistic monument to Gordon, we must protest most strongly against the idea, which from recent conversations in the House

of Commons appears to be tacitly accepted by the authorities, that such a memorial is to be allowed to dwindle into a mere statue in "pig-tail square." As we have already said, the central position in that belauded square is already occupied by the mast-headed admiral, and any other situation for a mere pedestal and statue must be a secondary,—quite secondary situation; and Gordon ought to be second to no English hero of modern times. Mr. Plunket, in answer to a question the other day from Mr. Mitchell Henry, declined to give any assurance that a statue would not be commissioned before the next meeting of Parliament. If the thing is to be done at all we want something better than that. Gordon was the greatest Englishman since Wellington, and we want, if anything is done, a public competition and a chance of evolving a monument that may be a worthy companion to the Wellington monument. To put up a mere statue (and in Trafalgar-square, of all places!) to a man like Gordon would be a miserable piece of bathos. Let him, like Nelson, have a square or place to himself, or find room for his monument in St. Paul's.

#### SLOUGH PUBLIC HALL AND INSTITUTE COMPETITION.

IN response to a not very tempting invitation the Committee for the above building have received twenty-five sets of designs from twenty-four architects. Mr. F. Albury, of Reading, was called upon to advise in the adjudication of the premiums and in the selection of a design for execution. After careful consideration, he has awarded the first premium of 25l. to Mr. Henry A. Cheers, of Fiddington, for his design marked "Ægis," which it is proposed to build forthwith. The second premium of 15l. has fallen to Mr. T. R. Richards, of King-street, Chesham, for his design marked "Eton"; and honourable mention has been accorded to Mr. F. Hemmings, of Fenchurch-street, for his excellent design bearing the appropriate motto "To-day." And no one can find fault with the awards. But they show very clearly a common, and perhaps inseparable, inconvenience connected with the competitive system. The instructions say that the classrooms and caretaker's rooms shall be in the upper part of the building; and the majority of the competing architects have followed the instruction implicitly. But the chosen design has provided for both these services in what is virtually the ground-floor, although shown by the author in what he calls a sub-ground plan.

On the other hand, the majority of the competitors have paid but little regard to the stipulation that the cost was not to exceed 3,500l. The selected design may be taken to have observed this condition, for it cubes out at this sum at a fraction over 6d. per cubic foot, and it is possible that a plain building with large rooms and scarcely any fittings may be built at this rate. Mr. Cheers has won his position by daring to be original in his plan, which is very compact and very perfect in every respect. The site is an ample one, and the author of "Ægis" has, as we think wisely, placed his building in the centre of it, leaving air and light on all sides. An ingenious arrangement of external steps gives access to the principal floor, on which the Public Hall, 85 ft. by 35 ft. 6 in. and its accessories, are placed. The entrance vestibule is flanked by ladies' and gentlemen's cloak and retiring rooms, and at the other extremity of the hall there is the usual recessed platform, 18 ft. wide by 10 ft. deep with *artistes'* retiring-rooms and separate means of access. On the floor below, which is only sunk three steps below the pavement level, is a separate entrance-hall with central library and flanking reading-rooms, well planned, well-lighted, comfortable, convenient, and compact. A side entrance leads to three class-rooms on this "sub-ground" floor, a "Friendly Societies meeting room, 35 ft. 6 in. by 31 ft., and a caretaker's residence under the platform end of the hall. The design is illustrated by three slight geometrical drawings and a very "telling" coloured perspective, which is by far the most effective drawing in the room. Without wishing in the least to disparage Mr. Cheers's design, or to detract from his well-earned position in the contest, we are bound to say that in our opinion the building will not look nearly so well in execution as it



does in his drawing, and that the exterior architecture will need much revision to render it all that one could wish. The style is very mixed, the detail neither pure nor piquant, and dignity there is none. The roof of the hall calls for reconsideration, for the deep principals which divide it into bays would certainly interfere with the acoustic qualities of the room. These are, however, points which will no doubt receive attention from the architect elect, now that his work is to be carried into execution.

In the design marked "Eton," and placed second in order of merit, the architect, Mr. Thomas R. Richards, has placed his public hall (75 ft. by 41 ft.) across the rear of the site with far less ample and convenient access than in the preceding case. All the main rooms are on one floor, the public hall being separated from the "Friendly Societies" room by a narrow passage and nests of water-closets and allied conveniences. The main entrance, which by prescription is from Mackenzie-street, is flanked by reading-rooms, one of which is inconveniently separated from the library. The "hall" itself is reached by a passage more than 60 ft. long and 5 ft. 6 in. wide. The class-rooms are placed on the first-floor fronting Mackenzie-street with a secretary's room (a useful addition) and a caretaker's residence. It cannot but be felt that the architect has in this case reduced his chances of success by a close adherence to the terms of the instructions; although he would in any case probably have been excluded by the comparative costliness of the structure. This design is shown by four sheets of drawings; but the author has not included a perspective view. The style is a kind of Queen Anne, but calls for no special notice. The roof of the public hall would offer less obstruction to sound than that of the selected design; but the ventilation of the building has not been so well considered, or, at any rate, is not so clearly shown.

We cannot help feeling commiseration for Mr. Hemmings, whose design, marked "Today," is far more pleasing as an artistic production than either of the above. The style is that of the sixteenth century of English domestic Gothic, and the materials were to be red brick and half-timbered wood. With the exception of a feeble little tower marking the main entrance, the Mackenzie-street front is picturesquely and well designed, and would lose nothing in execution. The interior roofing and joinery generally are quite *à la mode*, quaint, and artistic, and the design would, had the Fates so decreed, have proved a real ornament to the town. There is nothing of a monumental character about it, it is true, but neither is there such about its more successful rivals. We suspect that "Today" owes its exclusion to its cost, and all we can say is the more the pity. The public hall is placed longitudinally on the site, approached through a ample vestibule and a (perhaps too) spacious entrance-hall, which gives access to library, reading, and refreshment rooms. The Great Hall is top-lighted, and has a row of windows along one side only. Along the other side runs a corridor, into which two doors from the public hall open (a good feature) and which has an exterior side door. The societies' rooms, class-rooms, &c., are on the first floor, as prescribed. They are singularly well designed and arranged, and would be very handsome and convenient apartments.

"Pro Bono Publico" deserves a few words of commendation for his sensible, straightforward design, shown by well-drawn plans and elevations, both of which exhibit some excellent points. The block of building is placed centrally on the site, as in the selected design, the public hall, library, reading-rooms, &c., being below, and the class-rooms, societies' rooms, &c., above, on the Mackenzie-street side. The caretaker's rooms are in the attic. The roof of the great hall is semicircular in section, groined at the platform-end, and boarded throughout. It would almost certainly prove a good room for sound. The retiring-rooms, &c., for the performers, are on an altogether inadequate scale; but that is a defect which could be easily rectified if the question of cost had not once more come in. The exterior architecture is of a Georgian cast, severe, simple, grave, well proportioned, and, of course, symmetrically balanced. Picturesqueness in the accepted sense it does not pretend to have. Coupled Ionic pilasters mark the angles of the upper stage, and divide the bays of the great

hall and the order marks properly a single storey in each instance. The walls are crowned with stone cornice and balustrade, and behind this rise steep grey-slatted roofs, broken by the leaden-covered dormer of the period, and surmounted by open ventilating turrets of agreeable outline and good detail. The lower portions of the windows open as casements, and above the transoms are divided into small panes by wide sash bars. Every room is well lighted and well proportioned. The fireplaces are in their right places. The chimneys might with advantage be carried up a little higher, and the conventional "pots" on the copings of the balustrades could be dispensed with, and little else is required to be altered. There is a quiet business-like air, almost an academic grace, about the whole which is eminently suitable for the end in view, and makes one regret the circumstances which prevent the erection of a building which would do honour to the town.

"Prêt d'accomplir" sends a quiet and effective design of Late Gothic character, in red brick, freestone, and brown tiles. An open-timbered roof gives the public hall rather the look of a village school, and, indeed, a school-like character marks too strongly the design as a whole. It is an agreeable architectural composition well thought out, and quite unobjectionable from that point of view, but its cost would be prohibitory.

"Albany's" design is shown by a very complete set of drawings; the buildings, however, occupy nearly the whole of the site, and the plan has some radical defects. The elevations are neither very original nor very effective, but they are free from all vulgarity, and so have considerable negative merit.

The author of "Plan" gives a hall 50 ft wide and an open roof with an elliptical principal, which, with 14 in. walls and no buttresses to speak of, would, it is feared, possess but precarious stability, notwithstanding the invisible tie-rod. The large room for friendly societies he has placed under the platform at the end of the public hall. The architecture is modest and unassuming, and that is all.

"Y. R." departs from the usual type by placing his platform at the entrance-end of the public hall—a doubtful advantage. The plan has some good points, and the design, which has decided merit, is shown by a bold pen-and-ink perspective, which is one of the best in the room.

"Advance Slough" would not have advanced Slough's artistic fame, and "Fair Play" must be held to have received what he may be supposed to prize. Of some of the other designs it would not be kind to speak. The committees have succeeded in obtaining at a very small cost the suggestions of many minds, and have engrossed the services of many architects possessed of no mean skill; and, aided by the judgment of an expert, they have selected what all will allow is a good, or one may perhaps even say clearly the best, plan. The architecture, however, wants a leisurely and reviving touch, and this it will no doubt receive in due course. We cannot say whether the design for their "Albany Institute" is a burning question with the good people of Slough or not. The drawings are now on view. "The public may all come up to-day," said the youthful clerk-in-charge. We spent three hours in solitude before the ample array of art, and, up to the time of our leaving, not a single member of the Slough public had responded to the invitation to "come up."

#### THE DERBY MEETING OF THE ROYAL ARCHEOLOGICAL INSTITUTE.\*

We continue our special account of the Derby Congress of the Royal Archaeological Institute, which has been one of great interest, and has been attended in greater numbers than when we last wrote.—a fact no doubt largely due to the fine weather, which continued almost to the end. We resume our narrative at the point where we left off, having already informed our readers of the proceedings of the Congress up to Wednesday evening in last week.

Thursday (30th July) was one of the most interesting days of the entire Congress, being devoted to visits to Hardwick Hall and to its less well-known but not less interesting neighbour, Wingfield or Winfield Manor. The

party, numbering over a hundred strong, travelled by special train, placed at their disposal by the Midland Railway Company, to Chesterfield, where carriages and brakes were in waiting. They had not time to visit the Parish Church of Chesterfield, whose tall, crooked spire is so conspicuous a landmark all round. This was the more to be regretted, inasmuch as the church contains some fine monuments of the Foljambes, which would have repaid inspection. A drive of seven miles on a very dusty and hilly road brought the party to the deer-park of Hardwick, above the forest oaks of which tower the battlements of both the older and the newer halls. The older structure is now a roofless ruin, and a large portion of its walls were pulled down when the second hall was built. In other parts, however, the walls stand to tell the tale of needless and wanton destruction perpetrated in order to gratify the pride of that strong-minded lady, "Bess of Hardwick." The part still standing is of the Tudor style, and reminds the travelled visitor of the ruins of Cowdray, in Sussex. High up on the walls in two or three places may be seen the stags or harts, the cognisance of the Cavendishes of Hartington, portrayed above the chimney-pieces of chambers that have long ceased to exist; but that is all, for even the chimneys and gables have passed away. Close by stands, within a cordon of high stone walls, the proud mansion of Hardwick, built in the later Tudor or Elizabethan style, not unlike Wollaton House, Notts, and Charlton House, in Kent, or Bramshill, in Hampshire, though taller than any of them in proportion to its length. It is a little over 200 ft. by about 180 ft., and has at its angles six towers, each nearly 100 ft. high, with an open-work parapet running round the summit, in which figures repeatedly the initials of the builder, "E. S.," denoting Elizabeth, Countess of Shrewsbury. This lady, it should be stated here, was the heiress of the Hardwicks, and she married four times. Her first husband was a plain, untitled gentleman; her second, Sir William Cavendish; her third, Sir William St. Loe or St. Lee; and her fourth the Earl of Shrewsbury. She also built four new mansions; one at Chatsworth, one at Worksop, one at Hardwick, and one at Oulcotes, near Chesterfield, which was not quite finished at her death, when she was nearer ninety than eighty.

The entrance-hall at Hardwick is lofty, but plain and rather cheerless; its walls are hung with some tapestry and a few pictures, including a portrait of Henry VIII., drawn in Indian ink, and said to be by Holbein. The great staircase is massive, heavy, and gloomy, as indeed are most of the apartments. Here the tapestry is of two kinds, the one classical, representing the story of Hero and Leander, and the other a series of hunting scenes, in which the horses and dogs are portrayed with much spirit. From the staircase the visitors passed on into the dining-room, partly panelled with oak, and partly hung with tapestry, on which figures the story of Esther and Ahasuerus. The state-room, which came next, is a fine large chamber, with excellent tapestry, a large state bed, apparently of the reign of James I., and with a curious frieze in plaster. The furniture and hangings here were much admired. In the library, which is the most comfortable and habitable room in the house, are portraits of most of the friends and relatives of the head of the House of Cavendish. "Bess of Hardwick" shows in her face a strong likeness to Queen Bess, a likeness which holds good also in her character. Then there are portraits of two or three countesses and duchesses of Devonshire, including "the beautiful Duchess," Georgiana, whose features are so well preserved in her portrait by Gainsborough; the Countess of Bessborough, Lord Dover, Charles James Fox, Compton and Cavendishes innumerable, and a charming picture of a former Lady Hartington on horseback. In the corner are the portraits, strangely brought together, of Milton, with his giant intellect, and Jeffery Hudson, the Dwarf, so familiar to readers of "Peveril of the Peak." From the library the party went to what is called "Mary, Queen of Scots' bedroom," but which, of course, she never inhabited, as it was not built till three or four years after her execution. The coverlet of the bed, however, and its hangings were brought from Chatsworth, where she was a prisoner, and the bed also is traditionally said to have been hers. The velvet is black, or, at all events, of a very dark green; and the embroidery was much

\* See Builder, p. 137, ante.



admired by the ladies. The picture-gallery, which was reserved for the last, is a lofty and noble apartment, over 160 ft. in length, and lined from end to end with tapestry, which, however, is almost concealed from view by the family portrait-gallery. Here the most attractive portraits were those of "Mary, Queen of Scots," a full-length, taken when she was in her thirty-sixth year and had been ten years a prisoner, dressed in huge starched petticoat and ruffles, and "Bess of Hardwick," looking as fierce, cruel, and rapacious as she really was. Perhaps the finest portrait in the room is one of Thomas Hobbes, the philosopher of Malmesbury, who ended his days here. Other portraits worth notice are two of the unhappy Lady Arabella Stuart (one as a child), Henry VIII., Henry VIII., Edward, Mary, and Elizabeth, James V. of Scotland, and his queen; Mary of Lorraine, Lady Jane Grey, Lady Cavendish, the Earl of Devonshire,—in fact, this long gallery may be said to be an illustrated history of England under the Tudors and the Stuarts. In the chapel, which is a poor and small apartment near the top of the stairs, Mr. Micklethwaite, who acted as guide and interpreter to the party, pointed out a large quantity of ecclesiastical embroidery, sadly faded and worn; it consisted, he said, almost entirely of orphreys taken off the copes belonging to the parish churches round about in the days before the Reformation.

The party afterwards sat down to luncheon in the entrance-hall.

Early in the afternoon, the carriages were in readiness at the foot of the hill, and the party were driven along a hot and dusty road for about eight miles, at the end of which they reached the manor-house of South Wingfield, as it is called, though it might fairly claim to be regarded as a castle. It is one of the finest specimens of the Domestic architecture of the fifteenth century, when the castle was gradually developing into the baronial mansion; and it is of special interest as having been twice the prison-house of the unfortunate Queen Mary of Scots, first in 1559, and again in the last year of her life. The mansion is now a ruin, of which little is standing, except the outer entrance-gate and porter's lodge, the entrance into the inner court-yard, the entrance, and west, north, and east walls of the dining-hall, with its fine undercroft, and the kitchens and servants' apartments. In its proud situation it much resembles Prudhoe Castle on the Tyne, and many of its details recall parts of Knole and Penshurst, and portions of New College and Magdalen College, Oxford. Others have detected in it a fancied resemblance to Queen's College, at Cambridge. The Rev. Dr. Cox here acted as interpreter, and recounted the early history of the building from the days of its first erection, on the site of an earlier and smaller house, by the Lord Treasurer, Ralph, Lord Cromwell, about 1440-45. His symbol of office, a double purl, is to be seen carved in several parts of the house. The property next passed into the hands of the earls of Shrewsbury, one of whom at least, if not two, died within its walls. One of these earls was the custodian of the unfortunate Mary, who is traditionally said to have occupied a suite of rooms on the west side of the inner court, all now demolished. The dimensions and arrangements of the great hall are still clear and plain enough; but the very site of the chapel is a matter of dispute—it was probably, as at Haddon, an external adjunct. A vote of thanks was passed to Dr. Cox for his remarks. Whilst the party were at Wingfield, the sun came out and lighted up the old pile of buildings most opportunely, for up to then the day had been gloomy and dull. The return journey to Derby was effected in good time by a special train on the Midland Railway.

In the evening the members of the Institute gave a reception or *conversazione* in the Museum at the Free Library, to which they invited all their friends and most of the notabilities of the neighbourhood. Lord Percy, M.P., the President, was present, and so was Mr. Beresford Hope, who came down from London specially to join the Congress. While part of the company were promenadeing the Museum and inspecting the fine collection of treasures which it contains,—partly the property of the town and partly on loan,—Mr. Hope delivered in the lower lecture-room the short address on architecture and archaeology with which he had intended to open the proceedings of the Architectural Section on the first night of the

Congress. His audience, however, was large, as large as the room could hold, and many were obliged to remain outside. In his address he showed how important a study archaeology had grown to be in the course of the last half-century, and how important a part of it architecture, both ecclesiastical and civil, constituted,—quite as important, indeed, as its other branches, History and Antiquities. Architecture, he said, was the great and dominating sign of progress and civilisation, while without architecture the study of archaeology was as meaningless as the old antiquary's study of the many pedigrees of country squires. Passing on to the migratory and peregrinating character of the Institute itself, Mr. Beresford Hope said that, as himself partially a Derbyshire man, he considered that they had done well by coming this year to Derby. It is true that they had in Derbyshire no grand and imposing cathedral, and no castle of the first class, like those which they saw last year at Alnwick and Warkworth, but they had to show here a very magnificent series of parish churches, greatly diversified, and conspicuously enriched with noble monuments to which it would be difficult to find parallels elsewhere within so small a compass. Having referred to a few of the peculiarities of the churches of the county, instancing Ashburne (with its beautiful spire, and chancel and transepts of almost cathedral development; with its grand series of Renaissance monuments to the Cockayne family; and with its clergyman, who dared to restore his church without an architect, "and did it very well"), Bakewell, Repton, Melbourne, Tideswell, Youlgreave, and to the monastic houses of Repton and Dale. He expressed in conclusion his conviction that the Congress would have found more than enough at Hardwick, Haddon, and Wingfield, to reward them for all their labours in the cause of domestic architecture.

Early Percy moved a vote of thanks to Mr. Beresford Hope for his address. This was seconded by Mr. Micklethwaite, who, however, took the liberty of dissenting from Mr. Beresford Hope's remarks on the restorations at Ashburne, which he (Mr. Micklethwaite) could not approve in some points,—as, for instance, with regard to the black pointing of the masonry, the scraping of the stones, and the moving about of the monuments, practices which he trusted would not be repeated at the noble church of Repton.

Mr. Beresford Hope acknowledged the vote of thanks in a few words, and an interesting paper was subsequently read by Mr. W. H. St. John Hope, F.S.A., on "Ancient Chalcies and Patens in Derbyshire." The *conversazione* terminated at a later hour. On Friday (July 31) the members of the Institute had before them a long day, but the large number of those who joined in the excursion which had been arranged to Haddon Hall and Arbor Low showed that it was regarded as one of the most attractive parts of the programme. Immediately after breakfast a special train on the Midland Railway was in readiness to take them, over a hundred strong, to Bakewell, where carriages and brakes were ready to convey them to the parish church. Here, as at Ashburne, the old Norman work at the west end had been largely effaced by the "restorations" of some forty-five years ago. A very large sum of money, it appeared, had been spent in the erection of a fine and imposing structure, but one in which the new part encroached too far on the old. As the visitors went up to the church, they admired the lower limb of what had once been an early churchyard cross, of Saxon date, the incised ornamentation on it being of a character not unlike that to be seen in South Wales and the Isle of Man. In the church porch is a perfect museum of incised slabs and other monuments, crowded together in unmeaning rows. The interior of the church is furnished with solid and substantial open seats, of the heavy style which came in with the early church restorers, and which is to be seen in perfection in St. Mary's at Oxford. The new ornamental flooring of the chancel was pronounced by Mr. Micklethwaite in his comments on the church, as very fine of its kind; but it had been gained at the cost of the removal of at least one fine ancient recumbent effigy, which stood in the centre of the chancel when he was there last. He regretted also that so much of new work had been put into the old chancel screens. Mr. Beresford Hope made some remarks on the

sumptuousness and costliness of the work done by the vicar, Dr. Edward Balston (formerly Head Master of Eton, and now Archdeacon of Derby), since his appointment to the living. The Baron de Cosson commented, with his usual minuteness, on the very fine specimen of armour to be seen on the monument of Sir Thomas Wendesley,—who fell fighting, in the cause of the House of Lancaster, at the Battle of Shrewsbury in 1403,—in the Vernon Chapel. This armour, he said, could not have been more exactly rendered, and it would repay the closest inspection of every detail. The plate-armour, the shirt of chain mail, the *jupon*, and the collar of "SS." round his neck were each and all beautifully executed. Next him lay the effigy of Sir George Vernon, called, from his magnificent hospitality and for the great personal authority which he wielded, "The King of the Peak," and again, farther to the south, the mural monument of Dorothy Vernon and of her husband, John Manners, came in for some well-deserved praise, as an excellent specimen of its time. The Baron de Cosson also drew special attention to a small, but very elaborate, mural monument to two of the Foljambe family on the east wall of the south aisle, as a singular example of artistic work. It was earlier by some five or six years than the monument of Sir Thomas Wendesley, and scarcely inferior to it in beauty of detail. The ancient parish chest, of old oak, with its huge triple hinges and locks, lying in the Vernon Chapel, attracted much attention. A promise was obtained from one of the officials of the church, in reply to a remark from Mr. George Lambert, that an heraldic funeral shield, lying now loose in this chapel, should be hung safely on the walls.

As soon as the inspection of the church was finished, the party repaired to their carriages in order to drive to Haddon, where they lunched, by special permission of the Duke of Rutland, in the great entrance-hall. Before luncheon, however, they were shown over all the chief apartments of the place; but these are so well known to the general reader, thanks to artists and tourists of literary tastes, that we are spared the trouble of a minute description. The mansion consists, like Wingfield, of two courts, having the dining-hall and kitchen range between them. The original entrance is not that by which the house is at present approached, but stands at the north-east angle, near the higher road, now diverted. The view on entering the court-yard, or quadrangle, is extremely similar to that of the interior of many of the smaller colleges at Oxford or Cambridge, and in many of its details the mansion reminds one of Penshurst and Knowle. Mr. Micklethwaite, who acted as *cicerone* here, told the story of the earlier days of the building, and showed how the estate passed from the Crown to the Peverils, and from them, again, to the Vernons, the heiress of which house, eloping with her disguised lover, John Manners, carried it into the possession of the noble house of Rutland, to whom it still belongs. He pointed out in the great hall the fine specimens of deer's heads on the wall, the minstrels' galleries at the end and at the side, the curious staple in which a man's hand was sometimes placed whilst water was poured down his sleeve if he "did not take kindly to his ale, or was guilty of any other offence to the hospitality of the lord who owned the mansion," as also the massive kitchens, buttry, cellars, and servants' offices, with their array of old tables and kitchen-blocks for mincing meat. It may be mentioned, in passing, that this part of the house is almost as dark and gloomy as a prison. Mr. Micklethwaite next took his party into the long gallery, and pointed out, as especially interesting to architects, the huge oak timbers of the flooring, which, he said, were traditionally all from one giant tree, as well as the chimney-pieces, formed the staircase. The chimney-pieces, fireplaces, and "dogs" he pointed out as especially worthy of notice, and also the furniture and tapestry of the few state-rooms, which are still kept in their half-furnished state. The best and most comfortable of these rooms, perhaps, is the second or inner dining-room, for the use of the lord and lady, with its deep bay window for chat and conversation. This room is finely panelled, and still has some stained glass in one of its windows. The chapel at Haddon is of special interest, and the visitors made a very minute inspection of its chief features. Mr. Micklethwaite pointed out as especially worthy of notice its high side-light windows, the traces of its rood loft and singing



men's gallery,—thought and said often to be a confessional,—and the painted glass in the windows, which, though put up in 1427, as the inscription states, is still in a fairly good state of preservation. In the east window is the Crucifixion, and on the north side of the chancel is another window, with bold figures of the Blessed Virgin, St. Michael, and St. George. From most of the other windows the painted glass has been removed. He added that the chapel had once some parish rights, that of baptism at least, and probably that of burial also, so that it may be regarded as semiparochial. Mr. Beresford Hope remarked that it probably was once one of many outlying chapels in the forest, which were served by priests from Bakewell, on account of the large extent of the original parishes, and that, when the great hall was built close to it, it came gradually to serve a double purpose, as a parish chapel and also as a chapel to the Haddon household.

The inspection of the building was followed by a walk through the square trimly-cut gardens, laid out in terraces on the slope of the hill above the Wye, and the party paid a special visit to Dorothy Vernon's Walk of sycamores and yews, which form a grateful shade in summer and must look pleasantly green in winter. Re-entering the house by what is called "Dorothy Vernon's door," they sat down to luncheon in the great hall, the visitors afterwards left in carriages for Youghgreave and Arbor Low.

A drive of about seven miles, nearly all up hill, along the sides of a beautiful valley, brought the party to Arbor Low, a pre-historic monument lying in a field about a quarter of a mile from the road, four miles beyond Youghgreave. "It consists," to use Mr. St. John Hope's description, "of a circular platform, 173 ft. in diameter, with an outer circle formed of some thirty odd stones, once probably erected and in pairs, but now prostrate and broken. In the centre are several large stones, which may have formed a cist. The whole is surrounded by a vallum with an inner ditch—an almost unique feature. There are entrances on the north and south. Close to the latter is a barrow which was opened in 1845, it was found to contain a cist with burnt bones." Mr. Ferguson commented at some length on this curious monument of past ages, comparing it with "King Arthur's Round Table" at Carlisle. Prebendary Seath also compared it, and in some respects contrasted it, with the remains at Stonehenge and Avebury or Abury, in Wilt; and, after some remarks by Mr. G. Lambert, it appeared to be the opinion of the meeting that it was originally erected to serve the double purpose of a temple for religious rites and a burial-place for some chieftain. This latter view is confirmed by the existence of an acknowledged sepulchral mound, known as Gib's Hill, about 350 yds. off to the south, and till recently connected with Arbor Low by an earthen rampart. It may be gratifying to learn that, whatever may have been its original design, Arbor Low is now scheduled under the "Ancient Monuments Act" of Sir John Lubbock, and that on each side is a little stone pillar, half the size of a milestone, with an inscription, "V.R.," showing that the nation has taken the spot into possession, and that it will never be effaced by the plough or the builder. Mr. St. John Hope adds that Arbor Low ranks in size among the six largest stone circles known; but it is very small in comparison to either Stonehenge or Abury.

Youghgreave Church, dedicated to All Saints, which the party visited on their return journey, is a fine handsome church, externally of Perpendicular character, and with a lofty tower, very much of the type so common in Somerset. The interior of the nave was originally Norman, and much of the Norman work remains. The edifice was lengthened westwards when the tower was added, and the chancel is a good specimen of the Perpendicular style. The font is curious, as having a holy-water stoup attached to one of its sides. Probably it once stood close to the door of the church, and this stoup inside made it unnecessary to place another outside. In the north wall of the nave, near the west end, is a curious little figure of the Norman type, and thought to represent a pilgrim. On the north side of the altar-table is the recumbent figure of a knight cross-legged; but it does not lie in its original position. On the east wall of the north aisle is a piece of carved alabaster, "apparently a combination of retables and monument." In the centre is the figure of the

Blessed Virgin, with the lily and with the Divine Child in her arms; and on either side are a husband and a wife with sons and daughters respectively behind them. In the centre of the chancel is a miniature effigy in armour of Thomas Cockayne, who died in 1488. It is also of alabaster, and carefully and tastefully painted with the heraldic bearings of the family. The restoration of the armour, however, was spoken of by the Baron de Cosson as not very successfully executed, the details being open to much exception. This, he added, was all the more to be regretted, as there were so many fine examples to be copied at Norbury, Bakewell, and other places in the neighbourhood. A vote of thanks to the vicar, the Rev. Mr. Roy, was passed at the suggestion of Mr. Beresford Hope for his courtesy in showing and explaining his church.

Leaving Youghgreave, the members of the Institute again took their carriages for Rowsley Station, where a special train was timed to call for them, and to take them back to Derby; but, as they finished their day more than half an hour before the time laid down in the programme, part of them, including most of the ladies, took tea at the Pesscock Inn,—so well known to the disciples of Isaac Walton,—and walked in its pleasant gardens, whilst the rest visited Rowsley Church in order to see the monument (cenotaph) to the first Lady John Manners. The return journey was effected without accident or misadventure, and Derby was reached at seven p.m.

Later in the evening two sectional meetings were held. In the Antiquarian Section (Mr. R. S. Ferguson in the chair), the Rev. G. F. Browne, B.D., delivered an interesting and valuable address on the sculptured stones of Derbyshire, very fully illustrated by rubbings or full-sized drawings of many of the examples referred to. He commenced by referring to the very curious and interesting incised stone which is to be seen on the font at Wilne Church, but which is now discovered to be upside down. Another specially interesting incised stone is that of the well-known Bakewell cross. After giving detailed descriptions of many other notable incised stones in the county, and pleading for their preservation where they happen to be in exposed situations, for they were undoubtedly all of them work of the period of the Mercian kings, Mr. Browne explained the manner in which the various scrolls and other ornamental forms were described and executed, the wearing away of the overhanging portions of the undercut work having thrown a good deal of light on this subject. Many of the stones were of great interest as containing rudely-executed but unmistakable representations of important events in Scripture history, the figures, especially the horses, being very much "out of drawing." It was incidentally mentioned that the occurrence of horses on these incised stones was very rare, and it was asked why the Pictish stones of about the same period should not only be frequently found to contain not only representations of horses, but very faithful and spirited representations, indeed. It appeared that no satisfactory answer could be given to this question. In conclusion, Mr. Browne (who has made the subject of these stones a study for many years) mentioned that he had been commissioned by the authorities of the University Press at Cambridge to collect material for the publication of a work which should give representations of all the ancient incised stones of the country. To that end he had received handsome offers of co-operation from the Cumberland, Durham, and other archaeological societies, and he hoped that all such societies would co-operate with him in production of a work which could not fail to be one of national importance and interest.

The Chairman, having expressed the great interest which his local society (the Cumberland and Westmoreland) was taking in Mr. Browne's work, Dr. E. Taylor moved, and Professor E. G. Clarke seconded, a vote of thanks to Mr. Browne for his interesting discourse, which, he said, was one of unique interest. Mr. Browne had clearly succeeded in showing, by a study of these incised stones, the presence of a Christian feeling in times when it was thought that none existed, and the existence of civilisation where hitherto it was thought that barbarism was paramount. Mr. Browne, by his researches, and by the way in which he had carried them out, had shown himself to be a true archaeologist,—a very "geologist of history." All

archaeologists would look forward with very considerable interest to the publication of the work which Mr. Browne had undertaken to publish.

In the Architectural Section, Mr. R. P. Pullan presided, and the Rev. Father Hirst delivered an interesting address on "The Present Prospects of Archaeology at Athens."

Mr. Pullan, in introducing the lecturer, said that Father Hirst would be remembered more present as having delivered an interesting lecture at the Newcastle meeting of the Institute on the Classical Mines of Northumbria. Since then, Mr. Hirst (who had only lately returned from Greece) had been digging in mines more classical, and among the treasure which had been lately discovered at Athens were the remains of the Temple of Eleusis,—discovery which was of great interest, inasmuch as that temple was known to differ materially from other temples.

Father Hirst, after referring to the value of residence in Athens for gaining a practical knowledge of Greek antiquities, gave an account of the excavations now in progress, or projected, on the Acropolis, around the Acropolis, and at the Dipylon. He then went on to speak of what he had seen at Eleusis, where the excavations were now approaching their termination. Some ten thousand pounds had been spent upon them by the local Greek archaeological society. The most important discoveries made during that past year had been some pre-historic tombs and walls; the latter were of three different kinds—firstly, polygonal walls of blue Eleusinia marble; secondly, drafted stone walls of a very good appearance; thirdly, a thick unbaked brick wall, 4½ metres thick. These three varieties of wall had been, without doubt, in existence before the invasion of Greece by Xerxes. It was supposed that some of the walls were used for the enclosure of the sacred area, and others were evidently used for supporting two terraces on either side of the temple,—one passing due east and another passing due south. The walls were faced only on one side, and filled in with earth and rubble behind. The temple itself is now laid entirely bare, and is found to be laid out in seven rows of six columns each, making in all forty-two. The columns are all of very early workmanship, the style being Archaic Doric. The material of which they consisted was of common stone brought from the Peiraia, or from Zegina. The most remarkable discovery which has been that of the remains of the pre-Periclean temple, which was burned to the ground by the Persians before the battle of Salamis. This temple is supposed to have been 25 metres square, and to have had twenty-five pillars, disposed in five rows of five each. The bases of several of these pillars have been found, and their disposition has been clearly traced out. The size of the larger Temple of Eleusis, of which this smaller one occupies the north-east corner, was about 65 metres square. In conclusion, the lecturer observed that the Greek society, which had defrayed the cost of these excavations, was very wealthy. The excavations have from the first been under the direction of M. Phillos, a learned and intelligent Greek, who represented the Greek Government during the excavations made by Dr. Schliemann at Tiryns.

The Chairman having made a few observations on the lecture, a vote of thanks was given to Father Hirst, and

The Rev. R. C. Manning read a short paper on "Lockers for the Processional Cross." It he referred to the discovery in certain churches here and there of peculiar elongated recesses in the walls, varying from 6 ft. to 12 ft. or 14 ft. in height, and about 1 ft. in width. It is believed that each of these recesses (which very few are known to exist, and the chiefly in the Eastern countries) must have been provided with a door in order to serve as lockers for the processional cross.

A vote of thanks was given to Mr. Manning for his paper, and the section adjourned.

Saturday last was a "carriage-day," as visitors were paid to Sawley Church, Dale Abbey, Morley Church, and Breadsall Church. Leaving Derby shortly after ten o'clock, the first point made for was Sawley. The church is dedicated to All Saints, and is remarkable for the completeness of its ancient screen and chancel fittings, which are very massive and substantial, and have not been restored. The church, which is dedicated to All Saints, consists of a chancel nave with aisles and south porch, and western



tower and spire. According to Mr. St. John Hope, who made a few remarks about the church, the chancel-arch and a fragment of the north wall of the chancel seem to be part of a pre-Norman church. The next work in point of date is the west end of the north aisle, which has evidently belonged to a narrower aisle than the present one. The nave and aisles seem to have been rebuilt a little later. The long-lost Burton Chantry records that Ralph de Chaddelesien built "the chapel of the blessed Mary," when founding his chantry, between 1259 and 1266. The south aisle was the Lady Chapel. The aisle windows very much resemble those of St. Peter's, Derby. The chancel is of Decorated work, but a curious late Perpendicular recess has been built out at the west end of the south side of the chancel, to serve as a receptacle of a tomb. Another curious feature of the church is a solid wall or screen, about 8 ft. high, running across the chancel near the east wall. The space behind it, entered from the chancel by a door on the north side, serves as a vestry. This cross-wall is an insertion, and partly blocks up the old piscina. The chancel was some years ago restored by Mr. Ewan Christian, who, according to the rector, is of opinion that some of the masonry is of Saxon date.

A long and dusty drive having been accomplished, the visitors found themselves at Dale Abbey, where the hermitage, cut out of the face of the rock, and once adopted as a residence by a pious baker of Derby, was first examined. The story of the hermit, as given in a pamphlet entitled "The Hermitages of Depeedale, or Notes on the Chronicle of Thomas de Musca, Canon of Dale Abbey," lately published by the Rev. Charles Kerry, is very interesting, and extracts from it were read to the assembled company. The church, close by, is a singular little building, principally Perpendicular in character, but little of it is to be seen amid the excrescences which smother it. Traces of older work exist. The adjoining house was, until a year or two ago, a picturesque half-timbered structure, with a door connecting it with the church, both house and church being practically under one roof. The old house was demolished in 1883, and a new structure erected in its stead,—a circumstance which called forth very decided expressions of regret from Mr. Beresford Hope and other members of the party. A move was next made for the adjacent ruins of Dale Abbey, the site of which was excavated a few years ago by the Derbyshire Archaeological Society. The style of the buildings appears to have been Early Decorated throughout. The arch of the great east window is still standing, and was a few years ago repaired at the cost of the rates, it being stated that so long as the arch existed the inhabitants would be exempt from the payment of tithes. Extensive remains of the piers of the crossing and nave arcade exist, enabling the plan to be very clearly traced.

Mr. St. John Hope, who acted as *cicerone*, pointed out a curious effigy of a canon of the order, now in the Art Museum, standing partly over the site of the chapter-house. This museum, by the way, contains some very good specimens of flooring tiles, which appear to have been made here in abundance. The carriages being resumed, the interesting churches at Morley and Breadsall were visited. Morley Church contains a fine series of monuments and some old glass, which is supposed to have come from Dale Abbey, though this statement was received with doubt. Dr. Cox, who explained the church, said that a late inscription of the benefice (Mr. Fox), who was a good Saxon scholar, was strongly of opinion that the nave arches were pierced through, and supported, Saxon walls. The chancel is Decorated. The later work of the church is of peculiar interest, on account of its being dated, a brass in the north aisle to Ralph de Statham recording the work done by him. The tower was described as "incipient Perpendicular." Breadsall Church, the last item on the day's programme, consists of a chancel, nave with north aisle and south porch, and a tower and spire. The earliest part of the church is the south doorway, which is of Late Norman character. A fine alabaster figure of "our Lady of Pity" was discovered in 1877, and has been preserved. In the clock-room are stowed away the remains of an elaborate roof screen, which it is proposed to restore. The excursionists returned to Derby, and a meeting of the Historical Section was held in the evening,

when Mr. H. S. Skipton read an interesting paper on "The House of Cavendish."

But we must break off here, deferring until next week some account of the subsequent proceedings of the Congress, which terminated on Wednesday last.\* On the whole, the Congress has been very successful, and the excursions have been largely attended,—being exceptionally favoured by the weather, which remained fine for the whole time up to Wednesday afternoon, when the party returning from the final excursion encountered a steady downpour of rain. If there has been room for fault-finding, it has been found, according to some of the local members of the Congress, in a want of topographical knowledge on the part of the coachmen or their instructors, which has not unnaturally led to needless travelling over several miles of dusty and hilly road.

#### THE PLUMBERS' COMPANY.

The first meeting of the General Council of this Company was held on Friday, the 31st ult., at the Guildhall (the Right Hon. Earl Fortescue in the chair), to consider certain recommendations of the Court of the Plumbers' Company based upon resolutions passed by the recent conference of metropolitan and provincial plumbers, and having for their objects the improvement of plumbing work in dwelling-houses.

After some introductory remarks from the Chairman,

Mr. R. E. Coles (acting for the clerk of the company) read the notice convening the meeting, and also a number of letters from Sir J. M'Garel-Hogg, M.P., and other gentlemen, apologising for being unable to attend.

Mr. George Shaw (the Master of the Plumbers' Company) read the recommendations of the Court, and observed that the Court had now inaugurated a system which would be of great advantage to those following the trade. At present there was a large amount of plumbing work done by persons who were not properly qualified. By the means of the registration proposed those who were engaged in the building of houses would have an opportunity of knowing whether the persons they employed to do the plumbing work were duly qualified and occupied a recognised position in the trade. What the Court of Plumbers wished to do now was to establish a principle on which they could act in the future. The subject of technical education was an important one, and one which the Plumbers' Company had very much at heart. They had present Mr. Philip Magnus, Director of the City and Guilds of London Institute for the Advancement of Technical Education, and he would, no doubt, give the Council some valuable information. The subject of plumbers' work would be dealt with at the next meeting of the Council. He wished to mention that the gentlemen assembled in that room represented the masters as well as the men.

Mr. Philip Magnus observed that it was now five years since the directors of the City and Guilds of London Institute for the Advancement of Technical Education consulted with Mr. George Shaw, the Master of the Plumbers' Company, with the view of ascertaining what would be the most fitting syllabus of instruction not only in the classes in London which they desired to establish, but also in classes in different towns throughout the whole kingdom. Mr. Shaw was good enough to assist them on that occasion in drawing up a syllabus of instruction. It was contained in a publication he had before him, and which was known as their programme of technological observations. Any one who consulted the programme would see the kind of instruction which teachers were expected to give to students in technical classes established in connexion with the Institute, and he was quite certain that if any one would turn to the appendix to the programme which contained the examination questions, he would admit that those questions were of a very practical character, and that any plumber who answered them would not be likely to make the serious mistakes in his work which were so often made. The City and Guilds of London Institute were assisting this cause in another way, by endeavouring to establish every year a class of a more advanced character, in which those engaged in teaching in the provinces or elsewhere might have the opportunity of learning exactly those things

they ought to teach, and the manner of teaching them. A class of this kind was opened for the first time this summer in the Institute's building in Exhibition-road, when Mr. Maguire, of Dublin, came up to London and gave a most interesting course of practical lectures. It was, of course, most desirable that plumbers should know something of the principles of science as adapted to the occupation in which they were engaged. They ought to have some knowledge of chemistry, of mechanics, and of hydraulics, but whatever instruction was imparted would not be effectual unless it was practical. He, therefore, thought that every class wherever situated ought to include not only a course of lectures but also a plumber's laboratory. In this laboratory plumbers ought to be able to see the effects of many of the causes on which they worked, they should see the action of air and water under certain conditions upon the metal they had to use; and, besides learning so much of chemistry as might be useful to them, they ought to have an opportunity of learning in this laboratory something of metallurgy and of experimental work. No instruction, be it laboratory or theoretical instruction, could take the place of that which the young man learned from the master plumber, but he might learn in this school what he could not obtain a knowledge of from his master while carrying on his trade. It was in the technical class that he obtained the opportunity of having explained to him the difficulties which would occur in his ordinary work, and gaining the knowledge which would enable him to surmount those difficulties. A student serving his time and while acting as a plumber would at the same time be able to obtain instruction such as he had described, and if he went before the Board of Examiners, composed of practical plumbers, and passed an examination and also gained the certificate of the City and Guilds of London Institute, the public would feel secure in intrusting their work to him.

Mr. George Howell inquired whether others than those who served an apprenticeship of seven years would be permitted to come up for these examinations? He asked this because circumstances had changed very much of late years, and there were many young men who, without serving an apprenticeship, had become very good plumbers through superior ability and paying great attention to the details of the trade.

Mr. G. Shaw (the Master), in reply to Mr. Howell, said that excellence of workmanship and knowledge of the craft would be taken as a qualification for the certificates. Theoretical knowledge would not be sufficient to qualify a man as a plumber. He must have a practical knowledge.

Mr. Smeaton asked whether Mr. Maguire, who was mentioned by Mr. Magnus as having delivered a course of lectures to practical plumbers, was a practical plumber himself.

The Master replied that he understood Mr. Maguire was a practical plumber.

Mr. Howell was anxious that, while doing full justice in the future, they should not do injustice to those who, through their talent and perseverance, had obtained a sufficient knowledge of the trade to qualify them in undertaking and carrying out plumbing work, and so earning a livelihood by it.

Mr. Scott remarked that he was prepared to support the recommendations of the Court of Plumbers. Mr. Shaw had taken care in the observations he had made to show that, at any rate as far as he was concerned, his mind was exceedingly open. But he should also infer from what he said that he and those who acted with him in this matter would be the very last to discourage the feeling in the trade in favour of a practical apprenticeship.

Upon the suggestion of the Chairman the recommendations of the Court were then considered *seriatim*, and after a somewhat lengthy discussion, the following, as amended, were agreed to:—"The establishment of a system of Registration of Plumbers of the City of London and within a circuit of seven miles thereof." "That the register should include master plumbers and journeymen and be open to the admission of those who satisfy the Court of their qualification by either of the following means: 1. Evidence of present status and experience in the trade. 2. Examination by a Board of Examiners composed largely of plumbers, appointed for the purpose by the Court." 3. "The production of certificates of competency granted by the Plumbers' Com-

\* On another page, however, will be found a résumé of an interesting paper read by the Baron de Cosson on Monday evening, on "Monumental Effigies."



pany and the City and Guilds of London Institute, due weight and consideration being given to the production of indentures of apprenticeship." "The Court will reserve the right to remove names from the register in cases of proved misrepresentation or other gross misconduct, injurious to the trade and the public." "Plumbers admitted to the Register to be entitled to use the letters R.P. (Registered Plumber) after their names."

On the proposition of Dr. Vacher, Birkenhead, seconded by Mr. Scott, Manchester, it was resolved, "That the Council do now adjourn," the consideration of the following business being postponed to another meeting to be held at an early date:—

"The Court are prepared to assist in the organisation of Provincial Boards of Examiners of plumbing work, in accordance with the Resolution passed by the Plumbers' Congress, proposing that such Boards

1. Should be affiliated with a Metropolitan Board.
2. Should consist largely of trained working plumbers.
3. Should be in connexion with Provincial Schools of Plumbing.

The Court have decided to recommend the formation of special classes for instruction for plumbers in the City and Guilds of London Institute and in Provincial Institutions for the advancement of technical education."

A vote of thanks to Earl Fortescue for presiding terminated the proceedings.

#### EXCURSION OF THE SURREY ARCHÆOLOGICAL SOCIETY.

On Wednesday, July 29th, the members and friends of this Society made its annual excursion. They assembled together at Edenbridge, where light refreshment was taken, and a few members inspected some of the old timbered houses of the end of the fifteenth century in this picturesque village; after which they proceeded to Lingfield, where Major A. Heales, F.S.A., described the principal features of the church. This consists of a nave with aisles, these extending on the north side coincident with the chancel, and in the south side of the chancel is a vestry of the same date. A tower, flanked by buttresses, is at the west end, with a shingled spire. The greater part of the church was built at the time of the founding of the College by Sir Reginald and Lady Cobham, in 1431, and Major Heales called attention to the lightness and elegance of the pillars and arcades. An elegant oaken screen enclosed the chancel, but of this the western part was barbarously removed at a restoration (?) some thirty-five years ago. Accompanying this are many of the old stalls used by the collegiate priests, having on them badges of Cobham of Sterborough, and of Bardolf. Beneath the chancel is a singular crypt-form passage, entered on the north side, now a receptacle for coals, &c. Mr. J. G. Waller then described the interesting series of monuments and brasses connected with the Cobhams of Sterborough. He began by stating, that such monuments being of men who had done good services to the State, and associated with affairs which tended to build up our national fabric, were not to be regarded as mere objects of curiosity, to be looked at and passed by, but ought to be considered as of national concern, and to be religiously conserved. He alluded to the great battles of Cressy and Agincourt, in the first of which Sir Reginald Cobham, the first Baron Cobham of Sterborough, took a grand part, being one to whom the care of the Prince of Wales was consigned; also that he led the van at Poitiers, helped to rescue King John of France from his captors, and conducted him with honour and respect to the Black Prince. He also mentioned his other great services; his embassies abroad, and especially to the Court of Rome; and his being also one of the first Knights of the Garter. One of the features of his tomb is the array of heraldry, not in this case, as is usual, the record of alliances or descent; but, with exception of the personal arms of deceased and that of his wife, and the arms of his son, the armorial bearings are those of companions in arms, personal friends, whose names appear in Froissart associated with his own. Amongst these are those of three Knights of the Garter, viz., Pavey, Mortimer, and Bohun,

the whole forming an array of the chivalry of the brilliant era of Edward III. Sir Reginald Cobham was one of the victims of the second pestilence in 1361. The tomb of his son, Sir Reginald, second baron, is surmounted by a fine brass, with a very interesting descriptive inscription in Latin, setting forth the virtues of the deceased. He was handsome, of good manners, generous, brave, wise in council, and hospitable. He died in 1403. Like other members of the great Cobham family, he opposed the power of the Crown during the reign of Richard II., and, in consequence, was obliged to fly the kingdom, taking refuge with Henry Bolingbroke in Brittany, and landing with him at Ravenspurn, at the mouth of the Humber, and taking an active part in his elevation to the throne as Henry IV. The brass of his first wife, Elizabeth, daughter of the Earl of Stafford, though destitute of inscription, Mr. Waller identified by its character, as she died in 1374. Amongst the smaller brasses, now preserved in the north chapel, one to Katherine Stoket was pointed out, as that of a waiting-maid to Lady Joan Berkeley, wife of the first baron, who is mentioned in the will of the latter. One of the most important tombs is that of the founder of the college, Sir Reginald Cobham, and Anne, his second wife, daughter of Lord Bardolf. The figures are of alabaster and finely worked, placed on an altar-tomb built up of the Reigate freestone. The knight is in armour, giving a good example of the time. The lady is as a widow, as she survived him. This Sir Reginald was not summoned to Parliament, consequently the barony ended in 1403, when his father died. A very pretty brass to his first wife, Eleanor Colepepper, lies by the side of his father's tomb. The brasses of the priests of the college were alluded to as being of one general type. Mr. Waller pointed out the tomb of Sir Thomas Cobham and lady, now removed from its original spot, and stated that it had once been opened, and the bones of the original tenants displaced to make room for a Sir John Burrow, whose tablet records him to have specially affected a "convivial character." It is needless to say that he held up such proceedings to general opprobrium. The company thence proceeded to New Place, an old residence of stone, described by Mr. C. E. Powell as being formerly one of much greater extent. The earlier portions of this building, mostly of wood, may belong to the late Tudor period; but the general character of what remains is that of James I., and was built by one of a family of Turner in 1617, judging from a date, with initials G. T., which appear on a doorway to the garden wall. The fine oak panelling of the rooms, untouched by paint, were much admired.

The company then proceeded to Crowhurst Church, which, situated on a rising ground, is a very pretty object. Its fine old yew tree, the hollow of which once sixteen performers played the Hallelujah Chorus, is now very carefully preserved. Mr. Ralph Neville, F.S.A., gave a brief description of the interior of the church, pointing out the special features of the woodwork of the fifteenth century, and alluding to several of the monuments, especially to one of cast-iron to a member of the Gainsford family, dated 1591; and Mr. Waller made some remarks on two interesting brasses to members of same family; one to John Gaynesford, sen., 1450, very few examples of this type being extant; and one to his son John ten years later; both worthy of attention as showing the changes in defensive armour in the period of the wars of the Roses. Considerable disappointment was felt that Crowhurst Place, the ancient seat of the Gainsford family, a very fine old timbered mansion, of which some features were illustrated by the late Charles Bailey in the Society's Proceedings, could not be visited, one of its inmates being seriously ill. Two old farm houses in the immediate neighbourhood, however, the tenants kindly allowed the company to overrun, and much pleasure was afforded by seeing large open fire-places in the kitchen, dogs upon the hearth, with song seats, making a true chimney-corner, with the "hake" for hanging the cauldron and machinery for turning the spit, of excellent iron-work, and traditional Medieval ornament. It was a complete picture of the culinary apparatus of our ancestors, and was very suggestive of a capability of performing the rites of that good old hospitality, as hinted at on the brass of Sir Reginald, second baron, in the words, "dapsilis in mensis." The courtesy which allowed an inroad into the

privacy of the tenants must not be forgotten. This closed the archaeological proceedings of the day, which were presided over by Lord Hytton in the absence of Lord Middleton, who was unable to attend. The company was very numerous, and the day terminated in the usual festive manner, for which all were well prepared, in the schoolroom at Edenbridge.

#### Illustrations.

##### DESIGN SUBMITTED IN COMPETITION FOR PAISLEY BAPTIST MEMORIAL CHURCH.

WE give a representation from the elaborate coloured interior view of the design, which was submitted by Mr. J. P. Seddon in the recent competition for the Baptist Memorial Church at Paisley. We commented on the design, with others, at the time the drawings were exhibited (page 9, ante). The interior is rich and effective, and well suited for the intended purpose.

##### THE SACRISTY, BRISTOL CATHEDRAL.

THIS very interesting piece of Medieval work, which is not very well known, is carefully and fully illustrated by the measured drawings, which we publish this week, made by Mr. R. M. Paul, whose drawings were placed as the second in point of excellence in the competition for the last Architectural Association Travelling Studentship. The finials and other carving and fine examples of late Decorated foliage and ornament; the bosses are finely contrasted, and the crockets on the doorway, apparently suggested by the curled-up leaf of young fern, are curious examples of ornament conventionally based on Nature. The work is sufficiently described otherwise, by the various notes on the drawings.

##### CANONS ASHEY AND MIDDLETON CHENEY, NORTHANTS.

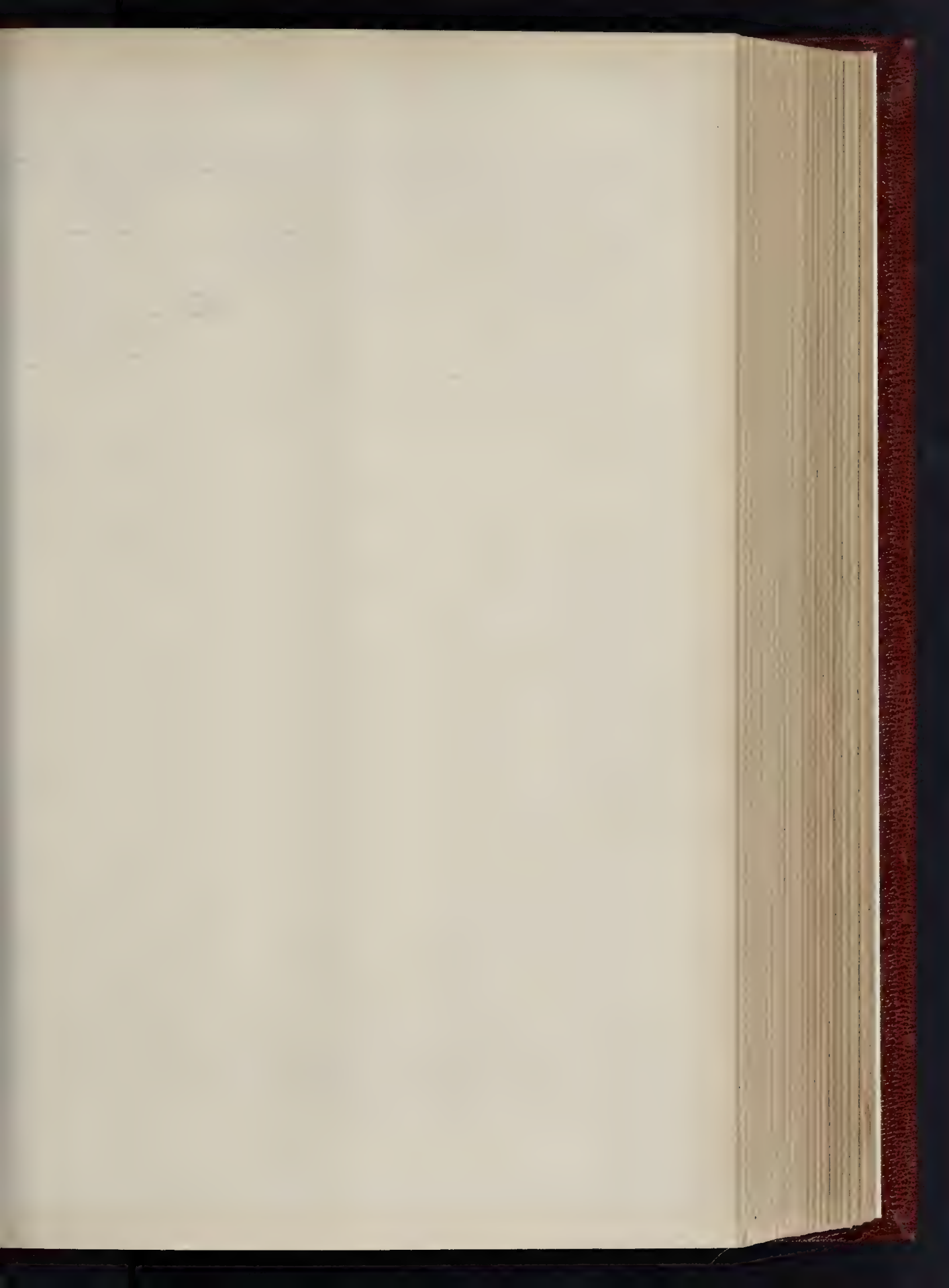
CANONS ASHEY HALL, in Northamptonshire, the seat of Sir H. E. L. Dryden, Bart., is one of the buildings "on the list" to be visited by the members of the Architectural Association on Tuesday next. Its chief interest is that it is "untouched" and retains so much of the "old life" about it. This is at once noticeable on passing through the low archway on the south side into the small but picturesque court. The hall is on the north side of the court, and a tower on the west side in the north-west angle, in which is the staircase, with its massive oak newels, balusters, and handrails. This staircase is illustrated by measured drawings in the third volume of the new series of the Architectural Association Sketch-book. The view we illustrate is seen approaching by the road from the south soon after passing the church. Besides the hall, there are at a little distance from it the remains of a Priory of the Black Canons, but only the tower (a very fine one) and part of the nave of the church now exist, though the foundations of the other buildings can be easily traced. The lower store of the tower and west end of the church have an elaborate wall arcading and a noble west door. The monastery well, of which we give a sketch and plan, is on the north side of the church. The date of it is given as A.D. 1253.

Middleton Cheney has a fine example of a four-light window of the geometrical period, the east end of its chancel (of which we give an illustration); the lines of the tracery most pleasing; and the mouldings simple and effective. There are other fine windows and a rood screen in this church, and a tower of spire 150 ft. high.

##### Cambrian Archaeological Association.

The fortieth annual meeting of this Association will be held at Newport, Monmouthshire, Monday, August 24th, and four following days. Lord Tredegar, President-elect of the Association, will deliver an inaugural address, and will be paid to Magor Church, Sudbrook Church, and Ancient Camp, Caerwent, Mathern, Chertsey, Caerleon, Usk, Raglan, Monmouth, Tintern Abbey, Caerphilly Castle, Bassallay, and Newport, where the Castle, St. Woolos Church, &c., other objects of interest will be inspected & described. Sectional meetings will also be held, and there will be a temporary museum form







DESIGN SUBMITTED  
IN THE COMPETITION FOR THE BUILDING

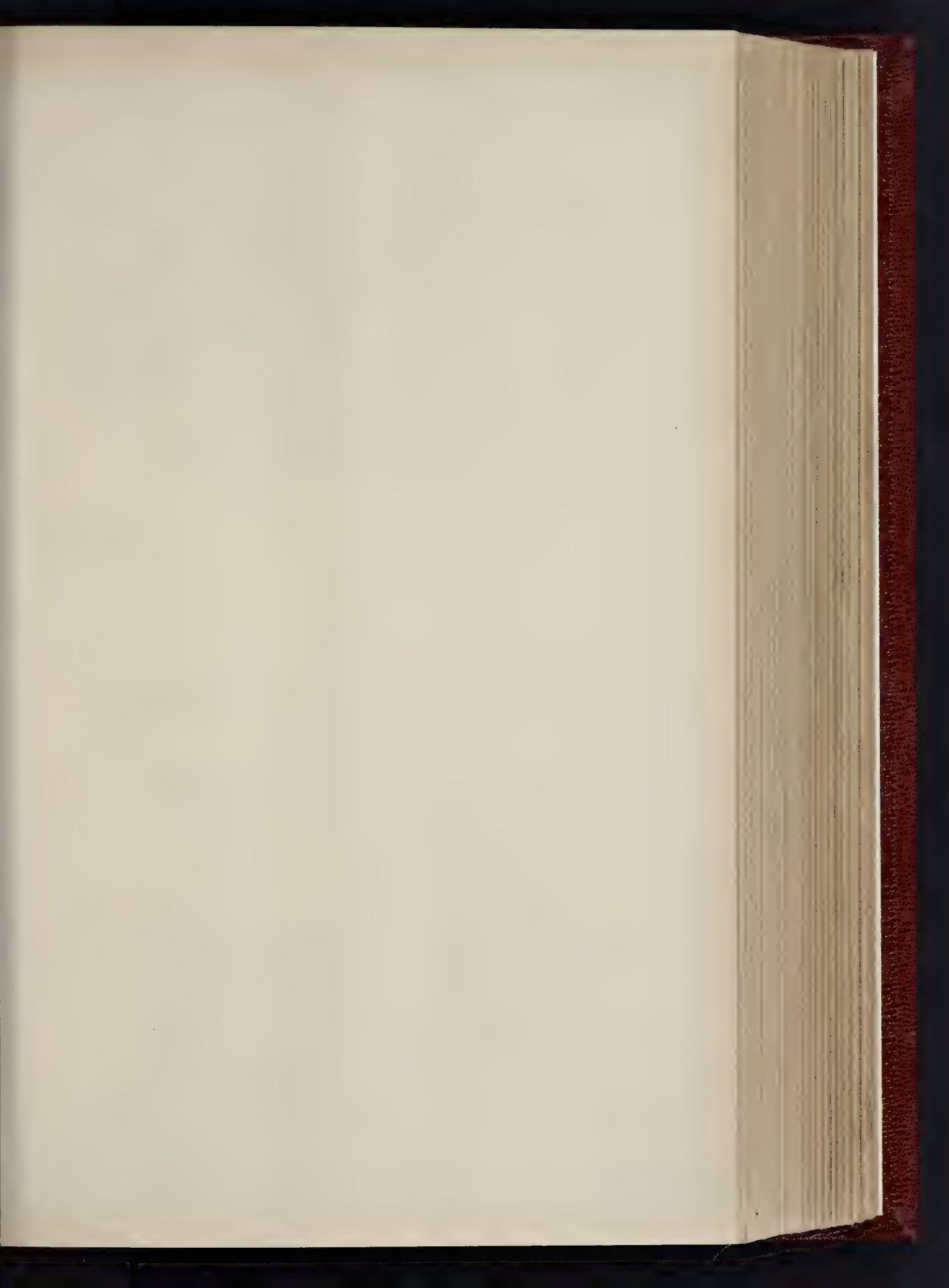




P. SEDDON, F.R.I.B.A.,  
 ARTIST MEMORIAL CHURCH AT PAISLEY.

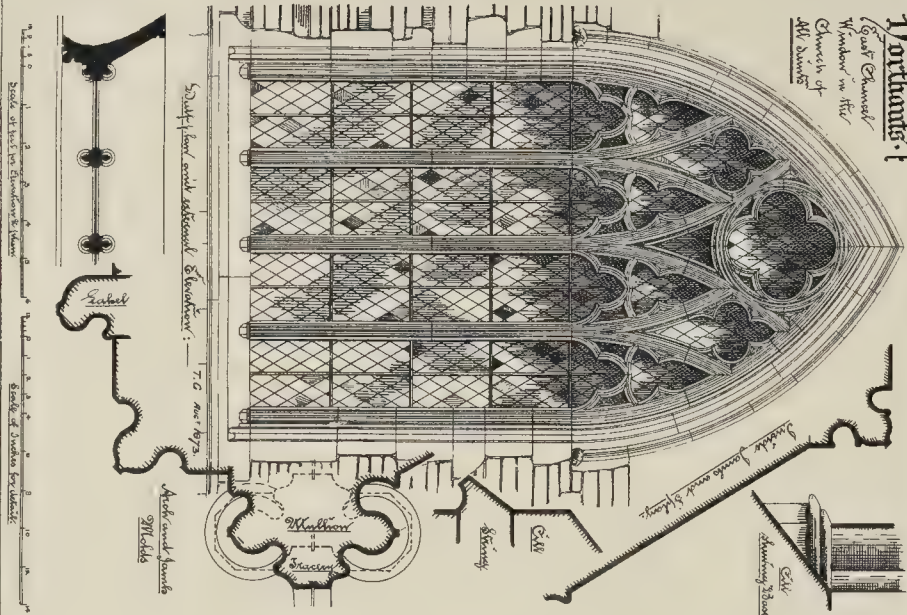




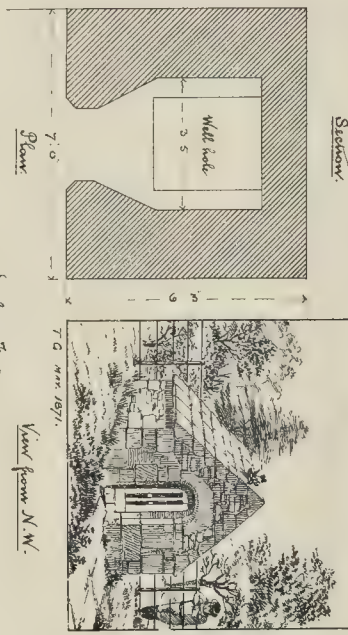
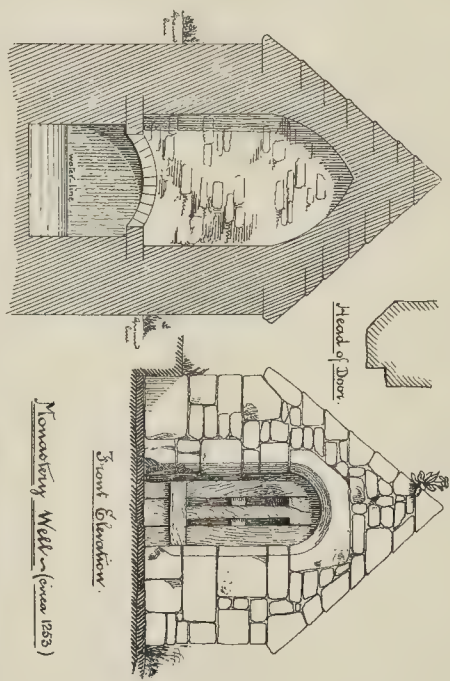


# Wobleson Cheney. Dorchester.

Great Church  
Window in the  
Church of  
St. James



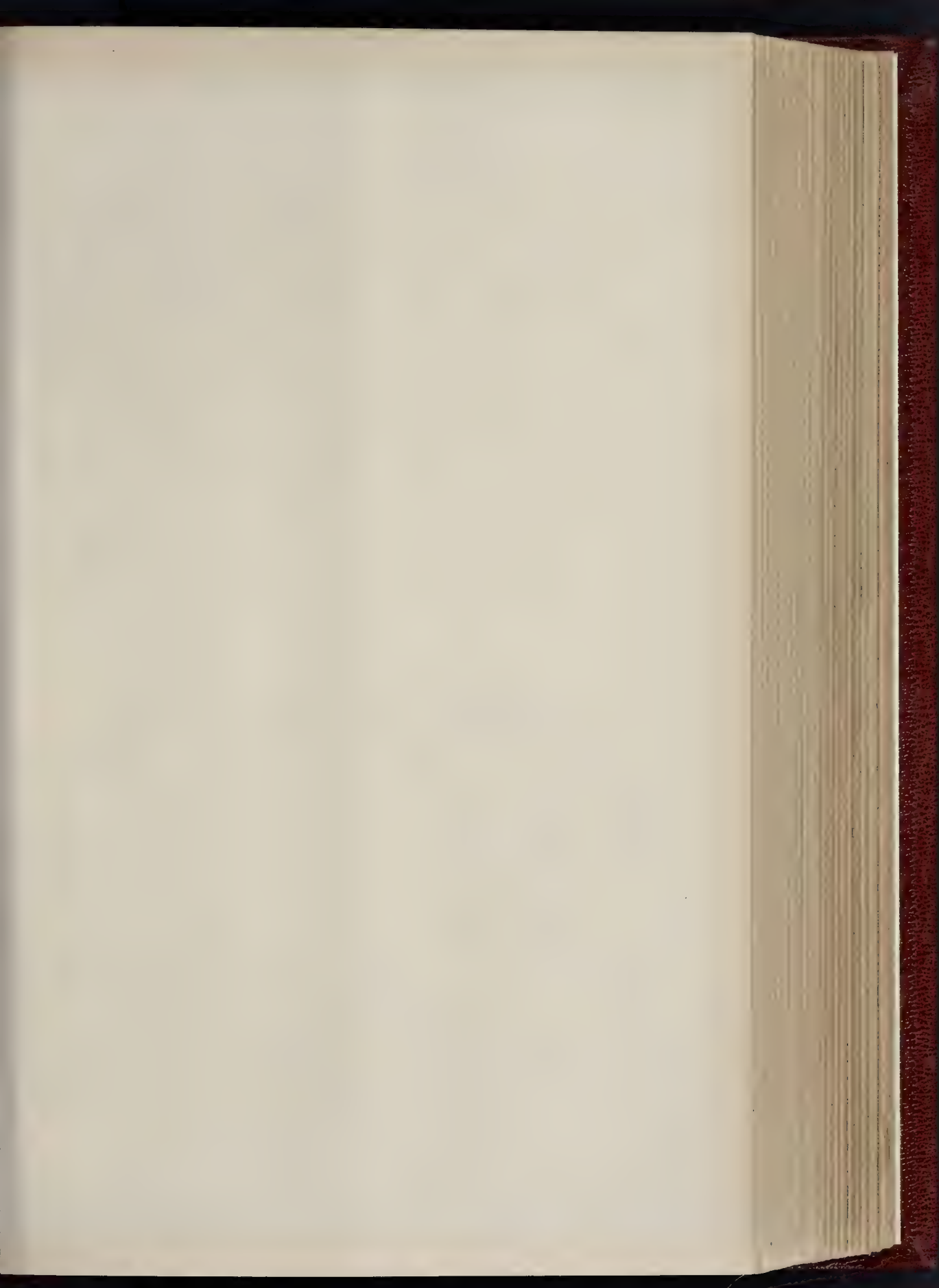
# Canon Ashby: Dorchester



SKETCHES IN CONNECTION WITH ARCHITECTURAL ASSOCIATION EXCURSION, 1881.

THOS. GARDNER, ARCHT.  
CANNON STREET, LONDON, W.

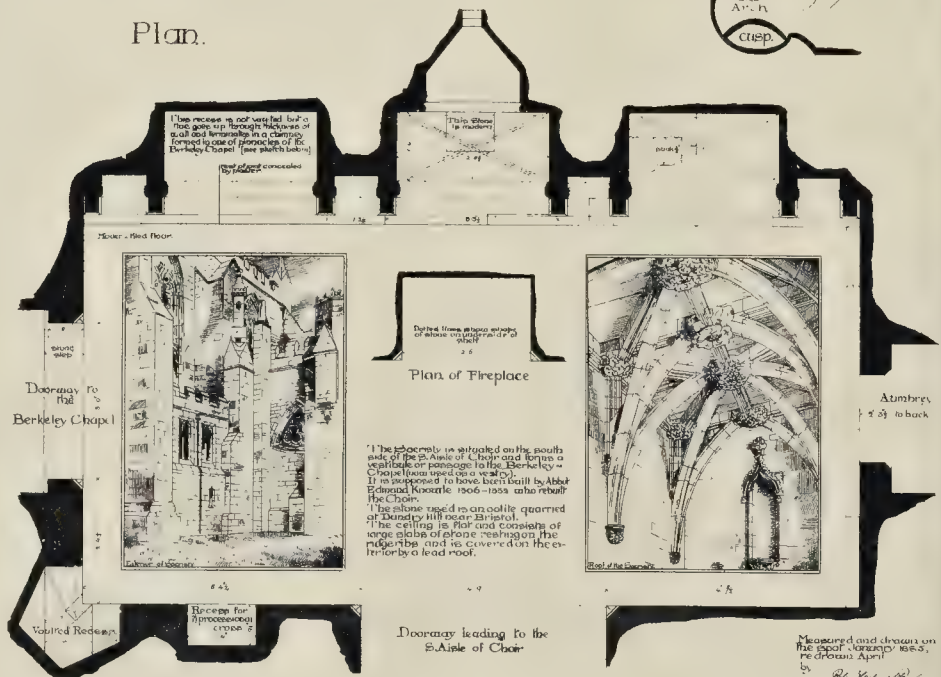




# The Sacristy: Bristol Cathedral:

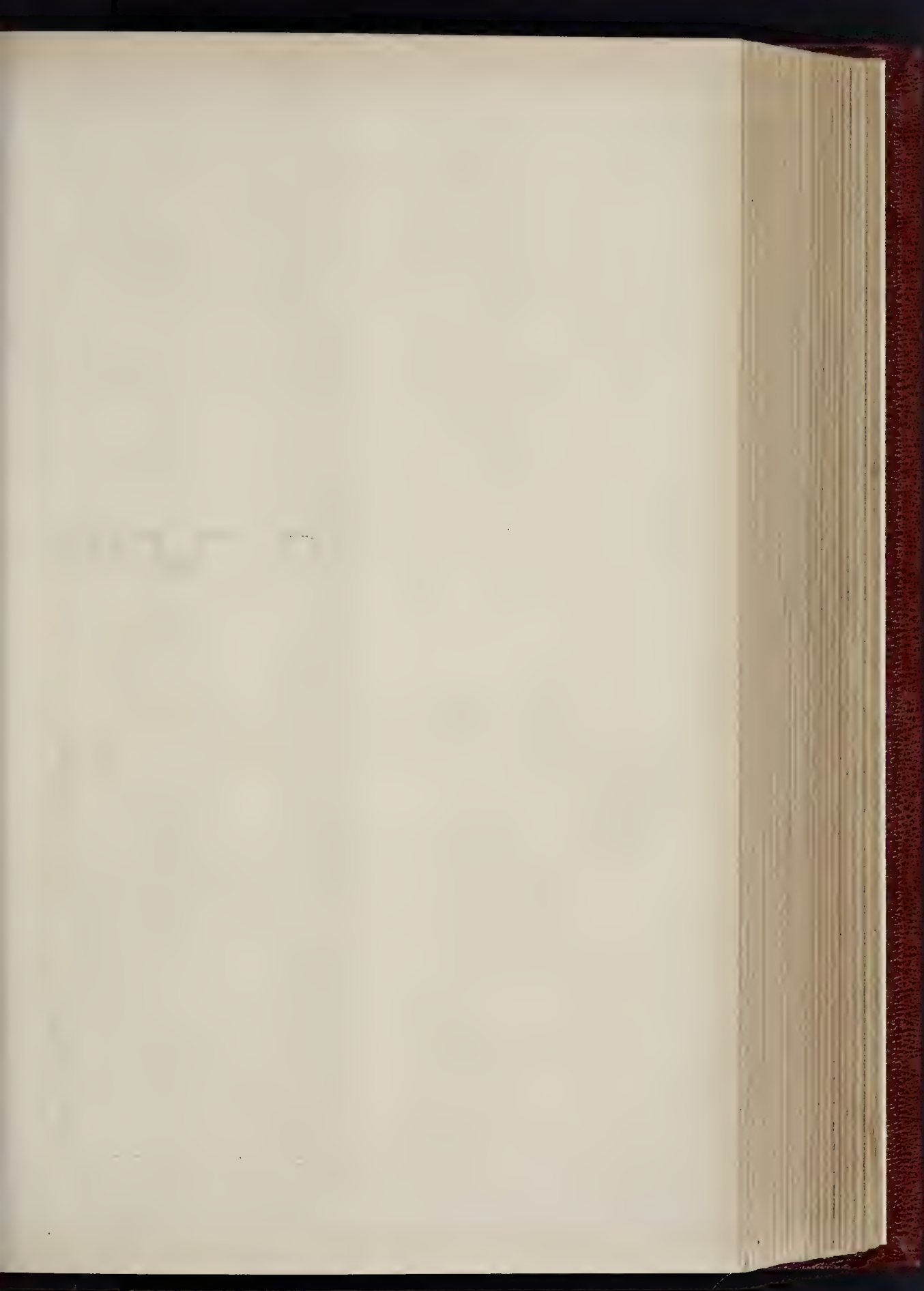


## Plan.



Scale.

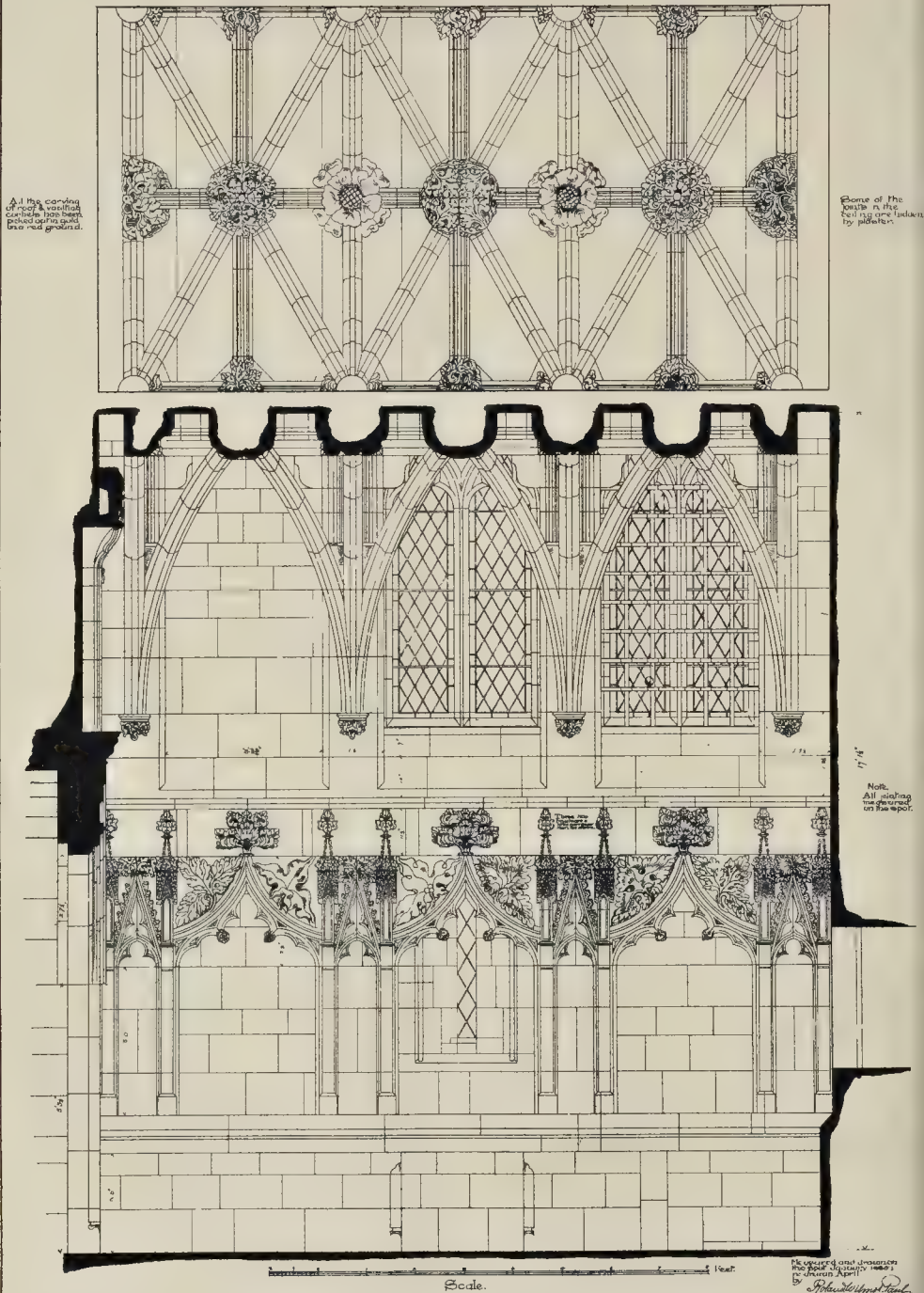




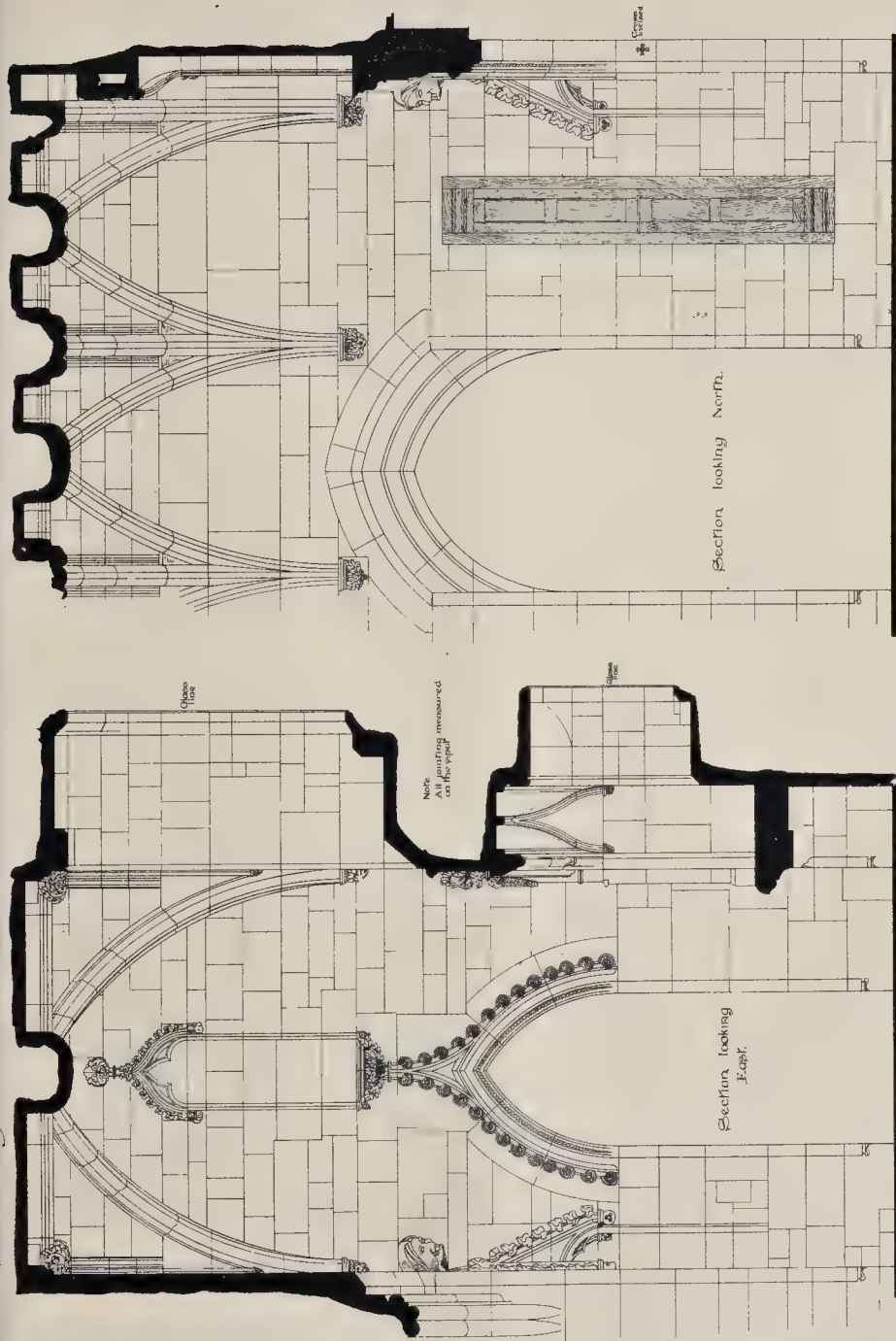
# The Sacristy: Bristol Cathedral:

## Section looking South and Roof Plan.

No 1.







Measured and drawn  
by  
J. H. Sturt

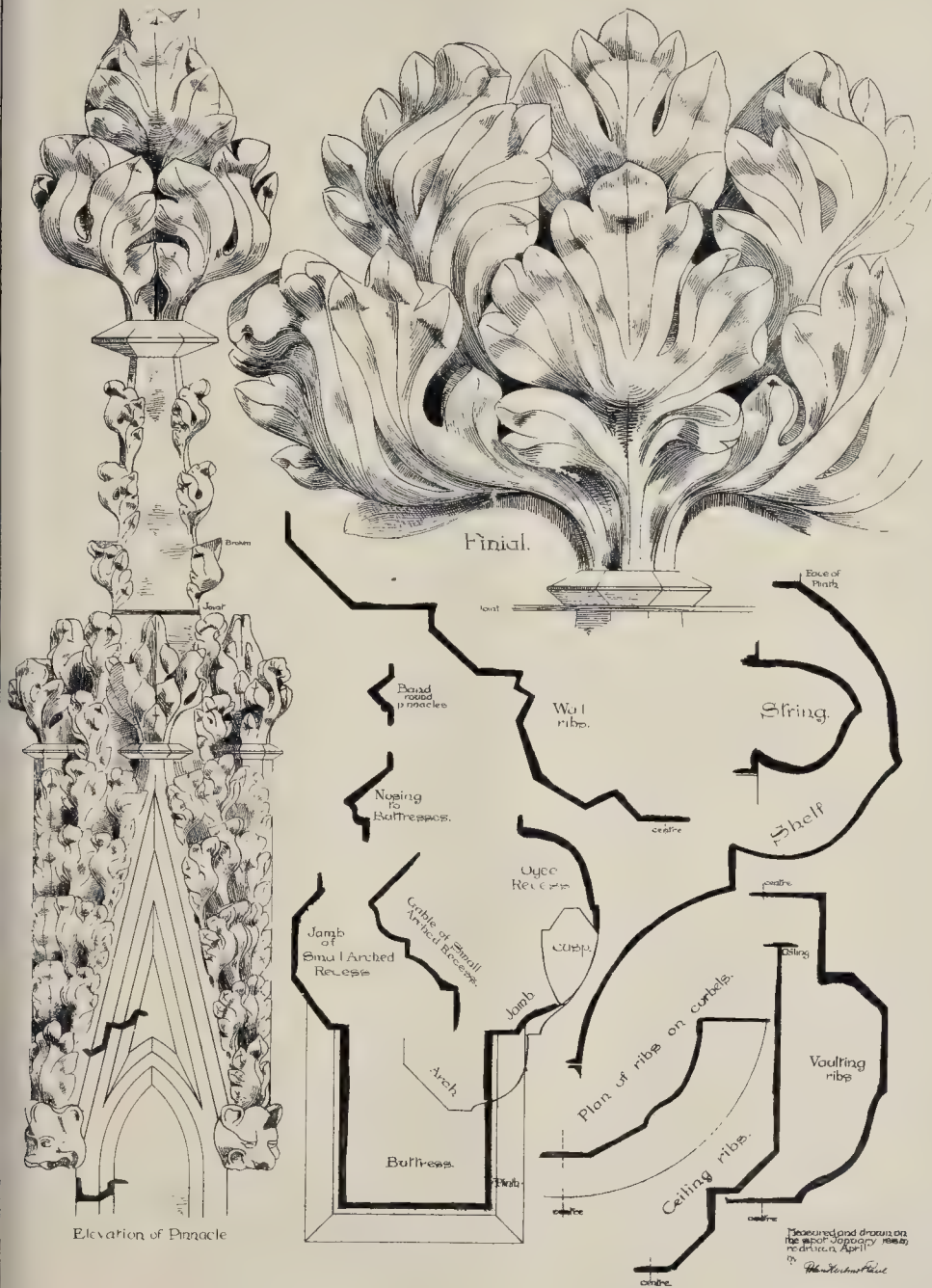
Scale.





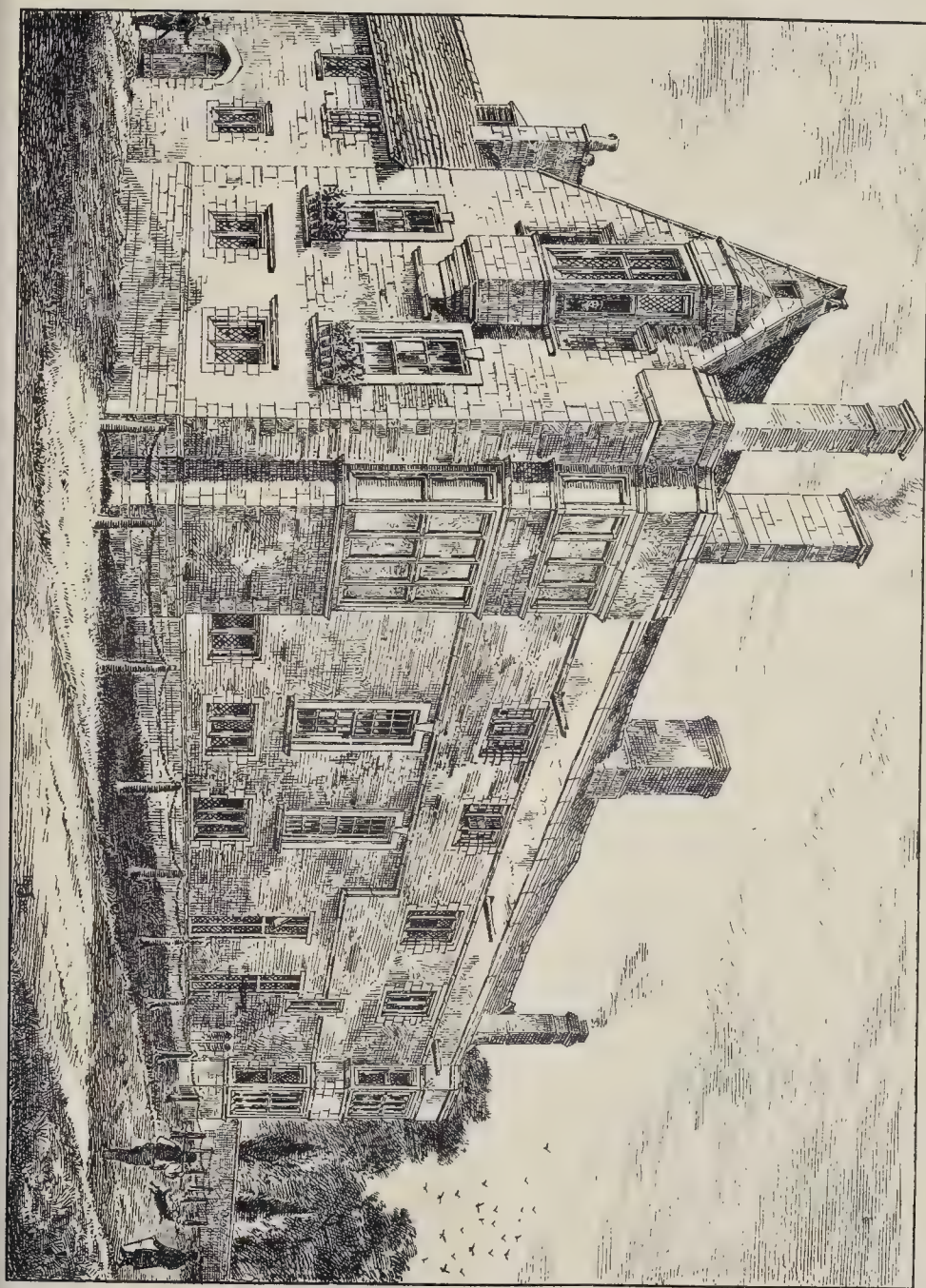
# The Sacristy: Bristol Cathedral:

## Details.









THE BUILDER, AUGUST 8, 1885.





## ENGLISH MONUMENTAL EFFIGIES.

This was the subject of an interesting paper read at Derby on Monday evening last by the Baron de Cossion, before the members of the Royal Archaeological Institute, as elsewhere mentioned. The lecturer observed that our English effigies are the most important and most carefully-wrought works now remaining to us of the English school of sculpture of the fourteenth and fifteenth centuries. Monumental effigies in our churches have often escaped destruction where other and it may be more important works of the sculptor's art have been ruthlessly destroyed. A careful study of what effigies the lecturer had been able to see had convinced him that in the fourteenth and fifteenth centuries a really excellent school of sculpture existed in this country,—a school which could hold its own with that of any other country at the same date, Italy alone excepted. Of this school of English sculpture what were probably the greatest works have all been swept away. In making a comparison between the work of the English sculptor with that of foreign sculptors, one should only compare his work in effigies with that in the effigies of other countries, not with those works in which imagination, sentiment, and the more attractive artistic qualities could be displayed. Effigy for effigy, the work of the Englishman is equal to that of the German, the Frenchman, or the Fleming. If inquiry be made why, if England possessed so fine a school of sculpture in the fourteenth and fifteenth centuries, it did not progress and develop at the period of the Renaissance, as happened in other countries, the answer would be that the complete cessation of demand for its works and the continual destruction of those already existing which took place during the sixteenth and seventeenth centuries brought it to an abrupt and premature end. To the soft and delicate modelling and the admirable technical execution of the alabaster effigies of the fourteenth and fifteenth centuries succeeded those wooden-looking dolls, in stiffly-folded dresses, which kneel with stony gaze on the monuments of the reigns of the Stuarts. So complete, so final, was the extinction of all English art, that during long years the arts of painting and sculpture, in their higher forms, were almost exclusively practised in England by foreigners, who brought to this country the art of the Renaissance, then already in rapid decay abroad, and from the teaching of these foreign professors of an art already in its decline has the art of England suffered almost to the present day; so much so, that for many long years no great art that was truly national in its character could be said to exist in the land. Going back to the effigies, it will be found that not only do they possess very great interest as works of art, but that they have a strong claim upon our attention on account of the marvellous faithfulness with which they reproduce the armour worn when they were made, and for the manner in which they teach us the story of the gradual growth and development of defensive armour in this country. Thoroughly to appreciate this wonderful accuracy it is necessary to have a very complete technical knowledge of real armour, to have seen, to have examined, to have weighed, to have felt, as much real armour as possible; to have endeavoured to learn how the armour was made and what means of manufacture the mediæval armourer possessed; and to have thought out the why and the wherefore, from a constructive and mechanical point of view, of each piece found and of each form given to it. In all really fine armour of the fourteenth and fifteenth centuries there is a good and workmanlike reason for each piece, and still more so for the special form given to it, and that those pieces and those forms often give proof of the greatest thought and ingenuity in constructive design. After the end of the fifteenth century, it is true, we often find extravagances in form and construction, due to special fancies of the armourer or of the wearer, but these were sure signs that the decline in the armourer's art was rapidly drawing nigh. Now, the great value of monumental effigies to the student of armour is that, down to the end of the fifteenth century, they presented faithful and exact copies of the armour worn by the persons represented by them. The business of the sculptors of the effigies was to make a simple and accurate presentment of the man,—to show him to us as he was when alive,—not (as was so often the case at a later date) to show us to him in clothes which he never

wore, habited as no human eyes had ever seen him habited. Truth in a tomb was then thought becoming,—nay, imperative. There was an absence of the fanciful posturing and theatrical bombast which in later ages often proclaims falsehoods which the silent dead beneath, however humble-minded he may have been in life, has now no power to recall. Not that pompous epitaphs always proclaim falsehoods. Some of the dead who lie beneath them may have possessed all the virtues with which they are credited; but, when a gentleman of the reign of Queen Anne is represented in Roman armour, a distinct falsehood is proclaimed. In like manner, when the late Prince Consort was shown in the armour of the fifteenth century on his monument at Windsor Castle, he was shown as wearing that which he had never worn in his life. It may be said that the Roman armour was allegorical of the Roman virtue of the gentleman in the full-bottomed wig, and that the fifteenth-century armour was emblematical of the knightly and Christian virtue of the Prince Consort; but how much simpler, how much more dignified, how much less ridiculous to future generations, are those monuments which show a man as he was, in the apparel he was proudest of, and tell nothing but the plain truth to posterity. Look at the grand dignity of the effigies at Norbury and Longford.\* See the knight, laid low at last, clad in the harness in which he has fought for king and country, his hands joined in humble prayer. And, when there is an inscription, it contains no vain-glorious vaunting of his virtue, but simply,—“Here lies —, of —, knight, who died —. May God have mercy on his soul!” Who, amongst even the best of us, would not rather have such an epitaph than one declaring that we were all virtue and perfection? When at Tissington, near Ashburne, the lecturer saw an epitaph to a Fitzherbert who died 1619, which amused him very much. It ran as follows:—

“Love, Justice, Honour here  
All at once in one appear.  
Let the reader silent be,  
And do homage on his knee  
To this Reverend Esquire,  
Yt hath now his full desire  
Of that peace he ever loved  
In his life and death approved.  
Layd here with his two loyal friends,  
Most renowned in their ends.”

The idea of asking the stranger who entered that village church to bend the knee, not to God, but to the “Reverend Esquire,” is delightful. But these fine early effigies not only interest us by their admirable workmanship, but they also set us an example of good taste and plain truthfulness in our commemoration of the dead. To the archaeologist that truth and faithfulness makes them especially valuable, for they told him the story of the growth, development, and decline of the defensive armour which in the Middle Ages chiefly exercised the ingenuity and skill of the worker in steel. The mechanical ingenuity and invention which now is applied to the construction of machine guns, torpedoes, and ironclad ships, was then exercised in devising weapons, engines of war, and defensive armour for the human body. It was the same long struggle between arms of offence and armour of defence, and, if we may learn from the struggle that is passed, we may predict that in the future the guns and torpedoes will win the day. It has been usual to divide the history of armour into the period of pure chain mail armour, the period of chain and plate armour combined, and the period of plate armour, admitting a transitional period between each of these; but, although this is a good rough division, still, it was not altogether satisfactory. In the history of armour we find certain periods where there was a type of armour to which all other examples approximate more or less, and that during a considerable period. To this succeeds a shorter period of change and experiment, and after that another type appears. Of course, as in the modern fashion of dress, there were always slow and gradual changes during the reign of the type. The lecturer proceeded, in conclusion, to trace the gradual development and final decadence of armour, as evidenced by monumental effigies, more particularly those of Derbyshire, in reference to which, generally, he said it must be a matter of eternal regret that Charles Stothard did not come into Derbyshire and portray its beautiful effigies in his

\* Visited by the members of the Institute. See p. 148, ante.

work, which may be said to be a continued source of wonder to the student of these remains, by its almost faultless accuracy, which would cause it to remain a pattern and a standard of what such works should be. The Baron de Cossion added, that if what he had said about the effigies of Derbyshire should be an incentive to any able draughtsman to render them useful to all antiquaries, and to preserve them for posterity by accurate delineation, he should feel that he had not spoken in vain. Whoever undertook the work, he would deserve the gratitude of all future students of the military history of this country.

## COAL-SLAG AS A BUILDING MATERIAL.

The first steps in the direction of using coal-slag for building purposes were due to the initiative of certain Lyons builders who wished to find a cheap, durable, and healthy material for the construction of suburban houses upon sites acquired for comparatively short leases, the contingency of occasional partial inundations being also kept in view. The coal-slag was mixed with some slaked lime, and was treated as a concrete. The mass hardened rapidly, and even after a few days the walls were firm enough to support the joist-framings. After the lapse of a month the building was dry. At the time named coal-slag was so plentiful that it could almost be had for the asking, and the cubic foot of wall (including transport, scaffolding, and labour) cost about 1½d. After thirty years' experience, this mode of construction has become so general in Lyons that the necessary transport of coal-slag from a certain distance has raised the cost to about 3d. per cubic foot.

According to the *Wochenschrift* of the Austrian Architects' and Engineers' Association, the original proportion for mixing was four parts of slag to one part of lime. At first fat lime was used, and later on hydraulic lime; but, in order to obtain greater strength, it is recommended to increase the proportion of lime and use white lime. The ramming is best effected in layers 6 in. thick. The walls are usually made 1 ft. 7½ in. thick, but they can be thinner if the burden they have to support is light. Solid party-walls can be made 6 in. to 8 in. in thickness by ramming the mixture between boards, or by forming out of it bricks, which can be built into a wall after drying. For a long time this style of building was confined to works of an unimportant character, but within the last two years it has been used by various architects (particularly M. A. Louvier, of Lyons) for public buildings and for private houses of large size.

The strength and fire-resisting properties of the composition in question have been successfully demonstrated by M. Louvier in the course of experiments made by him on a relatively large scale. It is further recorded that a nitrobenzene factory near Lyons was burned down, the violence of the conflagration even melting part of the machinery. The walls (made of this slag mixture) were unconsumed,—their surface having a glazed appearance,—and sustained without repair the ceiling and roof of the restored building. Similar results are said to have been demonstrated by the burning of the Célestins Theatre at Lyons.

**People who should Emigrate to New South Wales.**—Those who do not mind working hard when it signifies something better than the workhouse in old age. Those always ready to make the best of their position and regard the difficulties of the present as stepping-stones to the successes of the future. Those who are willing to utilise their practical skill and experience in developing the industrial resources of the colony. Those who are not ashamed to work with the hand as well as with the head. Those who have learned to labour and to wait. Those who can readily adapt themselves to the industrial requirements of the district in which they are residing. Those who believe in achieving independence from small beginnings. Those who wish to reap the fruits of habitual temperance, industry, and frugality. Those who believe that labour is prayer. Those willing to work in the present for independence in the future. Those who, like Mark Tapley, can put a bright face on everything. Those who believe in success based on individual effort.



## OBITUARY.

**Mr. R. W. Sprague.**—We regret to record the death of Mr. Robert Winter Sprague, the head of the well-known Lithographing firm of Sprague & Co. Mr. Sprague died on July the 31st, in his 51st year, and was buried at Croydon Cemetery on the 5th of this month. Mr. Sprague had been invalided for some months previous to his death. As most of our readers are aware, he was the inventor of one of the best and most reliable processes for reproduction by lithography from coloured drawings and photographs; and succeeded not only in producing good results, but in producing them with speed and certainty; a quality which none of the various would-be imitators of his method have, as far as we have observed, succeeded in emulating.

**The Rev. Henry T. Ellacombe, F.S.A.**—It is with much regret that we record the death of the Rev. Henry Thomas Ellacombe, Rector of Cylst St. George, which took place at the advanced age of 95 years, at the St. George's Rectory, on the 30th ult. The deceased was educated at Oriel College, Oxford, and took his degree of B.A. in 1812, and M.A. four years later. He was ordained Deacon in 1816 by the then Bishop of Exeter, and Priest in 1817 by the Bishop of Gloucester. From 1816-17 he was Curate of Cricklade, and upon leaving that parish he became Curate of Bitton until 1835, when he became Vicar of Bitton. In 1850, he was appointed to the living of Cylst St. George, which he held until his decease. Of the Manor of Bitton and the parish of Cylst St. George he published interesting histories. As many of our readers will know, he took a deep interest in campanology, and was the author of several works on the subject. In 1867 he published "The Bells of Devonshire," and in 1871 a supplement thereto, with practical remarks on bellfries and ringers. "The Bells of Exeter Cathedral" came under his notice in a most interesting edition in 1874. "Bells of Somersetshire" and the "Voice of Church Bells" (a sermon) are the titles of other works by the rev. gentleman. It is stated that he was to have been an engineer, and for some time was a pupil of Brunel's, who thought highly of him.

## THE BUILDERS' ACCIDENT INSURANCE (LIMITED).

The fourth annual meeting of this Company was held on Wednesday, the 29th ult., at the offices, 27, King-street, Covent-garden. Mr. F. J. Dove in the chair. The report of the directors for the year ending the 31st of May, 1885, contains the following passages:—

"In placing before you your report for the past year the directors would remark that during the four years the company has existed they have not only lowered the rate of premium from 6s. 6d. to 4s., but they have paid bonuses amounting in the aggregate to 1,736l."

Owing to the slackness of trade and other causes there has been a considerable falling off in the amount of renewal premiums; this, however, has been more than counterbalanced by new business.

The number of accidents reported during the year ending the 31st of May, 1885, has been only 354 as against 549 during the previous year, but your directors regret to say they have been of a much more serious character, and have resulted in a cost to the company of 2,553l. as against 2,011l. for the year ending 31st of May, 1884.

As many of the members are no doubt aware, the building business in the provinces, more especially in the larger towns in the north, is carried on upon a different system to that obtaining in the metropolis, viz., by separate contractors working on the same building. In the expectation that it will tend to largely increase the company's business in the northern district, the directors, without increasing the premium, have undertaken the extra risks thereby incurred.

The accounts show that, after providing 2,420l. for unsettled claims and unexpired risks, and the amount requisite for all known liabilities, an addition of 1,000l. to the reserve fund (making it 4,000l.) can be set aside."

The Chairman, in moving the adoption of the report, expressed his regret at the absence of the Chairman (Mr. Stanley G. Bird), who had gone on the Continent for the benefit of his health. The members have reason, on the whole, to congratulate themselves that there had been no retrogression with regard to the business, though the character of the business, to a certain extent, was such as induced the directors to proceed very cautiously. The full amount of liabilities which have come in of late are far in advance of those with which they had hitherto had to deal, owing probably to juries sympathising so strongly as they do with the workmen. The directors, therefore, had decided, after due consideration, that it will be far better on this occasion not to give a bonus, but to devote what surplus they had in hand

(1,000l.) to the reserve fund. The compensation for accidents had been heavier, though the cases had been very much fewer than on former occasions. The principal thing that has occupied our attention during the year has been the question of taking greater risks. As a company, they were very anxious and desirous that the whole of the builders of London and also the builders all over England should have every inducement to insure with them, hence they had placed themselves in the very best position they could to induce builders (who seemed at present to overlook the mutual character of the Company because the premiums were slightly lower in some other companies).

Six of the members of the Board retired, and Mr. Holme is about to retire from business, and consequently from the position he occupies as vice-chairman and as a director. The Employers' Liability Amendment Bill, now before Parliament, and of which notice is taken in the report, is chiefly directed to contracting one's self out of the Act. The Bill also deals with another much more serious point with regard to doing away with the six weeks' notice in case of injury. No body of reasonable men could expect Parliament to do that; at any rate, master builders would watch the Bill closely, and in doing so shall have the co-operation and help of various other associations.

Mr. Bartlett seconded the motion, which was agreed to.

Mr. S. H. Holme then proposed: "That a further sum of 1,000l., as proposed by the Board, be carried to the reserve fund." This was seconded by Mr. Thomas Patrick, and carried unanimously.

Mr. Alderman W. Brown then moved:—"That the sum of 500l. be devoted to the remuneration of the directors for their services during the past year." This was seconded by Mr. W. Nicholson and carried unanimously.

Mr. James Greenwood proposed:—"That the following six gentlemen, who retire from the Board and have signified their willingness, be re-elected, viz.,—Messrs. F. J. Dove, J. S. Jones, W. Nicholson, Thomas Patrick, W. Southern, and J. C. White." Mr. H. H. Bartlett seconded the resolution, which was carried.

Other resolutions of a formal character having been agreed to, the proceedings terminated.

## CONTRACTOR AND SUB-CONTRACTOR.

At the Lambeth County Court, on Tuesday last, before his Honour Judge Pitt Taylor, a case was heard in which Florence Pitcher and Thomas Pitcher (father and daughter) sued Mr. Richard Martin Priestley, a builder, of Doris-street, Kennington, for damages for injuries caused by the negligence of defendant's servants on Tuesday, the 17th of March last, in causing a scaffolding, erected in Lewis-road, Coldharbour-lane, Brixton, to fall upon the female plaintiff, whereby she was seriously injured, and her father was put to great trouble and expense.

Mr. Atherley Jones appeared for the plaintiffs, and Mr. Lewis Glyn for the defendant.

Mr. Jones, in opening, stated that on the day in question Florence Pitcher, who was about ten years of age, was wheeling a perambulator, containing a child, past some scaffolding, which had been erected in connexion with the construction of six houses in the thoroughfare above mentioned, when it fell upon her, causing the injuries which were the subject of the action.

The injuries were not disputed by the defendant, and Mr. Glyn proceeded with the defendant's case, observing that the defendant employed a sub-contractor, named Newman, to do the brickwork in connexion with the houses at 37, per rod, including putting up and taking the balance for putting up and taking down the scaffolding. The price was included the scaffolding. He had nothing whatever to do with the scaffolding, nor had any of his men.

Mr. Richard Pearson, foreman to the last witness, said that after the accident he found two stays had been taken out, and something had been done to the putlog. He believed the things had been moved for the purpose of pointing the reveals.

Mr. James Newman, master bricklayer, deposed to contracting to do the work at the price mentioned. He always included the scaffolding work in his price. The scaffolding was properly erected. He had to go to the defendant's foreman for orders with regard to the brickwork, and if he (the foreman) had told him to erect the scaffolding in a different manner he

would have done so. The uprights rested on plates; but if the foreman had told him to put them in tubs or in the ground he would have done so.

Harry Butt and Robert Potter were then called on behalf of the plaintiff, with a view of showing that the braces and stays were not moved by Newman's men, and the latter witnesses said that he assisted one of the plaintiff's carpenters to remove one stay in order to put in some sashes.

John Shirley, the carpenter in question, denied removing the brace, and said he remonstrated with Potter for having done so.

His Honour said the action had unfortunately been brought against the wrong person, and gave judgment for the defendant, with costs.

It was understood that the plaintiffs intend proceeding against the sub-contractor, Newman.

## LINES OF FRONTAGE.

At the Woolwich Police-court, Edward Nathan, of High-street, Sutton, builder, was summoned by the Metropolitan Board of Works for unlawfully erecting certain buildings beyond the general line of buildings on the east side of Lee-road, between Cresswell Park and Blackheath, without the consent in writing of the Metropolitan Board of Works, contrary to sec. 75, of 25 & 26 Vic., cap. 162.

Mr. Thos. Burton appeared for the Metropolitan Board of Works, and Mr. Glyn for the defendant.

The facts of the case were as follows:—In 1883, one Tucker commenced the building of three shops in Tranquil Vale, Lee-road; and, upon the Board being informed of this, the Superintending Architect was instructed to define the line of buildings, which was done, and it was then found that the same were some 30 ft. in advance of the line defined by him. Notices were then served upon the builder. Subsequently Tucker absconded, and the works were stopped. In June, 1885, the defendant commenced to finish the buildings, and proceedings were commenced against him.

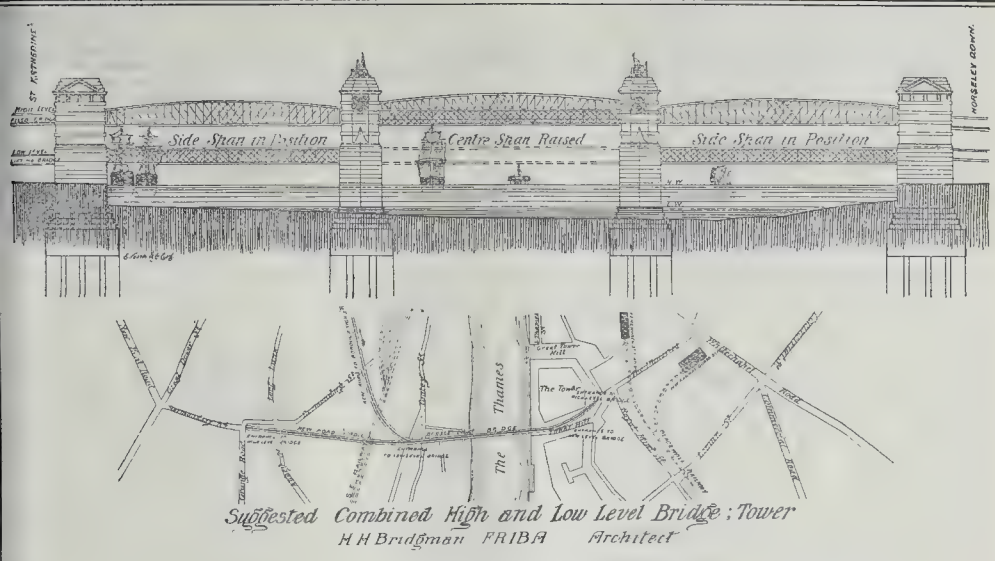
Evidence having been called as to these facts, Mr. Marsham made an order to pull down such buildings as projected beyond the general line, with costs.

## THE IMPROVEMENT OF LONDON MASONRY.

Sir—The decay of the masonry of freestone buildings in the noxious atmosphere of London is but too well known to architects. The remedy has been proposed, but has not yet been accepted by practical and scientific men, although the time would seem to be ripe enough. Meanwhile, does not a recent letter from the Eternal City offer an example that might be followed in London? The great Emporium built by Marcus Emilius Lepidus, on the banks of the Tiber, near the Aventine, has been discovered. Part of the quay was found in 1868. Here lay hundreds of immense blocks of rare marbles, breccias, and granites, just where they had been discharged from the galleys some fifteen or twenty centuries ago,—Parian, pure as ivory; Numidian, of golden yellow; Karystos, striped with green and white; pink granite from Syene; black diorite from Ethiopia; green and red porphyries from Nubia; Phrygian pavonazetta; marble, white as snow, from Mount Pentelicos. These, as we know, were all more or less commonly used in the magnificent edifices of ancient Rome.

Now, as modern buildings in our own metropolis, for want of better materials, are so imperfectly built that they require restoring in the lifetime of those who may have seen them rising from their foundations; as it is not necessary to go out of the United Kingdom for materials of everlasting durability, even in London, and of beauty rivaling those named above, and as the present trade in these is a close monopoly for high prices, is it not an urgent necessity that the British Government should establish an emporium on the banks of the Thames, and no longer permit perishable structures to be erected for the nation? Transport which would otherwise be lying idle in dock might ship supplies at the nearest ports to the different quarries, and these might be sold to contractors for Government work at cost price. Thus, future buildings in London, belonging to the nation, faced with white or nearly white granite, from Par or Cheesewring, in Cornwall, or Okehampton in Devon, and enriched with the coloured porphyries and syenites from Ireland and Scotland, would not only be constructed in a durable manner, but would be executed at the lowest possible cost to the nation. A reliable comparative estimate shows that the cost need not exceed the expenditure on existing perishable freestone buildings. The use of special machinery has reduced the ex-





expense of surfacing hard materials to that for manual labour on soft stone.

When these beautiful materials are available, styles of architecture unattempted before in this country could be introduced. Eastern Romanesque, with its domes; Siculo-Norman, with its pointed arch and arabesques; thirteenth-century Italian or Cosmati, or that rich phase of Renaissance, the Cinque-Cento, with its coloured marbles, as seen at the Dario Palazzo, and the Church of the Miracoli, Venice; the Palazzo Giraud, Rome, and at the Certosa, Pavia. The rich geometrical mosaics of these styles would be a striking and charming innovation.

T. R. A.

# PROPOSED BRIDGE ACROSS THE THAMES AT THE TOWER.

SIR,—The Select Committee of the House of Commons, presided over by Colonel Stanley, has inquired into the merits of the Corporation scheme for the construction of a new bridge across the Thames at the Tower of London, the preamble of which has been proved, subject to certain clauses being introduced to the satisfaction of the Committee in regard to the openings of the bridge for the accommodation of the river traffic, the most important of these being that the centre span of the bridge shall be continuously open whether vessels are passing or not, at or about the time of high water, for a specified period to be fixed from time to time by the Thames Conservators.

This means that the bridge would be entirely closed to vehicular traffic for a period of about four hours at every tide, reckoning from half-tide to half-tide, during which time alone the larger ships can navigate this part of the river. This would be without doubt a very great drawback to the utility of the bridge; consequently I have put forward the suggestion that a high and low-level bridge combined should be constructed in such a way that there might be a continuous traffic across the river by the upper bridge, whilst the lower may be lifted by hydraulic rams to the underneath side of the upper for the convenience of the shipping, either one or the whole of the three spans being so lifted for that purpose, thus leaving the pool virtually unobstructed. It is calculated that each span, weighing approximately about 250 tons, can be lifted by four 14-in. hydraulic rams, capable of raising any, 1,100 pounds to the square inch. The bridge would be divided into three equal spans of 257 ft., the piers between being 40 ft. each.

The approach to the high-level bridge on the north side of the river would be from Little Tower Hill, opposite the Minorities, through the gardens at the north-east corner of the Tower, whilst on the south side the bridge would be

continued by a viaduct passing over the South Eastern Railway and ending at Grange-road in a line with Bermondsey-road, which would at once bring the main arteries of Great Dover-street and New Kent-road in direct communication with the new bridge.

It is also suggested that, as the approach to the low-level bridge on that side would commence at Tooley-street, a new roadway should be constructed through Bermondsey, ending at Borough-road, by St. George's Church, thus linking this new bridge with all the other bridges. The height of the underside of the high-level bridge is drawn to show 65 ft. clear, the gradients of the approaches being 1 in 50 and 1 in 40 respectively.

A slight increase in the gradients would give an additional height of 20 ft. to the high-level bridge should it be imperative that this addition be obtained.

The height of the large proportion of the ships that pass this point at high water does not exceed 65 ft., and if the top masts of those, being comparatively few, which are higher, were lowered, 65 ft. would be found sufficient for all ships passing west of this point.

The estimated cost of the City Architect's bascule bridge is 750,000l.; but this amount, it was admitted in evidence, would be insufficient for the purpose considering the alterations that have to be made, the piers, for instance, being increased from about 40 ft. to 70 ft. This sum is exclusive of the approaches; the cost of the construction of the suggested combined high and low-level bridge itself, which is much simpler in character, would be considerably less. All points considered, it is most important at this juncture to secure the kind of bridge that shall be of the greatest use to the metropolis generally.

The construction of a bridge at the Tower would probably be the precursor of considerable improvements on the south side of the river, and the two lines of streets indicated on the plan would bring the locality of the Elephant and Castle into easy communication with the docks on the north side, whilst there would be direct communication from the south-west to the East-end across Lambeth and Westminster Bridges, and consequently London Bridge would be very materially relieved of the enormous traffic that now passes over it. This is the first occasion that a combined high and low-level bridge over the Thames has been suggested since the question has been under consideration, now extending over a period of about twenty years, and there is no doubt very important metropolitan improvements could be effected in conjunction with it. It is questionable whether a low-level bridge, after a year or two, would not have to be entirely closed to be capable of taking the larger amount of traffic that must necessarily follow its construction.

H. H. BRIDGMAN.

## CHURCH-BUILDING NEWS.

Staines.—The Parish Church of Staines is a comparatively modern structure, and was built at the worst period of church architecture, in 1828, and, bad as it is, being little more than a pewed and galleried room, cost the sum of 12,000l. The principal improvements just effected are the addition of a new apse and organ-chamber, raising the chancel floor by two steps above the nave, and three more beyond; the provision of a new altar and reredos, pulpit, desks, credence, lectern, &c., and the enlargement of the vestry, removing the flat plaster ceiling of the chancel and opening the timber roof, and panelling and remodeling the same. The chancel arch which replaces the narrow depressed Tudor opening surmounted by the Royal Arms (in plaster), is of a good width and as lofty as could be made. It is of terra cotta in several orders, heavily enriched. The old east wall has been pierced by a second arch of similar character leading to the apse, which has a semi-domed roof, and is lighted by three small lancet windows, the centre one of which has been glazed with stained glass through the kind liberality of their Imperial Highnesses the Crown Prince and Princess of Germany and their children, and is placed as a memorial to Miss Byng, who was for many years with them, and who is interred in the neighbouring cemetery. The ground of the semi-domed roof is coloured in a soft blue with gold stars and rays, and facing the nave is a colossal figure of Our Lord in Glory holding the Book and attended by adoring angels, while from the throne proceed the waters of life encircling the dome, below which are the words, "He shall come again in glory to judge both the quick and the dead."

The walls of the apse are treated in a warm cinnamon buff with light red-jointed masonry blocks and scrolls, the lower portion having a high dado of deep peacock blue. The subject of the east window is Our Lord wearing the Crown of Thorns and scarlet robe, and displaying the five wounds. The reredos, which is of alabaster inlaid with green serpentine, has a circular panel in the centre, the subject being the Lamb of God standing on the mount between the seven golden candlesticks; four smaller panels surround this with the evangelistic symbols, all painted on a gold ground. The gradine, or super-altar, is of white statuary marble. The altar is well raised, and has a white silk frontal, richly embroidered, and crimson velvet super-frontal, both the reredos and frontal being gifts from the daughters of the vicar. The pulpit, which stands on the north side, is a gift from a family long resident in the parish, and is of oak, with panels and tracing of sequoia wood. Regret is expressed that funds have not been forthcoming to effect further improvements in the nave; the ugly



galleries and the high square pews still remain, although much has been done to relieve the general hideousness, the walls and flat ceiling and gallery-fronts being decorated in colour, and the organ brought down and placed in a chamber on the south side of the chancel. A scheme is in existence for the improvement of the nave, but as some of the pews are freehold, there are difficulties in the way. All the work and decorations have been designed by Mr. George H. Birch, F.S.A., the architect of the Old London Street at the Inventions Exhibition, of Devereux-chambers, Temple, and has been carried out by Mr. John Fowell, builder, of Staines; the stained glass and painting being executed by Messrs. Campbell, Smith, & Co.; and the pulpit and reredos carved by Mr. Peter Cooke; the warming, lighting, and ventilating arrangements are by Mr. Apted, of Staines; and the brass lectern was made by Messrs. Starkie Gardner.

**Tudeley (Kent).**—Tudeley Church, which forms a portion of the ancient chapelry of Tudeley-cum-Capel, granted by Richard de Thurdeley and others to the prior and canons of Tonbridge in 1239, has just been re-opened for Divine service, after having been closed for the purpose of repairs rendered imperatively necessary, owing to the serious dilapidations caused by insufficient foundations on a clay soil. A portion of the north aisle has been rebuilt, and a new chancel arch inserted. The works have been carried out by Messrs. George Funnell & Sons, builders, of Tonbridge, under the superintendence of Messrs. Wadmore & Baker, architects, of London.

**Walsend.**—The foundation-stone of a new church to be dedicated to St. Luke, from designs by Messrs. Oliver & Leeson, architects, of Newcastle-upon-Tyne, was laid on the 23rd of July. The church will consist of nave, chancel, north and south aisles, south transept, organ-chamber, and vestries, affording accommodation for about 550 sittings. The style of architecture adopted is Early English. The work will be carried out entirely in stone, with snock walling and chiselled dressings externally, and stone dressings and stuccoed walls internally. The tower and spire together will rise to the height of about 140 ft. from the ground. The light will be admitted principally by means of the clearstory windows and windows placed high up in the chancel and west walls of the church. Small windows of three lights with internal arcing will light the side aisles, but as far as possible upper light will be depended upon. Vertical inlet wall shafts, in addition to the window ventilators, are provided for the admission of fresh air, and a lofty *flèche* which surmounts the nave roof will be utilised for the extraction of the vitiated air. The total cost of the church, exclusive of the cost of the site, but including heating, lighting, and boundary-walls, will be about 6,000. At present only a portion of the work has been ordered, viz., the nave and one aisle. The contract for this has been let to Messrs. N. & R. Reed, of Newcastle-upon-Tyne, for the sum of 2,400l., and Mr. G. Relph has been appointed by the committee to act as clerk of the works.

### Books.

*Pattern-making: a Practical Treatise, embracing the main Types of Engineering Construction.* By a FOREMAN PATTERN-MAKER. London: Crosby Lockwood & Co.

THIS book is evidently written by a man who understands and has practised what he has written about, and in this age of "book construction" this is no mean praise. Another good point about it is that he says what he has to say in a plain, straightforward manner, and we have not, as in many cases, to dig down through a mass of more or less "clever" but involved verbiage to get at the grains of practical information which may or may not be found below. The book commences with some practical notes as to the designing and making of toothed-wheel patterns, with a description of Professor Willis's very useful odontograph scale for obtaining the approximate radii and centres for studding the faces and flanks of teeth. Further on the author says:—"With respect to thickness of arms, rim, boss, &c., rules are somewhat arbitrary. Something will also depend on the special work the wheel has to do." A very great deal depends on what work the wheel has

to do; for instance, the author, we presume, would not recommend the use of a wheel that would suit the back gearing of a lathe for use in the intermediate feed gear of a four-outer wood-planing machine. The material of which the wheel is to be made is also an important factor in the case, as, should steel, gun-metal, or phosphor bronze be used, as is now frequently the case in the best practice where the duty is severe, the construction of the wheel may be very considerably modified. Chapters on spur and bevel gearing follow. These are short, and contain nothing very new; but old advice, if good, will bear repeating, and therefore we agree with the remark, "that sharp corners in all castings subject to much stress should be avoided."

We conclude the author has not extended his remarks on spur and bevel gearing to any great length, owing to the fact that of late years toothed gears have rapidly given way in favour of belt gearing, especially where high speeds are required. Concise instructions are now given as to setting out worms and worm-wheels. To do this correctly and secure continuous and even contact between worm and wheel is not an easy matter. The author's plan for getting the correct shape on the other faces, by putting the worm in the lathe, and re-leading it, and cutting the worm-wheel teeth until the lead shows contact everywhere, may be a shorter plan than setting them out properly, but it is certainly a rule-of-thumb. The author's remarks on mortise wheels are good; he, however, recommends apple-tree wood as the best for toothed wheels: this hardly accords with our experience, which is in favour of horn-beam, as being generally more reliable as regards quality.

Chapters 10 and 11 contain some capital instructions as to making cylinder and bed-plate patterns together with some remarks on castings, buckling, or bending when cooling-strap pulley patterns are now dealt with, and some notes on miscellaneous engine work follow, which should be useful to young pattern makers, as line illustrations of many of the parts are given with adequate instructions as to making. The author's remarks on making patterns for columns and pipes will repay perusal, and that there is ample scope for improvement in the design of many of the so-called ornamental columns used in building construction, our readers will probably agree with us. Our space precludes us noticing in detail the various other chapters on making patterns for lathes, chain barrels, screws, water-wheels, &c., but the instructions given are clear, and should be serviceable.

We notice the author remarks that glue joints are made, either with the trying plane or with a longer plane called a "joiner." We must not forget, however, that in nearly all pattern shops of any extent hand-fed surface planing machines, for making glue-joints, taking out of "wind," levelling, chamfering, &c., are used, together with panel planing and thicknessing, dimension sawing, and other machines, by which patterns of the extreme accuracy, both as regards thickness, shape, and weight, can be prepared. This being so, to make the next edition of his book more complete, we would suggest to the author the advisability of adding an additional chapter on pattern-making machines and their uses. A glossary of technical terms for young students would also be of considerable service. Although it must be admitted that no art or handicraft can be properly taught through the medium of a book, there can be but little doubt that a well-written Technical Guide—such as the one before us—can be made of very great service if carefully studied, and can be used as the base on which to build our information. We, therefore, cordially recommend the author's treatise to engineering students, young journeymen, and others desirous of being initiated into the mysteries of pattern-making.

*Hydraulic and other Machinery.* Chester: The Hydraulic Engineering Company, Limited.

Although this book is evidently intended for a trade catalogue, it departs very much from the beaten track in such things. It contains a large number of most excellent photographic reproductions of hydraulic cranes, lifts, pumps, water-motors, riveters, and other machines connected with water power; these illustrations convey even to the non-technical mind a very clear idea of what is represented. Several of the machines illustrated have already been

described in the *Builder*, in our notice of "Hydraulic Machinery" at the Inventions Exhibition. Some notes on the public supply of hydraulic or water pressure power will be found; and as this idea becomes gradually developed we predict for it in large towns an ever-widening field of operations, as for many purposes, such as lifting, working dock-gates, bridges, riveting, and various workshop and warehouse requirements—it should be both cheap, safe, and reliable power. Although the utilisation of water pressure has made considerable progress of late, it is to us a matter of some surprise that its commercial development has not earlier attracted the attention both of engineers and users.

### RECENT SALES OF PROPERTY. ESTATE EXCHANGE REPORT.

| JULY 27.                                                                                       |        |
|------------------------------------------------------------------------------------------------|--------|
| Hornsey-lane—The residence, "Red Bank," 68 years, ground-rent 30l. ....                        | 22,700 |
| By W. R. WATKINS & GREEN.                                                                      |        |
| Leatherhead—Eighteen plots of freehold land .....                                              | 2,845  |
| The freehold residence, "Bridge House," and a plot of land .....                               | 540    |
| Tulse Hill—128, Newwood-road, freehold .....                                                   | 1,300  |
| A plot of freehold land adjoining .....                                                        | 300    |
| Dulwich—Two plots of freehold land .....                                                       | 440    |
| Two plots of freehold land in Rosedale-road .....                                              | 800    |
| By FULFORD & FULFORD.                                                                          |        |
| Islington—19, St. James's-street, 40 years, ground-rent 5l. ....                               | 390    |
| City—22, 23, and 24, Bucklersbury, freehold, area 2,022 ft. ....                               | 15,000 |
| By COOPER & BULL.                                                                              |        |
| Baywater—131 and 131A, Queen's-road, and 1, 3, and 5, Porchester-gardens, freehold .....       | 8,000  |
| Camden-road—The Camberwell Brewery, freehold, area 44,500 ft. ....                             | 3,800  |
| By CHARLES & TEBBS.                                                                            |        |
| Kenilworth—49, Prince of Wales-road, 55 years, ground-rent 54. 5s. ....                        | 435    |
| Finchley—1, 2, and 3, The Broadway, 88 years, ground-rent 33l. ....                            | 1,800  |
| 4, 5, and 6, The Broadway, 88 years, ground-rent 31l. 10s. ....                                | 1,700  |
| Reversion to Nov. 15 to 24, Palmerston-road, term 78 years .....                               | 109    |
| By INMAN & CO.                                                                                 |        |
| Chelsea—26, Radnor-street, 57 years, ground-rent 2l. ....                                      | 405    |
| Kilburn—26, Princes-road, 77 years, ground-rent 6l. ....                                       | 280    |
| By FLETCHER & SON.                                                                             |        |
| Clapham—50, 52, and 55, Wyke-street, freehold .....                                            | 520    |
| Peckham, Queen's-road—"The London and Brighton Railway Hotel," 60 years, ground-rent 90l. .... | 9,500  |
| Thornton Heath—The freehold residence, "Brooklands" .....                                      | 1,300  |
| Peckham—A plot of freehold land in Birkbeck-road .....                                         | 75     |
| Peckham—Dorothy, "Percy," and "New England" Villas, freehold .....                             | 1,070  |
| 11 and 12, Francis-place, freehold .....                                                       | 470    |
| Ground-rent of 9l. 10s. a year, reversion in 89 years .....                                    | 205    |
| Nonhead—51 to 79 odd, Kirkwood-road, freehold .....                                            | 4,165  |
| 29 to 49 odd, Kirkwood-road, 84 years, ground-rent 45l. 13s. ....                              | 2,000  |
| By E. OWEN.                                                                                    |        |
| West Hampstead—30 and 32, Gascony-avenue, 97 years, ground-rent 18l. 16s. ....                 | 750    |
| 5, Fortune-green, part freehold and part copyhold .....                                        | 310    |
| JULY 28.                                                                                       |        |
| By DAVEN & CO.                                                                                 |        |
| Harwich—Freehold wharf and warehouses, area 11,700 ft. ....                                    | 1,000  |
| By P. D. TUCKER.                                                                               |        |
| Edmonton, Silver-street—Freehold house and out-buildings .....                                 | 850    |
| By DEBENTHAM, TEWSON, & CO.                                                                    |        |
| Lee, High-road—A rental of 65l., term 41 years ...                                             | 1,300  |
| 60 and 62, Church-street, 41 years, ground-rent 14l. ....                                      | 420    |
| Ealing Dene—The reversion to 1 and 2, Oak-villas, term 70 years .....                          | 75     |
| Romford—"Eastbury Lodge," and 6a. 8r. 9p., freehold .....                                      | 2,500  |
| By E. ROBIN & HINE.                                                                            |        |
| Chelsea—83, Robert-street, 31 years, ground-rent 7l. 2s. ....                                  | 545    |
| 22, Lydney-street, 40 years, ground-rent 6l. ....                                              | 980    |
| By F. JOLLY & CO.                                                                              |        |
| Row—176, Turner's-road, 75 years, ground-rent 4l. ....                                         | 200    |
| Peckham—168 and 170, Camden-grove, 77 years, ground-rent 12l. ....                             | 420    |
| Coldharbour-lane—16 and 18, Levis-road, 57 years, ground-rent 8l. ....                         | 275    |
| JULY 29.                                                                                       |        |
| By RUSHWORTH & STEVENS.                                                                        |        |
| Battersea—3, Stammer-street, 92 years, ground-rent 12l. ....                                   | 205    |
| Gower-street—21 and 23, Little Gower-place, 23 years, ground-rent 4l. 4s. ....                 | 165    |
| JULY 30.                                                                                       |        |
| By ROBINSON & REID.                                                                            |        |
| Strand—No. 278, freehold, area 710 ft. ....                                                    | 3,525  |
| By INMAN, SHARP, & HARRINGTON.                                                                 |        |
| Islington—Nos. 328 and 330, Essex-road, freehold .....                                         | 2,410  |
| By W. & F. BOONROD.                                                                            |        |
| Stoke Newington—29, Fountain-road, 91 years, ground-rent 10l. ....                             | 610    |
| Walthamstow—1 to 12, Ringwood-terrace, 94 years, ground-rent 42s. ....                         | 1,500  |
| By W. A. BLACKMORE.                                                                            |        |
| Lambeth—5, York-road, 38 years, no ground-rent ..                                              | 750    |
| 154, Waterloo-road, 38 years, no ground-rent .....                                             | 615    |
| 134, Lower Kensington-lane, Duchy of Cornwall lease, and a plot for 30 ft. ....                | 330    |
| Sydenham, Mayrow-road—"Grove Villa," freehold ..                                               | 1,500  |



|                                                                                                                                                                                                                 |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| By MADDOX & SON,<br>at Home—"Sutton Lodge," and 4a. Ir. 19p.,<br>freehold .....                                                                                                                                 | £3,700 |
| By E. W. RICHARDSON,<br>ord Hill—1, 2, and 3, Gladstone-terrace, 93<br>years, ground-rent, 37l. 18s. ....                                                                                                       | 800    |
| aden—1 to 7, Stonebridge Cottages, 84 years,<br>ground-rent 20l. 10s. 6d., term 7 years .....                                                                                                                   | 450    |
| ery—Coppold ground-rent of 37l. 10s., term<br>7 years .....                                                                                                                                                     | 82     |
| ryhold ground-rent of 6l. term 47 years .....                                                                                                                                                                   | 118    |
| By FRANK, 100, & FRANK,<br>m—1 to 8, Thornton Cottages, freehold .....                                                                                                                                          | 1,900  |
| Bedford-place, freehold .....                                                                                                                                                                                   | 1,200  |
| avenwood-place, and cottages, freehold .....                                                                                                                                                                    | 1,750  |
| o 6, Balham High-road, and 1, Holly-place,<br>freehold .....                                                                                                                                                    | 3,150  |
| nd 3, Holly Grove, freehold .....                                                                                                                                                                               | 750    |
| nd 37, Oldridge-road, freehold .....                                                                                                                                                                            | 1,380  |
| ehold ground-rent of 41l. 19s., reversion in 42<br>years .....                                                                                                                                                  | 1,235  |
| By TURNER, RUDON, & TURNER,<br>Hostley—The residence, "Stoneland," and<br>50 acres .....                                                                                                                        | 5,000  |
| he White Hart Inn, freehold .....                                                                                                                                                                               | 800    |
| By DRIVER & CO.,<br>table, near—"Clay Hall Farm," 142 acres,<br>freehold .....                                                                                                                                  | 2,175  |
| By WORSFOLD & HAYWARD,<br>r—The Maxton Brewery, freehold .....                                                                                                                                                  | 1,600  |
| lot of freehold land .....                                                                                                                                                                                      | 220    |
| tion Farm, and 33a. Ir. 20p., freehold .....                                                                                                                                                                    | 1,700  |
| he Hare and Hounds' beerhouse, freehold ..                                                                                                                                                                      | 350    |
| nclosure of land, 24a. Or. 23p. ....                                                                                                                                                                            | 1,027  |
| By BROAD, PRITCHARD, & WILTSHIRE,<br>gate—The residence, "Orchard Lodge," free-<br>hold .....                                                                                                                   | 1,600  |
| By SINCLAIR & SON,<br>rton—25, St. John-street, 41 years, ground-<br>rent 5l. ....                                                                                                                              | 355    |
| New North-road, 41 years, ground-rent<br>2l. 8s. ....                                                                                                                                                           | 400    |
| Packington-street, 41 years, ground-rent<br>4l. 6s. ....                                                                                                                                                        | 635    |
| By E. STURSON,<br>ham—43 and 45, Albert-road, 81 years, ground-<br>rent 10l. ....                                                                                                                               | 380    |
| erwell—216 to 222 even, Camberwell New<br>road, 19 years, ground-rent 30l. ....                                                                                                                                 | 1,140  |
| ondsey—102 to 118 even, Abbey-street, free-<br>hold .....                                                                                                                                                       | 8,445  |
| to 64, Fendall-street, freehold .....                                                                                                                                                                           | 1,370  |
| Grange-road, freehold .....                                                                                                                                                                                     | 500    |
| By NEWSON & HARRIS,<br>erton—2, Bridge-street, freehold .....                                                                                                                                                   | 240    |
| on—29 to 32, Frances-street, 33 years, ground-<br>rent 24l. ....                                                                                                                                                | 400    |
| John's Wood—130 and 132, High-street, 36<br>years, ground-rent 6l. ....                                                                                                                                         | 775    |
| nd 3, Cochrane-street, 36 years, ground-rent 6l.<br>debenture—28 and 30, Upper Montagu-street ..                                                                                                                | 865    |
| way—1 to 4, James-terrace, 73 years, ground-<br>rent 37l. ....                                                                                                                                                  | 455    |
| o 6, John-street, 73 years, ground-rent 8l. ....                                                                                                                                                                | 1,310  |
| o 5, James-street, 73 years, ground-rent 8l. ....                                                                                                                                                               | 950    |
| o 18, James-street, 73 years, ground-rent 8l. ....                                                                                                                                                              | 925    |
| nes-street, an erection for a public-house, 73<br>years, ground-rent 7l. ....                                                                                                                                   | 820    |
| By A. WALTON,<br>ham—43 to 43 even, Darrell-road, 80 years,<br>ground-rent 18l. ....                                                                                                                            | 350    |
| Kent-road—115, Falmouth-road, 9 years,<br>ground-rent 4l. 4s. ....                                                                                                                                              | 450    |
| ing Town—23 to 31 odd, Woudham-street, 78<br>years, ground-rent 13l. 10s. ....                                                                                                                                  | 115    |
| Kent-road—10 to 13, Upper Hall-street, 76<br>years, ground-rent 7l. 12s. ....                                                                                                                                   | 450    |
| ham—1 and 2, Christ Church Villas, 54 years,<br>ground-rent 8l. ....                                                                                                                                            | 600    |
| nd 4, Union Grove, 84 years, ground-rent 8l. ....                                                                                                                                                               | 745    |
| nd 2, Offer-road, 82 years, ground-rent 18l. ....                                                                                                                                                               | 750    |
| urn—161, Malvern-road, freehold .....                                                                                                                                                                           | 700    |
| elease of the "Malvern Stores," term 92 years<br>JULY 30. ....                                                                                                                                                  | 150    |
| By HAMMAN & MATTHEWS,<br>Ham—11, Wellington-terrace, freehold .....                                                                                                                                             | 123    |
| By H. PARKHOUSE & CO.,<br>n—1 and 2, Sunnyside Villas, freehold .....                                                                                                                                           | 610    |
| By BUISS & SONS,<br>oway—16, Magdala-road, freehold .....                                                                                                                                                       | 285    |
| ney road—120, Columbia-road, 37 years,<br>ground-rent 5l. 6s. ....                                                                                                                                              | 260    |
| to 72, Minerva-street, 20 years, no ground-rent<br>By DALE & SON,<br>ton—42, Almsack-road, 89 years, ground-rent 6l.<br>Lawley-street, 80 years, ground-rent 5l. 6s. ....                                       | 175    |
| By T. B. WESTACOTT,<br>Upstead—ground-rent of 6l., reversion in 98 years<br>By PRICKETT, VENABLES, & CO.,<br>ley—The freehold residence, opposite the Green<br>ingate, Bishop's-road—A plot of freehold land .. | 125    |
| By WESTON & SONS,<br>ton—85, Vassall-road, 16 years, ground-rent 4l.<br>Dulwich—24, Corvett-road, 53 years, ground-<br>rent 77l. ....                                                                           | 245    |
| 5, Upland-road, 84 years, ground-rent 77l. ....                                                                                                                                                                 | 230    |
| erwell—16 and 24, Vaughan-road, 56 years,<br>ground-rent 8l. ....                                                                                                                                               | 1,055  |
| By BAKER & SONS,<br>den Town—4, Albert-terrace, 49 years, ground-<br>rent 17l. ....                                                                                                                             | 805    |
| don—10, Church-walk, 50 years, ground-rent 5l.<br>By BAKER & WILKINSON,<br>oway—13, 14, and 15, Scholesfield-road, freehold<br>91, and 93, Duncombe-road, freehold .....                                        | 670    |
| 23 odd, and 46, Nicholas-road, freehold .....                                                                                                                                                                   | 1,605  |
| and 65, Rupert-street, freehold .....                                                                                                                                                                           | 480    |
| b's Conduit-street—Profit rental of 600l., term<br>13 years .....                                                                                                                                               | 300    |

# The Student's Column.

## DESCRIPTIVE GEOMETRY.—PART II.

Find the intersection of a surface of revolution by a plane.

LET P be the cutting plane, and I its intersection with the surface of revolution, of which G<sup>2</sup> is the meridian, A the axis, X the plane of the meridian, parallel to the elevation.

We find the intersection I by means of a series of sections by horizontal planes, H, which cut the plane P along horizontal lines, F, parallel to P<sup>h</sup>, and cut the revolving surface according to circles H<sup>h</sup>; the points, m, where both intersections meet one another, belong to the intersection I of the surface, by the plane P.

The tangent to the curve I in the point m is contained in a plane, Q, tangent to the surface

other words, a torus is what is commonly called a ring. We find it in architecture, both in the caps and bases of columns, in vaults circular on plan, such as the turning quadrant of the subway to the Exhibition buildings of South Kensington and the annular vaulting adopted as an architectural feature in the subway between the high-level railway and the Crystal Palace; vertical rings have been used for the vaulting at both ends of the Hall of Clumber Castle, with the following practical advantages:—Thanks to the arc of generation selected, the surface is a portion of a sphere, and any section of it by a plane gives a circle, so that the penetrations of lunettes and top circular lights fit in quite naturally without the help of groining.

If we draw the torus round a vertical axis, A, we will find that every horizontal section will give us two concentric circles, such as the two circles B<sup>h</sup> and the two circles G<sup>h</sup>. The outer

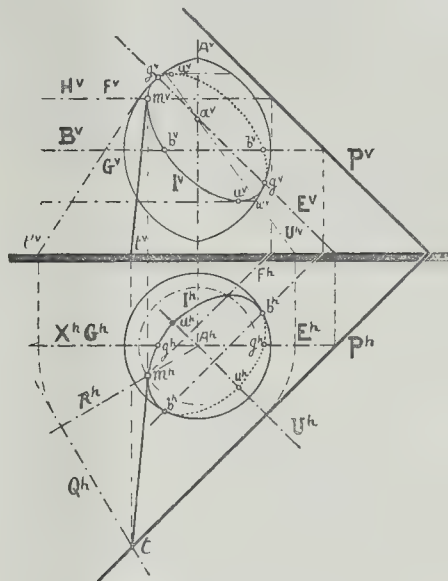


Fig. 140.

in m, and is also contained in the cutting plane, P. The tangent is, therefore, the intersection of the two planes, P and Q. We shall draw, Q<sup>h</sup>, trace of the tangent plane by the method shown in fig. 139; marking the point t where Q<sup>h</sup> cuts P<sup>h</sup>, the projections of the tangent will be t<sup>m</sup> and t<sup>m'</sup>.

The principal points of the intersection with which it is well to begin the drawing are,—the points, b, where the curve is tangent to the outline of the plan; in other words, the points which belong to parallel B, which we find in the same way as any point, m; then the points, g, where the curve is tangent to the outline of the elevation, which we find by drawing the intersection E of the planes X and P (E<sup>h</sup> falls on X<sup>h</sup>, and E<sup>v</sup> is parallel to P<sup>v</sup>); then the points u, the highest and the lowest points of the curve, which are on the meridian, U, the plane of which is perpendicular to the cutting plane, P. The intersection of plane P by plane U passes through the point a on the axis, for the intersections of plane P by all the meridian planes pass through this same point a; in rotating the plane U until U<sup>h</sup> coincides with X<sup>h</sup>, we shall have U<sup>v</sup> passing through a', and will be able to mark thereon U', the new positions of the points u after rotation; rotating back we get the points u themselves. (See fig. 140.)

Draw a torus, the plane Q tangent to it in a given point, m, and its intersection by a plane P.

The methods given above for solving questions relative to surfaces of revolution are applicable to the torus, which is a surface generated by a circle revolving round an axis outside its circumference and in the same plane as itself. In

circle B is called the equator of the torus, the inner circle B is called the throat. The sections made in the torus by the vertica

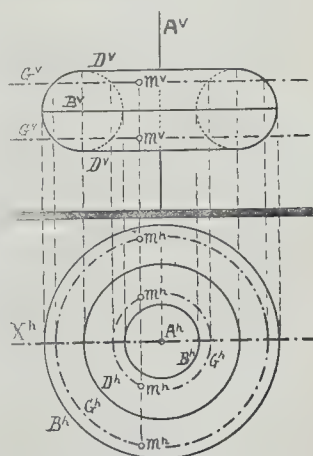


Fig. 141.

plane X are two circles, which, with their tangents, D<sup>v</sup>, form the outline of the elevation; these tangents are the elevations of the highest and lowest parallels, D, of the torus. In drawing

lifts.—We understand that the American Water Company have recently been instructed the Corporation of Manchester to erect one their Standard Hydraulic Passenger Lifts in Town Hall.



the figure we shall mark, as seen on the plan, all the points the elevations of which are above B', and we shall mark, as seen on the elevation, all the points which are on the plan, both in front of X' and also outside the parallel D', for we see on the elevation only one quarter of the total surface of the torus. The ordinary method for finding the projections of points on surfaces of revolution hold good for the torus, only we can see on the figure 141 that each  $m^s$  is generally the plan of two points  $m$ ; on the other hand, one projection,  $m^s$ , may be the elevation of four points  $m$ . (See fig. 141.)

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

6,005, Garden Frames and Lights. C. G. Shea.

The sash is hinged to bars which, at their opposite ends, are hinged to the frame. To allow the sash to be completely closed, the bars are recessed in the frame. The sash when raised may be supported by rods jointed to it at the corners, the ends resting on notched bars, or by bars pivoted at the sides of the frame, a pin being put through them into a hole in the centre of the sash.

6,923, Fireplaces. A. Perkins.

Angle-plates are fixed to the edges of the grate, to prevent the deposition of soot in the space near the wooden jambs and floor-boards, and so lessen the chance of fire by preventing its ignition.

7,104, Picks and the like Tools. A. E. Stainer. Straps or languets are formed in one with the blades or arms of the tool which strengthen the hold of the haft in the eye. These "languets" are of the usual form, but are slightly elongated, to strengthen their hold on the handle of the pick.

16,187, Water-closet Basins. A. C. Billings and A. D. Middleton.

The flushing-pipe opens into a circular passage round the top of the pan, having several holes to supply reserve water, when the flush is completed. The water enters the pan through three separate openings, which spread it and deflect streams to each side and down the centre.

4,259, Chimney Cowl. E. G. Wright.

Apertures are formed near the base of the cowl by piercing the barrel and by arranging truncated cones one above the other. The openings are protected by ears.

5,515, Furnaces and Vessels to resist intense heat. H. D. Pochin.

The sides and flues, and in some cases the beds of the furnaces and the interior of casting ladles are formed of blocks of chrome iron. The blocks may be dressed and the interstices filled with fire-clay, tar, or pitch with a backing of fire-clay or such material as may be formed, and the blocks set more roughly in it.

6,097, Cabinets with invisible cupboards. J. P. Word.

Mirrors are so arranged in cabinets as to enclose a space, and at the same time to reflect the square ends or other parts of the cabinet so as to make it appear empty. Articles may be concealed in the enclosed space.

6,467, Bridges. W. Morris.

The bridge is constructed with an opening portion which swings on the pier. On each side of the opening are piers supporting a fixed bridge at a sufficient height to allow vessels of all kinds to pass underneath without lowering their masts. On the land side of each set of piers, elevators worked by steam or hydraulic power are arranged to transfer the passengers and traffic from one level to another. In another arrangement the fixed elevated bridge is not used. On each side of the opening the projecting part is built at right angles to the bridge, from which vertical shafts are sunk to a tunnel or subway passing under the open part of the bridge. The means for elevating the traffic in this case may be the same as in the first.

## APPLICATIONS FOR LETTERS PATENT.

July 24.—8,931, W. Bruce, Water-closet Apparatus and Mode of Connecting Pipes.—8,952, J. Cowland, Apparatus for Locking Ladders or Steps.

July 25.—8,968, W. Buchan, Improvements in Water-closets.—8,980, J. Sumner and E. Higginbotham, Improvements in Fire Grates.—8,989, O. Hertrumpf, Brick Kilns.

July 27.—9,007, E. Clark, Pavements for Foot-paths and similar Surfaces.—9,021, J. B. Spence, Construction of Roofs.

July 28.—9,087.—A. Reddie, Method and Compounds for Preserving Stone.

July 29.—9,090, D. Thomas, Screw Drivers.—9,097, D. Macdonald, Improved Brick.—9,123, J. Sledge and A. Slatier, Construction of Electric Bells and Indicators for Domestic Purposes.

July 30.—9,147, W. Ward and Others, Apparatus for Opening, Closing, and Securing Fanlights, Ventilators, &c.—9,154, W. Joy, Improvements in the Manufacture of Cement.—9,155, F. Farley, Manufacture of Butt Hinges.—9,155, W. Beck, Water-waste Preventing Apparatus.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

6,280, G. Barnard, Combination T-square, Set-square, and Clamp.—6,923, A. Ashwell and C. Cross, Indicating Door-fastenings.—7,189, W. Joy, Manufacture of Cement.—7,376, W. Bruce, Syphon Traps, for Drain and other Pipes.—7,587, W. Farrow, Water-waste Preventer Cistern for Water-closets.—7,820, H. Byles and T. Hanson, Improvements in Water-closets.—7,735, T. Collis, Portable Dust-bin.—8,072, J. Adams, Silent Closing and Retaining Door-springs.—12,544, E. Adams, Door Springs and Checks for the Prevention of Slamming.—4,241, P. Walker, Improvements in Ventilators.—6,294, M. Shearer and others, Brick Pressing and Moulding Machine.—7,086, H. Haddon, Joiners' Clamps.—7,433, J. Hamond, Mortising Machine.—7,560, J. Mulliner, Improvements in Sanitary Pans, &c.—7,741, C. Elphick, Flushing Apparatus.—8,138, H. Williams, Window Sash Fastener.—8,444, J. Pearson, Improvements in Bakers' Ovens.

## COMPLETE SPECIFICATIONS ACCEPTED.

## Open to opposition for two months.

13,095, W. Brook, Construction of Sanitary Houses and Bungalows.—8,207, J. Blakeley, Improvements in Mortar Combs.—7,785, T. and E. Durran, Improvements in Nails, &c.—7,813, H. Hobson and S. Rushton, Machine for Elevating or Lowering Fireman, &c., to any desired altitude of a building or structure.—12,965, W. Vivian, Syphon Flushing Cistern.—13,026, T. Briggs, Soldering Apparatus.—13,213, A. Pimm, Improved Pavement.—13,493, H. McCollery, Machine covers for Drains, &c.—13,891, W. and C. Ekins, Improvements in Ventilators.—14,319, E. Banner, Ventilating Apparatus.—16,504, H. Smith, Preventing the Rattling of Window-sashes.—7,770, R. Best, Central Light Gasoliers.

## Miscellaneous.

**Ceramic Decoration at the Chinesees Palace.**—Ceramic decoration has been largely used in the above edifice, constructed for the King of Bavaria. The celebrated terra-cotta factory of Villeroy and Boch of Merzig was intrusted with the whole of the rich external decorations of the façade, the capitals of the pilasters and columns, &c. All these decorative objects are in *alto relievo*, and are executed upon a colossal scale in the peculiar terra-cotta of the factory referred to, which resembles sandstone in colour and granular structure. The official testimony of Herr Von Dollmann attributes to this substance (according to the *Sprechsaal*) greater durability and resistance to the weather than are possessed by natural sandstone and limestone. The Meissen porcelain factory has been executing an order of the value of 12,500*l.* in connexion with the internal decoration of the palace. One object of special interest is a candelabrum, about 9 ft. in height, made to bear 108 lights, and richly ornamented with flowers and figures. This work has occupied a year in its production, and has alone cost 1,000*l.* Four large mirror-frames are also noticed, each about 10 ft. high. The increasing adoption of specially-prepared terra-cotta work for architectural purposes is further exemplified by the fact that in the new Academy at Munich there is being extensively used an imitation of white Trentine marble. Of this material there are in the edifice named 500 metopes, 150 capitals, 300 running yards of *alto relievo* figured frieze-work, 1,680 consoles, 24 portrait medallions, 1,500 balusters, and 86 vases. Herr Von Neureuther has officially expressed his approval of the quality of this material and of the artistic exactness of the work in general.

**A New Altar Tomb and Recumbent Statue** of the late Rt. Rev. Thomas Brown, Bishop of Newport and Monmouth, is to be erected in the chantry of the Pro-Cathedral, Belmont, Herefordshire, from the designs of Messrs. Pugin, architects. The committee have commissioned Mr. R. L. Boulton, sculptor, with the work which is now in hand.

**Writtle.**—The foundation-stone of a new Congregational Chapel at Writtle, Essex, was laid a few days ago. The new building, which is to be of brick, in the "Queen Anne" style, is intended to seat 160 persons, and will cost 500*l.* Mr. C. Pertwee, of Chelmsford, is the architect, Mr. H. Kennell, of Writtle, being the builder.

**Erratum.**—In describing the furniture which is being made by Messrs. Johnstone, Norman, & Co., from Mr. Alma Tadema's designs, we gave the name of Mr. Coleman as the artist who had worked out the details under Mr. Tadema's supervision. It should have been Mr. W. C. Codman.

**The "Housing Bill."**—We have received a copy of a memorial presented to Sir Richard Cross, the Home Secretary, by the Association of Public Sanitary Inspectors on the "Housing Bill." In it the memorialists state that the continuance of the evils of preventible sickness and mortality amongst the wage-earning classes by the failure of the existing laws has been efficiently carried out as set forth in the evidence, as yet incomplete, produced before the "Royal Commission on the Housing of the Poor," has been occasioned by the defective legislation and of local administrative organisation in confiding the application of the remedy to incompetent and unwilling authorities, often, as owners of the worst-conditioned tenements, are actuated by sinister interests against their amendment, and where such interests do not prevail failures in the execution of the sanitary laws will be found to have arisen from defective administrative organisation from local authorities having only an insufficient service of paid officers, especially of the officers who have to deal practically and almost directly with unsanitary conditions, and the sanitary inspectors, being often institutionally underpaid and not thoroughly efficient or effectively organised. The memorialists propose that in the Bill it should be provided—

(1) That no Sanitary Inspector should be eligible to his office unless he can produce a certificate of a competent recognised authority that he is duly qualified for the situation, unless he has held his appointment over the years.

(2) That, in order that Inspectors should be protected the efficient discharge of their duties, it is recommended that all officers shall be approved of by the Local Government Board, and that no officer shall be discharged except upon proof of incompetency or of misconduct, verified by a central authority.

(3) That local authorities shall have the same powers as are granted to the Poor Law Authorities for the suspension of Sanitary Inspectors for making provision in case of partial disablement caused by accident or disease, so that it shall be legal for local authorities to make provision for the support of the family of any officer who might lose his life by disease caught while in the discharge of his duties.

In addition to the proposed amendments, it is suggested that the word "may" in the several sanitary laws affecting this question shall be "shall," so that the local authority shall be compelled, under a penalty, to effectually enforce the laws in the locality of which they have charge.

**Injury to Iron Bridges from Locomotive Fumes.**—How necessary it is to protect iron bridges against external influences by repainting them is shown by a report of the injury done to such a bridge by smoke which we read in the *Bulletin*. The western approach to Callow-hill-street bridge, Philadelphia, is said to be in a shabby condition. The bridge is an iron one, and its western end spans the track of the Pennsylvania Railroad at a point where locomotives are continually passing; and it is stated that the sulphurous acid from the smoke stacks of the engines has been the cause of the trouble. A great deal of the iron about the tracks most used is being gradually eaten away, and the ground beneath is thickly strewn with thick iron scales that have dropped from the bridge work, which has not been protected by proper painting. The river span, which is not reached by locomotive smoke, is not affected, and is said to be in excellent condition.—*From London & County Banking Company (Limited).*

The half-yearly report and balance-sheet of this company, adopted at the half-yearly meeting held on Thursday last, will be found in one of our advertisement columns. The directors report that the net profits for the half-year ending June 30 last amount to 234,190*l.* The directors have declared an interim dividend for the half-year of 10 p. c.

**The National Competition Exhibition of 1885.**—With reference to the article with this title in our last, we are asked to say that the Travelling Studentship, in connexion with the West London School of Art was awarded to Mr. A. C. Weatherstone, not Wheatstone, as printed.

**Architectural Association Lectures.**—Messrs. Walter Dewes, A. J. White, and V. Sheen, jun., have been awarded first, second and third prizes respectively in connexion with Mr. Henry Lovegrove's lectures on Construction at the Architectural Association.

**Accrington.**—We understand that Mr. F. E. Button, assistant surveyor to the Corporation of Accrington, was unanimously appointed borough surveyor to that Corporation at a meeting held on Monday last, Mr. Wm. Green being appointed assistant surveyor.



**the Salters' Company and Technical Institute.**—The following resolution was passed at a meeting of the Court of the Salters' Company, held on July 31st, 1885:—"That the Court of the Salters' Company being informed of the need of increased funds to enable the Company and Guilds of the London Institute to obtain in efficiency the various branches of the Institute for the advancement of technical education, to which the confederated companies are attached, hereby agrees to raise its annual subscription to the Institute from 525*l.* to 1,000*l.*, payable in moieties during the pleasure of the Court, in the months of May and November."

**PRICES CURRENT OF MATERIALS.**

| TIMBER.                    |          |          |  |
|----------------------------|----------|----------|--|
|                            | £. s. d. | £. s. d. |  |
| Heart, B.G. ....           | 6 10 0   | 7 10 0   |  |
| B.L. ....                  | 12 10 0  | 15 10 0  |  |
| U.S. ....                  | 0 2 0    | 0 2 0    |  |
| Canada ....                | 3 0 0    | 5 0 0    |  |
| " ....                     | 3 0 0    | 4 10 0   |  |
| " ....                     | 3 10 0   | 5 0 0    |  |
| Danish, &c. ....           | 1 10 0   | 4 10 0   |  |
| " ....                     | 3 0 0    | 5 0 0    |  |
| " red ....                 | 6 0 0    | 7 0 0    |  |
| " yellow ....              | 3 10 0   | 4 10 0   |  |
| Danish, fathom ....        | 5 0 0    | 6 0 0    |  |
| Petersburg ....            | 5 0 0    | 7 0 0    |  |
| sect, Riga ....            | 0 4 0    | 10 0 0   |  |
| Finland, 2nd and 1st. .... | 8 0 0    | 9 0 0    |  |
| 4th and 3rd ....           | 8 10 0   | 7 10 0   |  |
| Petersburg, 1st. ....      | 7 0 0    | 8 10 0   |  |
| 2nd ....                   | 8 0 0    | 9 10 0   |  |
| white ....                 | 7 0 0    | 11 0 0   |  |
| ite Sea ....               | 8 10 0   | 12 0 0   |  |
| ada, Pine 1st ....         | 18 0 0   | 32 10 0  |  |
| " 2nd ....                 | 12 0 0   | 18 10 0  |  |
| 3rd, &c. ....              | 7 0 0    | 10 10 0  |  |
| Spruce 1st. ....           | 9 0 0    | 13 0 0   |  |
| 3rd and 2nd ....           | 6 10 0   | 8 0 0    |  |
| Brunswick, &c. ....        | 5 0 0    | 7 10 0   |  |
| as, 2nd kind ....          | 4 0 0    | 13 0 0   |  |
| ing Boards, sq. 1 in. .... | 0 9 0    | 0 13 0   |  |
| ing, first ....            | 0 7 0    | 0 8 0    |  |
| nd ....                    | 0 5 0    | 0 7 0    |  |
| ing Cavalry Barracks ....  | 0 0 0    | 0 4 0    |  |
| er qualities ....          | 0 0 0    | 0 4 0    |  |
| U.S. ....                  | 0 0 0    | 0 4 0    |  |
| nduras, &c. ....           | 0 0 0    | 0 4 0    |  |
| tralian ....               | 0 0 0    | 0 4 0    |  |

| TIMBER (continued).     |           |           |  |
|-------------------------|-----------|-----------|--|
|                         | £. s. d.  | £. s. d.  |  |
| Mahogany, Cuba ....     | 0 0 5     | 0 0 7 1/2 |  |
| St. Domingo cargo ....  | 0 0 5 1/2 | 0 0 7 1/2 |  |
| Mexican ....            | 0 0 4     | 0 0 5     |  |
| Tobacco ....            | 0 0 4 1/2 | 0 0 5 1/2 |  |
| Honduras ....           | 0 0 4 1/2 | 0 0 5 1/2 |  |
| Rose, Rio ....          | 7 0 0     | 17 0 0    |  |
| Bahia ....              | 7 0 0     | 16 0 0    |  |
| Satin, St. Domingo .... | 0 0 8     | 0 1 0     |  |
| Porto Rico ....         | 0 0 8     | 0 1 0     |  |
| Walnut, Italian ....    | 0 0 4     | 0 0 5     |  |

| METALS.                        |          |          |  |
|--------------------------------|----------|----------|--|
|                                | £. s. d. | £. s. d. |  |
| Iron—Pig in Scotland ....      | 2 0 8    | 0 0 0    |  |
| Bar, Welsh, in London ....     | 5 0 0    | 5 7 6    |  |
| " in Wales ....                | 4 12 6   | 4 17 6   |  |
| Staffordshire, London ....     | 6 0 0    | 7 0 0    |  |
| Sheets, single, in London .... | 7 10 0   | 9 0 0    |  |
| Hoops ....                     | 7 0 0    | 8 0 0    |  |
| Nail-roads ....                | 6 0 0    | 7 0 0    |  |

| COPPER.                      |          |          |  |
|------------------------------|----------|----------|--|
|                              | £. s. d. | £. s. d. |  |
| British, ore, and ingot .... | 47 10 0  | 48 10 0  |  |
| Best selected ....           | 48 10 0  | 49 0 0   |  |
| Sheets, strong ....          | 55 10 0  | 56 0 0   |  |
| " India ....                 | 53 10 0  | 53 0 0   |  |
| Australia, fine cast ....    | 53 10 0  | 56 0 0   |  |
| Chili, bars ....             | 43 17 6  | 44 5 0   |  |
| YELLOW METAL.                |          |          |  |
| Lead—Pig, Spanish ....       | 12 5 0   | 0 0 0    |  |
| English, com. brands ....    | 12 12 6  | 0 0 0    |  |
| SILVER.                      |          |          |  |
| Silesian, special ....       | 13 7 6   | 14 0 0   |  |
| Ordinary brands ....         | 13 12 6  | 13 15 0  |  |
| TIN.                         |          |          |  |
| Straits ....                 | 94 0 0   | 94 10 0  |  |
| Australia ....               | 94 0 0   | 94 10 0  |  |
| English ingots ....          | 96 0 0   | 0 0 0    |  |
| ZINC.                        |          |          |  |
| IC coke ....                 | 14 6 0   | 18 6 0   |  |
| IX ditto ....                | 21 0 0   | 25 0 0   |  |
| IC charcoal ....             | 17 0 0   | 20 0 0   |  |
| IX ditto ....                | 26 0 0   | 27 0 0   |  |

| OILS.                    |          |          |  |
|--------------------------|----------|----------|--|
|                          | £. s. d. | £. s. d. |  |
| Linseed ....             | 23 0 0   | 23 10 0  |  |
| Cocconut, Ceylon ....    | 32 10 0  | 0 0 0    |  |
| Ceylon ....              | 27 10 0  | 0 0 0    |  |
| Copra ....               | 23 0 0   | 26 10 0  |  |
| Palm, Lagos ....         | 23 10 0  | 30 0 0   |  |
| Palm-kernel ....         | 29 10 0  | 0 0 0    |  |
| Rapeseed, English ....   | 25 10 0  | 26 0 0   |  |
| " brown ....             | 24 0 0   | 0 0 0    |  |
| Cottonseed, refined .... | 22 0 0   | 23 10 0  |  |
| Tallow and Oleine ....   | 25 0 0   | 45 0 0   |  |
| Lubricating, U.S. ....   | 7 0 0    | 10 0 0   |  |
| " Refined ....           | 8 0 0    | 15 0 0   |  |
| TURPENTINE.              |          |          |  |
| American, in cks. ....   | 1 9 3    | 0 0 0    |  |
| Tar—Stockholm ....       | 1 2 0    | 1 2 6    |  |
| Archangeal ....          | 0 14 0   | 0 14 6   |  |

For private street improvements, for the Leyton Local Board. Mr. Wm. Dawson, C.E., surveyor:—

| Kerbing and Paving with Victoria Stone. |        |      |  |
|-----------------------------------------|--------|------|--|
| Farrar ....                             | 28,772 | 3 2  |  |
| Neave ....                              | 6,718  | 13 0 |  |
| Kowall & Robson ....                    | 6,714  | 16 3 |  |
| Brewers ....                            | 6,679  | 10 6 |  |
| Griffith (accepted) ....                | 6,373  | 1 3  |  |

**Drainage and Roadmaking.**

| Harris ....             | 2,220 | 0 0  |  |
|-------------------------|-------|------|--|
| Neave ....              | 2,004 | 0 6  |  |
| Jackson (accepted) .... | 1,944 | 0 0  |  |
| New Intercepting Sewer. |       |      |  |
| Bell ....               | 267   | 13 9 |  |
| Neave ....              | 263   | 0 0  |  |
| Jackson (accepted) .... | 251   | 0 0  |  |

For alterations and additions to residence to Ashburnham-road, Bedford, for Mr. G. W. Parker. Mr. F. T. Mercer, architect. Quantities supplied:—

|                      |      |     |  |
|----------------------|------|-----|--|
| Potter ....          | £879 | 0 0 |  |
| Harrison ....        | 878  | 0 0 |  |
| White ....           | 915  | 0 0 |  |
| Laughton ....        | 890  | 0 0 |  |
| Foster ....          | 779  | 0 0 |  |
| Adams ....           | 770  | 0 0 |  |
| Watson & Walker .... | 765  | 0 0 |  |

[All of Bedford.]

For painting, decoration, &c., to the Borough-road College, for the British and Foreign School Society. Messrs. Lee & Smith, architects:—

|                                             |      |      |  |
|---------------------------------------------|------|------|--|
| Rhodes ....                                 | £399 | 10 0 |  |
| Decorative Society ....                     | 348  | 0 0  |  |
| Rice ....                                   | 241  | 0 0  |  |
| Dicksee & Dicksee, 4, Pall Mall-place* .... | 236  | 0 0  |  |

\* Accepted.

For new boundary-wall, five-courts, paving works, &c., at the Borough-road College, for the British and Foreign School Society. Messrs. Lee & Smith, architects:—

|                                             |        |     |  |
|---------------------------------------------|--------|-----|--|
| Mowlem & Co. ....                           | £1,466 | 0 0 |  |
| W. H. Castle ....                           | 1,357  | 0 0 |  |
| D. S. Rice ....                             | 1,698  | 0 0 |  |
| Dicksee & Dicksee, 4, Pall Mall-place* .... | 1,028  | 0 0 |  |

\* Accepted.

For painting, decoration, &c., to the Stockwell-road College, for the British and Foreign School Society. Messrs. Lee & Smith, architects:—

|                                             |      |     |  |
|---------------------------------------------|------|-----|--|
| Decorative Society ....                     | £518 | 0 0 |  |
| Rhodes ....                                 | 423  | 0 0 |  |
| Rice ....                                   | 960  | 0 0 |  |
| Dicksee & Dicksee, 4, Pall Mall-place* .... | 344  | 0 0 |  |

\* Accepted.

For decoration and alterations to St. Barnabas's Church, Addison-road, Kensington. Mr. Arthur Baker, architect:—

|                                             | A.   | B.         | Total.     |
|---------------------------------------------|------|------------|------------|
| Nash ....                                   | £568 | 0 ... £132 | 0 ... £700 |
| Callingham ....                             | 597  | 0 ... 99   | 0 ... 696  |
| Heath ....                                  | 470  | 10 ... 192 | 5 ... 662  |
| Grady ....                                  | 408  | 0 ... 143  | 0 ... 551  |
| Dicksee & Dicksee, 4, Pall Mall-place* .... | 203  | 0 ... 144  | 0 ... 347  |

\* Accepted.

A. Decorations to nave, chancel, staircases, and lobbies, and alterations to gallery front.

B. Alterations to and painting gallery pews.

For alterations at the Hercules Tavern, Holloway-road, for Mr. Hewitt. Mr. Jas. Miller, architect:—

|                         |      |      |  |
|-------------------------|------|------|--|
| Adams ....              | £541 | 0 0  |  |
| King & Son ....         | 416  | 0 0  |  |
| Aitchison ....          | 469  | 0 0  |  |
| Veas ....               | 448  | 0 0  |  |
| Mark ....               | 444  | 0 0  |  |
| Bartlett & Hawkins .... | 415  | 12 0 |  |
| Smith ....              | 413  | 0 0  |  |

For pulling down and rebuilding stable, coachhouse, and residence, Little Cadogan-place, S.W., for Mr. J. Richards. Mr. J. T. Stokes, architect:—

|                    |        |     |  |
|--------------------|--------|-----|--|
| C. Wall ....       | £1,841 | 0 0 |  |
| J. Holloway ....   | 1,270  | 0 0 |  |
| Rayment & Son .... | 1,250  | 0 0 |  |
| Channon ....       | 1,310  | 0 0 |  |
| Lathey Bros. ....  | 1,130  | 0 0 |  |

For alterations and additions to No. 1, "The Hill," Acton, W., for Mr. W. J. Amherst. Mr. Chas. J. Smitham, architect:—

|                                           |      |     |  |
|-------------------------------------------|------|-----|--|
| Bray, Ealing ....                         | £458 | 0 0 |  |
| Myring, Acton ....                        | 450  | 0 0 |  |
| Hudson, Wandsworth ....                   | 440  | 0 0 |  |
| Hedges & Goodrick, Acton (withdrawn) .... | 365  | 0 0 |  |

For part rebuilding of and alterations to 9, Wilmor-street, W. Mr. Alexander Payne, architect. Quantities supplied:—

|                                |        |     |  |
|--------------------------------|--------|-----|--|
| J. & J. Greenwood ....         | £2,433 | 0 0 |  |
| J. M. Macey & Sons ....        | 2,168  | 0 0 |  |
| P. L. Green ....               | 2,067  | 0 0 |  |
| Chas. Cox ....                 | 2,039  | 0 0 |  |
| Stimpson & Co. (accepted) .... | 1,698  | 0 0 |  |

For engine-house and pump well, cottage, brick and pipe sewers, east-iron pumping main, gas engines, pumps, &c., for the Oxford Local Board. Mr. W. H. White, engineer:—

|                                    |        |       |  |
|------------------------------------|--------|-------|--|
| S. H. Hatching, Oxford ....        | £2,331 | 5 0   |  |
| T. H. Kingerlee, Oxford ....       | 2,088  | 8 8   |  |
| Innes & Wood, Birmingham ....      | 1,941  | 15 3  |  |
| J. W. Pichall, Yardley ....        | 1,850  | 0 0   |  |
| G. Moss, Oxford and Liverpool .... | 1,799  | 14 11 |  |
| Cowdery & Sons, Newent ....        | 1,795  | 3 5   |  |
| Bell & Sons, Saffron Walden ....   | 1,770  | 0 0   |  |

\* Accepted.

Engineer's estimate, £1,778.

For painting and decorating works at 49, Elvaston-place, S.W., for Mr. Horace H. Budd:—

|                               |      |     |  |
|-------------------------------|------|-----|--|
| Best ....                     | £503 | 0 0 |  |
| Bevan ....                    | 489  | 0 0 |  |
| Pratt & Son ....              | 489  | 0 0 |  |
| Cook ....                     | 440  | 0 0 |  |
| Leamon, Ascot (accepted) .... | 430  | 0 0 |  |

**CONTRACTS AND PUBLIC APPOINTMENTS.**

Epitome of Advertisements in this Number.

**CONTRACTS.**

| Nature of Work, or Materials.            | By whom required.          | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page.  |
|------------------------------------------|----------------------------|-----------------------------------|--------------------------|--------|
| Re-hall, Class-rooms, &c., Wolverhampton | Trustees of Chapel         | S. Loxton                         | August 11th              | ii.    |
| Up and Repairing Wood-Paving             | Fulham Board of Wks.       | Official                          | August 13th              | ii.    |
| Building Beckenham Village Bridge        | Kent Justices of the Peace | do.                               | do.                      | ii.    |
| Up Carriage-way                          | Hornsey Local Board        | T. De Courcy Meade                | August 17th              | ii.    |
| Building Piggeries, &c., at School       | Cent. London Schl. Dist.   | Official                          | do.                      | xviii. |
| Materials                                | Richard (Surveyor) U.S.A.  | do.                               | August 18th              | ii.    |
| Building Cavalry Barracks                | War Department             | do.                               | do.                      | ii.    |
| Light and Cast-Iron, for Bridges         | Midland Railway Co.        | A. A. Langley                     | August 20th              | ii.    |
| Works                                    | Friern Barnet U.S.A.       | Baldwin Latham                    | August 26th              | ii.    |
| Contract of Abington Lock-on Molesey     | Lower Molesey Water Co.    | Law & Chertson                    | August 27th              | ii.    |
| Water, Manholes, &c., Engine-house, &c.  | Walthamstow Lcl. Bd.       | G. B. Jerram                      | August 28th              | ii.    |
| Hops at Acton                            | G. A. Lean                 | Not stated.                       | Not stated.              | xviii. |

**PUBLIC APPOINTMENTS.**

| Nature of Appointment.           | By whom Advertised.                          | Salary.                          | Applications to be in. | Page. |
|----------------------------------|----------------------------------------------|----------------------------------|------------------------|-------|
| Director of School Buildings     | Leicester School Board                       | 3 <i>l.</i> 3 <i>s.</i> per week | August 17th            | xvi.  |
| Director of Works                | Wimbledon Local Bnd                          | do.                              | August 25th            | xvi.  |
| Director of Justice of the Peace | Justices of the Peace for the Co. of Warwick | 400 <i>l.</i> per annum          | August 31st            | xvi.  |

**TENDERS.**

| For the erection of a school-house and outbuildings at Leicester, for Mr. R. S. Lea. Mr. W. Millican, architect. |        |      |  |
|------------------------------------------------------------------------------------------------------------------|--------|------|--|
| G. J. Fox & Son, Atherstone                                                                                      | £8,587 | 0 0  |  |
| Foster & Dicksee, Rugby                                                                                          | 6,240  | 0 0  |  |
| Parrell & Son, Rugby                                                                                             | 6,150  | 0 0  |  |
| Smith, Chivers & Co., Leicester                                                                                  | 5,880  | 0 0  |  |
| Barnes & Turton, Nottingham                                                                                      | 5,820  | 0 0  |  |
| F. Major, Leicester                                                                                              | 5,669  | 0 0  |  |
| Clarke & Garrett, Leicester                                                                                      | 5,549  | 0 0  |  |
| Law & King, Lutterworth                                                                                          | 5,550  | 0 0  |  |
| J. O. Jewsbury, Leicester                                                                                        | 5,548  | 10 0 |  |
| Herbert, Leicester                                                                                               | 5,510  | 0 0  |  |
| H. Black, Barrow-on-Soar                                                                                         | 5,337  | 0 0  |  |
| For alterations of premises for the Liberal Club, Audenshaw. Mr. J. H. Burton, architect, Ashton-under-Lyne.     |        |      |  |
| Goodall & Co., Manchester                                                                                        | £190   | 0 0  |  |
| Chas. Morris, Ashton-under-Lyne                                                                                  | 180    | 0 0  |  |
| J. W. Williamson, Ashton-under-Lyne                                                                              | 186    | 0 0  |  |
| Castle Hall Saw-mills Company, Stalybridge                                                                       | 182    | 10 0 |  |
| Walter Clough, Ashton-under-Lyne                                                                                 | 182    | 0 0  |  |
| Aaron Marsden, Ashton-under-Lyne                                                                                 | 176    | 0 0  |  |
| Jabes Gibson, Delfield                                                                                           | 173    | 0 0  |  |
| Allen Hines, Ashton-under-Lyne                                                                                   | 168    | 10 0 |  |
| Zachariah Pike, Hooley Hill                                                                                      | 164    | 0 0  |  |
| Sandham, Thomson & Co., Droylsden                                                                                | 160    | 0 0  |  |
| * Accepted. † Withdrawn.                                                                                         |        |      |  |
| Repairs and decorations to the Grosvenor Hall, Birmingham Palace-road. Mr. Geo. S. Finlay, architect.            |        |      |  |
| Griffiths                                                                                                        | £197   | 0 0  |  |
| Conthard                                                                                                         | 160    | 0 0  |  |
| F. Williams (accepted)                                                                                           | 148    | 0 0  |  |

For the rebuilding of Nos. 85 and 86, Berwick-street, Soho. Messrs. Barden & Milnes, architects:—  
 Stuart ..... £2,387 0 0  
 Simpson & Son ..... 1,759 0 0  
 Longmire & Burge ..... 1,710 0 0  
 Cook ..... 1,695 0 0  
 Macey & Sons ..... 1,680 0 0  
 Scrivener & Co. .... 1,588 0 0

For the erection of new stables at Stratford, E., for Mr. J. R. Roberts. Mr. J. Kingwell Cole, architect. Quantities supplied by Mr. P. Pieterzen:—  
 Puzer & Lumley ..... £3,074 0 0  
 G. S. Williams & Sons ..... 2,935 0 0  
 G. & J. Green ..... 2,912 0 0  
 Macey & Sons ..... 2,889 0 0  
 G. J. Hosking ..... 2,869 0 0  
 J. Morter ..... 2,787 0 0  
 M. A. Palmer & Co. .... 2,869 0 0  
 Patman & Fotheringham ..... 2,647 0 0  
 M. Gentry ..... 2,640 0 0  
 Wall Bros. .... 2,638 0 0

For two houses at Hampton. Mr. John Warne, surveyor, Teddington:—  
 Bonell ..... £638 0 0  
 Hickingbotham ..... 650 0 0  
 Richardson ..... 602 0 0  
 Webb ..... 593 0 0  
 Filley ..... 523 0 0  
 Garrett ..... 493 0 0  
 Potter ..... 490 0 0

For the erection of new offices, Deptford Lower-road, S.E., for Messrs. Rose, Smith, & Co. Mr. Edward Thomas, architect:—  
 L. Stevens ..... £383 0 0  
 S. Chafen ..... 650 0 0  
 R. & E. Evans, Peckham (accepted) ..... 483 0 0

For works to the St. John's-road, Sevenoaks, Kent, in forming, metalling, kerbing, channelling, tar paving, &c., for the Sevenoaks Local Board. Mr. Jabez Mann, town surveyor:—  
 W. J. Bottell, London and Sevenoaks ..... £814 0 0  
 Jas. Clarke, Croydon ..... 763 17 3  
 H. W. Morlett, Maidstone ..... 751 10 0  
 W. & J. Woodham, Sydenham ..... 746 2 0  
 H. Owen, Sevenoaks ..... 637 13 0  
 Woodham & Fry, Greenwich ..... 545 0 0  
 Beadell Bros., Eith ..... 540 0 0  
 \* Accepted according to schedule of prices.  
 Surveyor's estimate, £280.

For the erection of Wesleyan Chapel at Whitmore Reams, Wolverhampton. Mr. Charles Bell, architect. Quantities by Mr. Henry Lovegrove:—  
 Cave ..... £5,187 0 0  
 Jones ..... 4,200 0 0  
 Gough ..... 4,321 0 0  
 Dove ..... 3,824 0 0  
 Guest ..... 3,769 0 0  
 Smith ..... 3,768 0 0  
 Higham ..... 3,718 0 0  
 Horton ..... 3,998 0 0  
 Hornman ..... 3,800 0 0  
 Bradley ..... 3,549 0 0  
 Lynex ..... 3,638 0 0  
 Tildesley ..... 3,250 0 0  
 Davis ..... 3,038 0 0  
 Moss ..... 2,880 0 0

For the erection of Wesleyan Chapel at Buckhurst Hill, Essex. Mr. Charles Bell, architect. Quantities by Mr. Henry Lovegrove:—  
 Anley ..... £1,990 0 0  
 Robson ..... 1,825 0 0  
 Green ..... 1,783 0 0  
 Greger ..... 1,763 0 0  
 Allen ..... 1,736 0 0  
 Stevard ..... 1,680 0 0  
 Walls ..... 1,460 0 0  
 Egan ..... 1,407 0 0

For a new lodge, for Mr. Pryce Jones, Newtown. Mr. Edward Parker, architect:—  
 Swain & Owen ..... £217 0 0  
 E. C. Phillips ..... 183 10 0  
 Morris & Sons ..... 180 0 0  
 John Morris (accepted) ..... 171 11 6  
 [All of Newtown.]

For a range of farm buildings at Dolow, for Mr. Pryce Jones, Newtown. Mr. E. Parker, architect:—  
 John Morris, accepted at a valuation.  
 [No competition.]

For building Nos. 116 and 118, Green-street, Mr. W. Batten, architect. Messrs. Batstone Bros., surveyors:—  
 Gainsford ..... £3,748 0 0  
 Roberts ..... 2,365 0 0  
 Forrest ..... 2,187 0 0  
 Green ..... 2,135 0 0  
 Hughes ..... 2,119 0 0  
 Colson ..... 2,080 0 0  
 Hawkins ..... 1,959 0 0  
 Subey & Son (accepted) ..... 1,948 0 0

For painting, decorating, and repairs at the "House of Charity," Soho-square. Mr. C. Braun, surveyor:—  
 Warne & Son, Soho ..... £237 0 0  
 McIntosh, Langham-street ..... 185 0 0  
 Bywaters, Regent-street ..... 185 0 0  
 W. A. Rhodes, Marble Arch ..... 175 0 0  
 \* Accepted.

For new story, brick additions, hot-water pipe, paneling, &c., at 23, Upper Berkeley-street, Hyde Park, for Dr. Beale. Mr. Edward S. Prior, architect:—  
 W. A. Rhodes, Marble Arch ..... £280 0 0  
 \* Accepted.

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

#### TO CORRESPONDENTS.

H. B. & B. H. & Co.—J. T. S.—H. W.—C. N. M. Y. N.—W. C.—K. L. & B. G. (to move the house bodily, as before stated, is, we believe, the intention. For your P.B., what was done forty years ago is not of much interest, but recent work may be).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

**NOTE.**—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return repeated communications.

Letters or communications beyond mere news-items which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR. All communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

#### PUBLISHER'S NOTICES.

THE INDEX and TITLE-PAGE for Volume XLVIII. (January to June, 1885) were given, as a Supplement, with the Number of July 11th.

A COLOURED TITLE-PAGE may be had, gratis, on personal application at the Office.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

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DOUGLAS FOURDRINER, Publisher.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

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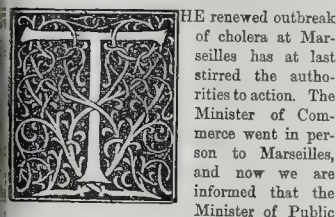
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### The Marseilles Main Drainage Scheme.



HE renewed outbreak of cholera at Marseilles has at last stirred the authorities to action. The Minister of Commerce went in person to Marseilles, and now we are informed that the Minister of Public Works has made a grant of 24,000*l.* so as to enable the town to build sewers. During the epidemic of last year, M. Guérard, Chief Engineer of the Special Maritime Services, carefully watched the development and progress of the disease. Tracing every case to its home, he marked with a black spot every house in the map of Marseilles where a fatal case of cholera had originated. By this means M. Guérard was soon able to demonstrate that cholera was more frequent and more fatal in all the streets possessing no sewers or which were badly paved. M. Guérard then drew up a report on the entire subject and proposed, as the commencement, a system of main drainage which, at the cost of 48,000*l.*, would prevent the contamination of the Old Port. It is a portion, in any case, of this scheme which will show, at the eleventh hour, be executed. The geographical position of Marseilles, the importance of its commerce, renders its sanitary condition a matter of universal concern; and, now that the cholera has once more attacked this port, M. Guérard's proposals are of considerable interest. In a lecture, delivered before the Scientific Society of Marseilles, M. Guérard alluded in the following words to the general condition of the town:—

"The custom, dating from the good old times, of throwing every sort of filth out of the windows will only be obliterated with great difficulty. There are some persons who do not even give themselves the trouble of carrying their refuse to the gutter, but throw it into some back yard where all the soil and garbage accumulates, and is only removed when it is materially impossible to let it remain there any longer. It is surprising, under such circumstances, that there should still exist many wells yielding uncorrupted water.

"Marseilles is built on non-permeable soil; that is thrown on the surface only penetrates the superficial layer artificially formed, and which is always porous to a certain extent. The soil of the streets, the sub-soil of the houses and the back-yards have been impregnated, in many places, with excremental matter, and this has continued now for many centuries."

M. Guérard then proceeded to give statistics proving how typhoid fever and other diseases akin to cholera had been reduced by building sewers that prevented the contamination and facilitated the drainage of the sub-soil. This is notably the case at Brussels, where the average monthly death-rate from typhoid fever has been reduced from 16.5 cases (1864 to 1873) to 8.5 cases during the period between 1874 and 1880.

Marseilles is supplied with the water of the river Durance brought to the town by a magnificent canal and aqueduct, which cost nearly two millions sterling, and measures 81,625 metres in length. Then there are also the waters of the river Huveaune, the spring of La Rose, and a number of wells dug in all parts of the town. The water of the Durance is distributed in every part of the town and the outlying districts, while the other supplies are limited to certain quarters. According to the figures given by the engineers of the Canal and the La Rose Companies, Marseilles receives every second 1,550 litres of water for drinking and industrial purposes from the Durance; 1,650 litres for public services, and 3,800 litres for irrigation. This makes a total of 7,000 litres per second. The Huveaune gives 100 litres per second, 75 litres being for domestic purposes; the Rose, 5 litres per second for domestic purposes. Without counting the well-water, we have a total of 7,105 litres per second. In round numbers, this equals 614,000,000 litres per day, or 2,000 litres per head per day. Considering, however, that half this is used for irrigation purposes, it would perhaps be more precise, when speaking of the sanitary aspect of the question, to set down the daily supply at 1,000 litres per day per head, or about 200 gallons. In a word, the provision of water is ample; indeed, it is one of the largest of any town in Europe. Further, in this respect it is important to note that the cholera broke out at Marseilles some time before any of the regions whence the water supply is obtained were affected. Some theorists have pretended that water is the only vehicle capable of conveying the germs of cholera, but these facts seem to defeat such a statement. In the districts supplied with the water of La Rose, namely, the Madelaine, Lonchamps, St. Michel, Préfecture and Palace of Justice, there were very few fatal cases of cholera. The waters of the Huveaune reach both the north of the Old Port and the districts to the south of the Old Port; and here, again, the number of fatal cases was small. There is nothing to indicate that the drinking-water had any influence on the epidemic. Therefore, in the sanitary works advocated for Marseilles, the question of water supply is not raised. Of course, it is urged that private wells should

be abolished, and the use of the town supply rendered compulsory. This being the case, the question of the sewers and of purifying the port holds the first rank.

So far back as 1849 an elaborate project for the drainage of Marseilles was drawn up by M. de Moutricher; but it would be now of little practical use to examine the details of this plan. Its most original feature was a proposal to create a canal for the purpose of pumping into the port a certain quantity of fresh seawater. As there is next to no tide in the Mediterranean, the water in the port of Marseilles remains, comparatively speaking, stationary; hence it becomes particularly foul. From the district called Les Catalan, which faces the open sea, a conduit was to have been built, ending at the bottom of the Cannebière, where this celebrated thoroughfare terminates at the head of the Old Port. An engine of 45-h.p., which should never cease working, would pump every second into the Old Port 1½ cubic metres of clean seawater, brought from Les Catalan. By this means it was calculated that the entire volume of water in the Old Port would be changed twice a month; and thus was the harbour to be purified.

Many other schemes have from time to time been proposed. One was an ingenious idea of utilising the waves that dash up the break-water outside the port. When the waves reached a certain height they were to topple over into a sort of reservoir, and the water from thence would travel along a canal, and reach the far end of the port, and there be admitted, so as to cause an outgoing current. There were proposals also for disinfecting the port chemically.

All these suggestions had, however, the grave defect of dealing with the effect instead of seeking to remove the cause. Even if a very large volume of clean salt water could be thrown into the port, it would not produce the desired effect, for it would not move the heavy deposits at the bottom of the water.

The surface of the Old Port measures 263,000 square metres, or 26 hectares 34 metres. The tide, such as it is, causes a rise and fall of 30 centimetres, and this introduces 79,020 cubic metres of water, or 150,000 cubic metres per day, that is, two cubic metres per second. Yet this natural movement, which is greater than that to be produced artificially by M. de Moutricher's scheme, fails altogether to prevent the grievous fouling of the port. The use of waves, as a motive power for cleansing ports, has been tried and with success on the coasts of Syria; but the prevailing winds must be favourable and the ground section must afford a sufficient fall. These conditions do not exist at Marseilles. The action of the waves would only be effective at Marseilles when the wind



came from the south-west and north. But it is principally during the periods of calm and excessive heat, that is, when the southern winds blow, that the purification of the port is most necessary. As for the use of disinfectants, this was tried on the much smaller surface of the Canal des Douanes and did not give any encouraging result.

The real point at issue is not how to disinfect or to flush the port, but how to prevent its contamination. One large sewer at Marseilles has its outfall direct into the sea. This is at the new docks called La Joliette. Most of the other sewers and gutters fall into the Old Port. There the sewage stagnates and makes deposits that have to be dredged out every year; otherwise the port would soon be filled up with solid sewage, and the ships could no longer enter. The municipality, during the recent epidemic, appointed a commission to inquire into this question; and this body finally adopted, principally at M. Guérard's suggestions, the following project:—

The scheme is divided into two sections. The first consists of the construction of a sewer which would form a belt round the port, but would be built at a sufficient height and distance from the port to enable its contents to drain by gravitation into the sea, either to the south of Marseilles, at the Catalan, or to the north, beyond the jetty, into the open sea, after passing under the Joliette Docks by means of a siphon. The second part of the scheme consists of making another sewer under the quays of the Old Port, and below water-mark. This sewer would receive all that came from the district below the other or upper sewer. The sewage would flow into a basin to be built near the Canal des Douanes, to the west of the port, and from this point it would have to be pumped up into the higher-level sewer.

The higher belt is divided into two branches. The southern branch, starting from the sewer already existing in the Rue Saint Ferréol, runs under the Rues Grignan, Breteuil, Sainte, Fort Notre Dame, Neuve St. Cathérine, crosses the Place St. Victor, follows the Boulevard de la Corderie, and falls into the sea between the bays of the Catalans and the Auffes. A siphon would be established under the railway line that goes down to the Old Port. The total length of this branch would be 2,447 mètres, and there would be a fall of 0.008 mètres for a distance of 131 mètres; of 0.00172 for 1109 mètres and 0.0005 for 1,207 mètres. The sewer, it is suggested, should have an invert 90 centimètres wide and 60 centimètres deep, with a ledge on each side 40 centimètres broad, surmounted by a vault 170 mètres high and 2 mètres wide.

The northern branch, in the course of its travels, forms a loop. Starting near the new Cathedral at the Place Leuche, it goes through the upper portion of the old town, passing by the hospital, then crossing the lower part of the Rue de la République, the Place Jean Guin, on to the Rue Colbert and the Cours Belzunce, where a large sewer already exists. Having gone thus far in a westerly direction, the main sewer would now take a northerly course towards the Rue d'Aix, and then return eastwards by the Rue des Dames till it reached the higher portion of the Rue de la République, and follows this great street down to the new docks of the Joliette, where the outfall is beyond the sea-wall in to the Mediterranean. The total length would be 1,070 mètres, with the following falls:—On 74 mètres, 0.048 metre falls; on 523 mètres, 0.012 metre fall; and on 473, only 0.001 metre. The section of this sewer is designed in an ovoid form, 2 mètres high and 1.30 metre wide. At the Place Jean Guin and the Rue de la Lune d'Or, the soil being low, two galleries would be substituted for a distance of 150 mètres, having each a circular section of 1.30 metre diameter.

The lower-level main sewer would follow the entire embankment, or quays, of the Old Port, and go round the Canal des Douanes. Starting on the northern side, at 0.82 below low-water mark, it would arrive at the pumping station at 4.62 mètres still lower down. The length of this sewer is estimated at 1,518

mètres, its fall about 0.0025 metre. In shape and size it would be similar to the sewers described above. The cost is set down at 10,721, for the lower-level sewer, 17,990, for the higher-level sewer, and 14,600, for the pumping station; this, with extras and unforeseen expenses, is roughly estimated at 48,000. The higher-level sewer should be constructed first; for it would receive from the sewers of the Rue Cannebière and the Rue Breteuil by far the larger part of the sewage which now actually falls into the harbour. It is probably this portion of the project which will now be at once executed with the 24,000, given by the Minister of Public Works.

Unfortunately, these works, though doubtless excellent in themselves, leave the drainage of the greater part of the streets and of all the houses of Marseilles, in their present deplorable condition. The port will be purified undoubtedly, but the inhabitants who were the most exposed to the emanations from the port were not the greatest sufferers from the cholera epidemic. Of course, in other respects, the foul water, though salt water, must prove injurious, and anything that will cleanse the port will prove a benefit to all travellers, and will render our communications with India and the East far more pleasant. But it is the system of house-to-house inspection, sanitation, and improvement that is the most urgently needed in Marseilles.

#### "PROFESSOR DONALDSON."

A PERSONAL NOTE.

BY GEORGE GODWIN, F.R.S.



THE Editor of the *Builder*, with a few able and telling touches, has already reminded his readers of the sort of man we have just now lost, and has mentioned his principal works, architectural and literary, and his claims on the memory of the public. I am unwilling, however, to let the grave close over the remains of Thomas Leverton Donaldson, Emeritus Professor of Architecture at University College, London, and the greatest friend the profession in England has ever had, without casting in a wreath, and expressing, even if briefly, the great respect and sincere affection I have long entertained for him. Drawing lines with a T-square, as a boy in my father's office, Mr. Donaldson, entering accidentally, took from a roll under his arm a drawing of the well-known frieze of the Temple of Vesta at Tivoli, and gave me then and there my first lesson in free-hand drawing. From that time to the day of his lamented death the connexion has been unbroken; we were engaged together in several undertakings; I have received from him some hundreds of letters, many of which are now before me, and a few extracts from these will probably be found interesting and assist in presenting a picture of our friend to those who come after. One of the earliest memories that occur to me is that of a conversation given by him at his house in Hart-street, Bloomsbury, soon after the decision on the designs submitted for rebuilding the Houses of Parliament, when much commotion was caused by the fall of a large chandelier. Many of the competitors were present, and a few minutes before the disaster Mr. Barry, afterwards Sir Charles, had been leaning under the chandelier examining some capital drawings by J. D. Harding. The host lessened the prevailing dismay, and led the way to a resumption of the gaiety which had prevailed by proposing for discussion the question, whether if the brazen delinquent had wrecked the successful competitor as well as the table the incident would not have afforded more pleasure than pain to many of his guests. Harding's drawings were ruined, and much commiseration for Donaldson was expressed on that head. The artist, however, behaved handsomely, refusing to accept, as I heard afterwards, anything more than a comparatively trifling solatium. A quarrel grew out of this competition, some will remember, which led to much talk at the time, and, strange as it may sound now, had nearly resulted in a duel. Mr. Savage, the architect of Chelsea Church,

and one of the competitors, took objection to some of Mr. Donaldson's proceedings in connexion with a meeting of the competitors, and two well-known lines from *Hamlet* were angrily quoted:—

"My tables, my tables,—meet it is I set it down."  
"That one may smile, and smile, and be a villain."

The intervention of friends brought matters to a peaceful ending. Both the would-be combatants, not to speak it profanely, were short "tubby" men, and, though they themselves discussed the matter with great gravity, some of the outside commentators did not.

One of the earliest letters before me refers to the first competition for the Royal Exchange, the result of which greatly disappointed Donaldson. He writes:—

"At present the affair stands thus: Messrs. Smirke, Hardwick, and Gwilt were asked to make a conjoint design. Smirke declined, but the others accepted the task. Then came my application and Mocatta's to the Common Council, which being referred to the Grand Joint Committee they decided upon considering their proposition to the three original architects as nullified by the refusal of Smirke. But the other two were requested to re-consider the eight designs named in the report, and to return two or more which were the most eligible or *perhaps the least ineligible*. They, however, declined to do this. George Smith applies to the Committee to submit a design of his own, this, the Committee refuse to allow, but come to the resolution that, whereas 51, 36 (!) and 27 were the finest designs, that one of them ought to be selected and carried into effect—that the three to which the premiums had been awarded and paid should be packed up and put by, and numbers 4 and 5 (Wyatt's and Pennethorne's) returned to the authors—that I, Cockerell, and Richardson, and Mocatta should be examined by G. Smith, who should report upon the estimates, practicability, eligibility, and reward. Cockerell and I are having estimates made. Mocatta says he has his ready cut and dried; but would you believe that the Committee will not let us have our drawings home to prepare the estimates, but insist upon our going there to the Mercers' Hall with our measures to take out the quantities."

"In confidence I will state my apprehensions. Mocatta has powerful moneyed interest in the city, and . . . his friends are moving heaven and earth for him, on the plea that his plan is more commodious, less wasteful than mine in its arrangement, and will produce a much greater rental. The Mercers are mad upon having as great a return as possible upon the letting of the building. They want to realise 10,000, per annum, and little care how it is produced. In all this there is great trick and manoeuvring. The Jews would be in ecstasy were one of the tribe of Israel to be the architect of the Royal Exchange of London, as is natural. Now, I have no interest whatever in the City. The patrons of intrinsic merit are seldom influenced by as warm feelings as those who are urged by interested motives of a personal kind, so that I have nothing to plead my cause except the design itself. I have been most highly gratified by the testimony borne to my drawings by my professional brethren, who have come forward so handsomely to express their approval of the design. This does not render me sanguine, but it encourages me to struggle on to retain the position in which I have been placed and from which I fear I shall be put aside from considerations foreign to the subject. It is very mortifying, but I suppose I am only experiencing the fortune of much greater men."

As every one knows, the affair ultimately took an entirely different turn, and the commission went into the hands of Mr. Tite, afterwards Sir William. Mr. Donaldson's design had some very fine points. He took a prominent part in another important competition,—that for H.R.H. the Prince Consort's Memorial, concerning which, in 1863, he writes:—"We, the competitors, were invited to go and see the drawings at Windsor Castle on Saturday. Digby Wyatt and I agreed to go together, and we met Pennethorne at the station. We all agreed that the series by G. G. Scott were magnificent in execution, and as pictures beat all the others out and out. As designs, of course taste must vary, but there was immense talent and taste and effect in his. He has only one design for the memorial,—like a tabernacle in a Roman Catholic Cathedral, as a piece of magnificent furniture and metal-work, 180 ft. high. He has four or five designs for the Hall of Science, very fanciful and in their way very beautiful. The interior view is a most lovely drawing, quite irresistible in point of grace and colour. We all felt that Scott must have it, and our impression is that the memorial in the Park will be abandoned, and that the Hall of Science with a very fine statue in it will be the memorial."



His labours for many years in connexion with the establishment of the new Royal Institute of British Architects, and his devotion to its interests are well known, not alone in England, but all over Europe. As Honorary Secretary and afterwards Honorary Secretary for Foreign Correspondence he worked perpetually to extend its influence. It would be easy to write much on this period of Mr. Donaldson's life, but I forbear. Some trouble was caused in the early days of the Institute by a rule on the books of the Royal Academy, which seemed likely to keep out of its ranks any architect who became a Fellow of the Institute. It is unnecessary to say that those who hesitated on this ground found little favour in the sight of Donaldson. "I am very sorry to say," he writes, "that Hardwick is coquetting with the R.A. for his Academicianship. He wants the R.I.B.A. to let him slip away from them lest he should be disqualified, as a Fellow of that body, from being a R.A. I want him to show more moral courage, to offer himself boldly as a Fellow of us, and let the R.A.s, if they dare, reject him on that ground. 'Sir Filippo' must be with us or against us. If he wishes to shirk the R.I.B.A. he must leave us altogether; but, if he does, he will sadly lose in the estimation of all, whether his professional brethren or honourable men in society." The doubt was ultimately set at rest by Barry, who refused to give up his position in the Institute, and was elected an Associate of the Academy notwithstanding. A fine fellow was Sir Charles Barry.

A memorandum from Donaldson, dated 1847, serves to illustrate the history of the Queen's gold medal. Here it is:—"I am working away on the question of the Royal Medal at the R.I.B.A. We had a meeting at Lord de Grey's on the matter yesterday (a private one), and the Council met to-morrow evening. I have hopes of a more noble appropriation of the medal than to youths for pretty drawings, and likewise of giving for the youths more prominence to the Soane medal."

At times he was very despondent, and felt he was not regarded as he should be. Thus, during the struggle for the President's chair at the Institute, he writes:—"As regards myself, I am no longer ambitious; and experience has taught me that the dreams of earlier years are not for me, and that the refining progress of Hope deferred need not necessarily lead to the result desired by the wise man, but rather to purify the mind and raise other aspirations higher still. I could have wished that, at least, one of the secretaries to the R.I.B.A. should be a senior in the profession. Earnestness and zeal are not always necessarily seconded by wisdom, and experience does much to produce it." Earlier in his life it had occurred to him that the press scarcely gave him as Professor of architecture at University College, or his brother professor at King's College, that assistance and encouragement he thought he might have looked for. Here are his thoughts on the subject:—

"In my own case I give every year about 100 or 150 lectures. I stimulate the pupils as much as possible. I take them to the buildings of chief importance in the metropolis and point out their merits of design and execution; the demerits they themselves perceive. I have hundreds of illustrations, and I have various experiments more fully explanatory of my principles. And I am gratified to say that a class of thirty amply repay by their attention and conduct the pains I take, and their notes are really full of intelligence. Yet, with all this painstaking and anxiety, the papers do not condescend to notice such labours of professors by a word, and I do not encourage by a friendly remark; and I do not recommend. If we did so more, surely it would not be in vain if we point out the subjects to be studied, the method to be pursued, the sources of information to be consulted, the works that have been executed, and the merits of the great men who have done great works. Those who follow the course have all the materials of mortars and cements, the lime slaked, the mortar mixed, and bricks and tiles united, before their eyes, by a cement,—in fact, all the processes of construction,—it must be confessed, imperfectly; still their attention is directed to points for observation, and they get the method of observation."

The illustrations mentioned in the letter were excellent, many of them made with his own hands, and have been handed down first to

his immediate successor, the estimable Professor Hayter Lewis, and are now used by Professor Roger Smith. Mr. Donaldson sketched well. Only a few years ago, when he visited Egypt, he brought back a large number of agreeable and interesting drawings. To save time, he often employed a *camera lucida*. On one occasion he writes: "I have been examining a *camera lucida* invented by our Corresponding Member, M. Revoil. I use greatly our old *camera lucida*, and doubt whether this supersedes, nay, equals, it. It is not so compact for carrying about and use; and I think ours gives the distant objects quite as large. M. Revoil is author of the fine work 'Architecture Romane du Midi de la France,' and other publications on the antiquities at Nîmes and elsewhere; he resides at Nîmes, and is an Active Correspondent of the Institute."

Mr. Donaldson early joined me in the foundation of the Art-Union of London, and remained one of its most active and useful supporters to the last. He was one of a small committee who drew up an admirable report on its possibilities which was of great service in shaping its course. He fully understood its value. Thus, during the time of the Parliamentary Inquiry as to Art-Unions, which was carried on in 1866, he writes:—"I hope to meet you to-morrow and have a few minutes' chat as to evidence before the Committee of the House of Commons. I think we must dwell much upon the educational purposes of our Art-Union, and the object, to instil a love for art in the middling and lower classes by the diffusion of good productions,—as our prints and series of illustrations, 'Pilgrim's Progress,' the 'Idylls of the King,' and the 'Norman Conquest of England'; the promotion of good line-engraving, we being now almost the only executors of works of purely line-engraving of any size at this moment; our encouragement of medal die-engraving; and our introduction of able men such as Henry Selous and Prioli as book-illustrators. We might speak too of the many works of art sent by us to the colonies and foreign parts."

Warm-hearted and impressionable, he never failed to show how fully he participated in the troubles of his friends. In this connexion I shall probably be pardoned for printing a note dated June 23, 1863, though it includes references to a personal loss:—

"I sympathise deeply in your sorrow for one of the best of fathers, whose loss must be irreparable to you, and whose sweetness of disposition endeared him to all who had the privilege of knowing him. I entertained for him the most sincere regard and respect, for he was very kind and considerate with me in a difficult case, when I was, as a young man, entering upon professional life. Sweet is the memory of such a man, whom all must have loved, and, at the same time that we feel for your sorrow, we are sure that your memory must ever dwell upon the remembrance of him as one of the best, kindest, and most judicious of friends and fathers. I return to my home this evening and find two of the saddest announcements,—your loss, and the death of my equally excellent friend Ludwig Förster, of Vienna, on the 16th inst., in the sixty-seventh year of his age, your colleague as the literary chronicler of our art. He had been ailing for some time, and some months since went to Venice in search of health, and whence I received from him, some weeks ago, a charming letter (equal in interest to Hitlerff's), written playfully in Italian. He was a very dear friend of mine also,—a man of sound judgment, of the noblest principles, notable for his firmness of character, a sound Protestant and patriot, and held in deservedly high estimation at Vienna, where, as a politician also, he took part in the leading liberal movements of the day. May both rest in peace, honoured on earth, accepted in Heaven!"

Let me give another example in the letter he wrote, when asked to pen a few notes on the death of Sir William Tite:—"I have not the heart," he says, "to write about one with whom I have been intimately connected for these last several years, and whom I have lost so recently. And I have so often written necrological notices, that at length my pen falters. Had I the spirit which I once possessed, I could dwell upon the many noble qualities of our deceased friend. A man of acute perception, vigorous judgment, and firm decision; munificent to a princely degree; generous to every claim of want and misfortune; active to serve his friends and all members of the profession; a

true lover of literature and the arts; with his purse open as his heart, having not only the means, but the will to do good. He was a rough diamond, impatient of opposition or control, and with no consideration for those who attempted to impose on or oppose him. He had a determined energy in all he thought and did; indefatigable, for he was never idle. It is a pity that architects will attempt to disturb the well-earned reputation of their deceased brother professionals, and that young Grellier should attempt to claim for his father the design for the Royal Exchange; with much greater grounds might I have urged my pretensions for the façade, when Tite told me *himself* that he had taken my portion. Grellier's was not the first; mine was the first of the highest class."

Mr. Donaldson, Mr. Penrose, and the writer of these notes were called in by the Lords of the Privy Council, at the suggestion of Sir Henry Cole, 1857, to arrange, name, and date, so far as was practicable, the architectural casts belonging to the Government, including a large collection that had been made by Sir Charles Barry, to facilitate the works at the Houses of Parliament, and this was done with some pains. It may be as well to print the first memorandum on the subject received from Donaldson:—"We shall I presume recommend in order to render the casts fully valuable, as objects of study, that the separate fragments of one subject be put in combination so as to complete the subject, and in juxtaposition with like objects for the sake of comparison. This is the only way to render them really available. If treated otherwise, they are only fragmental and deficient in the sentiment and meaning belonging to the whole entire object. What should we think of the head of the Apollo or Venus on one screen, the arms on another, the legs on a third, and the torso on the shelf?" Whether or not these casts are now kept together and made available I do not know. Since the present able manager, paraphrasing a well-known line, has given up to mankind what was meant for South Kensington, there has been a lengthened lull in that direction.

I will take two or three more letters on subjects of independent interest. Here is one, for example, that refers to an early Association of London Architects, and to one of its members who did good service, Joseph Woods. "I have written," says Donaldson, "to my friend Joseph Woods, author of the 3<sup>d</sup> vol. of Stuart's 'Athens,' of 'Letters of an Architect from Greece and Italy' (a very striking work, and remarkable for the period), and architect of the Commercial Sale Rooms, Mincing-lane, &c., respecting the old Architectural Association, and enclose his reply. I had thought, and think still, that an elder brother of mine, dead fifty years ago, was one of the body. However, Mr. Woods's memory is good, and so I stand corrected. Joseph Woods is one of the most estimable of men, and retains his faculties remarkably well, although eighty-four, and more. Mrs. D. and I spent two or three days with him and his sister last year at Lewes. There he was, in his study, finishing up some of his Grecian studies made above forty years ago, and discoursing of arts and artists with great vivacity, and of the reminiscences when we were together at Rome, and we knew Canova, Camuccini, Thorwaldsen, and other men of mark there, and John Soane, jun., Bassevi, Bond, Saunders, Geo. Rennie, sculptor, and other such, now passed away. Hardwick and myself used to go to his rooms, and we read Goldoni and Alfieri together, and battled it out on many questions of taste regarding Greek and Roman architecture. To-morrow I am going down to Oxford to value the property of Christ Church for assessment to the town rates, appointed the valuer by the Poor Law Board, as I was two years ago the referee to decide the assessments of the Colleges and University of Cambridge."

Mr. Woods, in reply, is not able to speak positively as to who were members. He writes, however:—"James Savage was certainly one, and Edmund Aikin, also Samuel Bealey. I saw a good deal of him about that time. Billing and Birkhead, no; Bubh, a sculptor. Charles



Augustine Busby had been my fellow pupil at Alexander's; Cood, maker of artificial stone; Lowry, the engraver, we used sometimes to see, but I doubt if he was a member; Perry, no; Schroder, a sugar-baker; I think neither of the Smiths; Josiah Taylor, the bookseller; J. Wallen was also at Alexander's, but whether he was a member or not I do not know; he and Taylor, I think, are both dead. I think there were one or two more whose names I cannot recall, but Joseph Parkinson was certainly one of us. We published separately a book on the Doric order, written by Edmund Aikin, which brought us into trouble, for Wilkins got an injunction against it. The statements did not profess to be original, and Wilkins was largely quoted, but there happened to be one place where he was not cited, which induced the court to grant the injunction. Afterwards Wilkins consented to withdraw his opposition on condition that his crotchet about the Temple of Solomon as a Doric building should be omitted in Aikin's book. N.B. This was not the passage on which the injunction was granted."

Some comments having been made on one of Mr. Donaldson's papers by Mr. Jermyn, he at once writes a justification, first telling me that his paper was written for a general audience in general terms:—

"Dion Cassius is, according to Burgess, in his work on Rome, the authority for the story about Apollodorus losing his head for his daring criticisms of Hadrian's design.

My allusion to the sizes of columns was also intended as a general illustration of the scale of the Roman buildings built of marble, and, without meaning to particularise, I had in view the Mars Ultor, which, according to my dimensions, I calculate to have been 6 ft. 1½ in. diameter, and 57 ft. 11 in. high, which in round numbers I gave as 6 ft. in diameter, and 60 ft. high, thinking that the memory better retained round numbers than broken ones.

To give you some idea of diversity of opinion as to dimensions, I will compare Mr. Jermyn's with Taylor and Cressy's dimensions of two temples:—

|                          | Jupiter Stator. |         | Taylor and Cressy's. |  |
|--------------------------|-----------------|---------|----------------------|--|
|                          | Mr. Jermyn's.   | ft. in. | ft. in.              |  |
| Diameter of columns..... | 4 5             | .....   | 4 10-2               |  |
| Height .....             | 45 3            | .....   | 48 4-9               |  |
|                          | Jupiter Tonans. |         | ft. in.              |  |
| Diameter of columns..... | 4 4             | .....   | 4 8-3                |  |
| Height of do. ....       | 44 0            | .....   | 48 5-2               |  |

And Taylor and Cressy's dimensions are considered to be generally accurate.

I did not state the Pantheon dome to be twice the size of that of St. Paul's. What I did state was that the Pantheon dome was 142 ft. in diameter, and St. Paul's a little more than 100 ft. Its precise diameter at the base is, I think, 101 ft. 6 in.

As regards the tomb of Hadrian and the columns of St. Paul's without the walls, I mentioned what is the tradition at Rome, and the account recorded by Vast in his *"Itineraris"*; but on reference I find in pencil on the margin of my own book the probability of the columns being taken from the Basilica *Æmilia*."

Turning over these old letters, one is tempted to refer to incidents the mention of which might seem egotistical. Thus, in one of them, "Donny," as he was affectionately called by some of his intimates, speaks in the warm language common to him of a dinner given by the present writer, the guests at which were mainly architects, with a sprinkling of engineers and men of letters. "Every one," he says, "was well pleased, and we shall not easily forget that happy evening." I can recall as amongst them besides Donaldson, Cockerell, Barry, G. G. Scott, Sydney Smirke, Tite, Digby Wyatt, Wentworth Dilke, the father of the present untirable member for Chelsea, and Robert Rawlinson, then fresh from Liverpool. Probably because the leading members of the profession then met together less often than they do now, this dinner was often talked about; only a few months before Digby Wyatt's untimely death, he boasted good-naturedly, with the tears in his eyes at the same moment from bitter dread of what was coming, that he was the youngest man that had been invited on that occasion. Sir William Tite, a day or two after the dinner, having had a little fight with Mr. Rawlinson (who was the trusted friend of Elmes), as to the completion

of St. George's Hall, said that he ought not to have been included, not having won his spurs. Donaldson was more far-seeing, and prognosticated for him an eminent career, a prognostication which has been more than fulfilled. "Where is that *barby* now?" Sir Robert Rawlinson, unless I am mistaken, is the only member of it who remains amongst us.

Considerations of time and space suggest conclusion, or I would gladly speak, among other incidents, of a remarkable week passed with Donaldson in Antwerp when, on the occasion of a Rubens Festival, we represented by invitation with Wyatt, David Roberts, and others, several English art bodies. Some of Donaldson's speeches, in fluent French, during the business part of the proceedings, surprised all who were not previously acquainted with him. This and many other matters, however, must be passed over. His latter days were spent happily. After the death of Mrs. Donaldson, an interesting and wise lady, his sister, Miss Donaldson, and his son, Mr. Thomas Olintus Donaldson, tended him with affectionate care.

#### NOTES.

IT is gratifying to find that after a very long dispute, interrupted by several divisions at various stages, the clause of the "Housing of the Working Classes" Bill which suggested the sale of the prison sites at artificial prices was, on Tuesday night, practically left in abeyance for the present, the Home Secretary recognising the fact that as the discussion proceeded there was at least an increasing minority against the clause. The speech of Mr. Bryce on the subject deserves careful attention. The amount of the subsidy (for such it practically was) which was proposed might, he said, be relatively small, but the principle involved was a large one. "Supposing the land on which the prisons stood was worth 10,000*l.* an acre, and it was sold under the Bill to the Metropolitan Board of Works for 8,000*l.* an acre, that would be a subsidy on the part of the State to the amount of 2,000*l.* an acre. How was the Metropolitan Board of Works to deal with the dwellings to be built on these sites? Was it to let them at the ordinary market price? If it did, it would make a profit corresponding to the difference between paying 8,000*l.* and 10,000*l.* an acre. Was it intended that the Metropolitan Board should become a landlord, making a profit? That was a very undesirable function for it to assume. Yet there was no advantage in selling the site below the market price unless they were to let the dwellings below the market price. On the other hand, if the dwellings were let below the proper market rate the influx of people into London would be encouraged, and the great evils arising from the undue pressure of population would be stimulated." That is exactly what some of the benevolent wise-aces, who are bestirring themselves on this subject, cannot for the life of them see. London is suffering enormous evils from overcrowding; let us offer additional inducement to poor and struggling persons to crowd into London! That is just what it comes to.

THOSE who have to consider the question of repairing the buildings of a benefice under sequestration have now to bear in mind that they are tied and bound by the provisions of the Ecclesiastical Dilapidations Act, 1871. The recent case of *Kimber v. Paravicini*, Law Reports 15, Queen's Bench Division, p. 222, shows how easy it is for well-meaning persons to make a costly mistake in regard to this subject. The benefice of Avening, in Gloucestershire, was sequestrated by writ, and the Bishop's secretary,—a solicitor,—was appointed sequestrator. After the sequestration, the diocesan surveyor was directed by the Bishop, under the above Act, to inspect the glebe buildings, and to estimate the cost of their repair. He accordingly did so, and reported that the necessary repairs, as set out in the annexed specification, would cost 140*l.* By

the 16th section of the Ecclesiastical Dilapidations Act, 1871, objections to the report of the surveyor must be sent in within a month after a copy of it has been sent to the Incumbent and the sequestrator. By the same section, if no objection is taken within this period, the report becomes final, and this is what occurred in the present case. Presently a fresh surveyor was appointed. The sequestrator himself afterwards visited the premises, and came to the conclusion that the estimate of the former surveyor was wholly inadequate, and that very considerable repairs were required in order to properly maintain the buildings. These repairs were accordingly put in hand, and cost 780*l.* Mr. Waller, the new surveyor, visited the buildings from time to time, and made recommendations to the sequestrator, but the Bishop did not at any time direct him to make an inspection or report. There was really no question that all the work was necessary, but the Incumbent excepted to the accounts of the sequestrator on the ground that he was not entitled to spend more on the benefice than was stated in the report, and he therefore asked for all the items other than those mentioned in the first surveyor's estimate to be disallowed. The consequence of this opposition was that the Court came to the conclusion that the Incumbent was in the right, so that it would seem that the unfortunate sequestrator would have to pay all the cost above 140*l.* out of his own pocket. It was contended, on his behalf, that, as before the Act of 1871, he had power to do anything necessary to keep the buildings in proper repair, he still had it under the saving clause of the Act of 1871. But it was pointed out by Lord Coleridge that the twelfth and following sections seem expressly to apply to such a case as this. The Bishop could at any time have ordered the surveyor to make a report during the sequestration, and then, following on it, the necessary repairs could have lawfully been made and charged against the revenue of the benefice. But in addition to the fact that this case shows that the provisions of the Act must be carefully followed, it further calls attention to the necessity that the report of the surveyor,—especially in a case of sequestration,—should be full and correct. We say in a case of sequestration, because it affects third parties, who are waiting for their money; and every one, incumbent, creditor, and bishop, should know the exact position of matters. If the Bishop of Gloucester's surveyor had, in the first instance, made a comprehensive report, all the subsequent proceedings would have been unnecessary.

THE dividend of the Primate of England Railways, the London and North-Western, for the half-year, is officially announced to be at the rate of 6 per cent. per annum, against the same rate in the corresponding period of 1884, and 7 per cent. per annum in 1883. The Great Western pays 4½ per cent. per annum, carrying forward 8,500*l.*, against 5 per cent. last year, when 7,183*l.* was carried forward. The Great Northern Railway directors declare a dividend at the rate of 3 per cent. per annum on the original stock, carrying forward a balance of 3,136*l.* The diminution in the traffic of this line for the half year has been 18,560*l.*, falling to 1,775,538*l.* from 1,789,469*l.* The working expenditure has increased by 2,348*l.*,—the co-efficient of working costs being thus a little more than 59 per cent. On the London and South-Western Railway there has been a decrease of 6,733*l.* in revenue, and an increase of 19,802*l.* in working expenses, the co-efficient of working cost having risen from 58·2 to 59 per cent., and the dividend having declined ½ per cent. as compared with that fatal first half-year of 1884. The Maryport and Carlisle divide at the rate of 7½ per cent. per annum, against 9 per cent. for the corresponding period of last year. The directors of the Midland Railway recommend a dividend on the ordinary stock, for the last half-year, at the rate of 4½ per cent. per annum, against 5 per cent. for the corresponding period of 1884. Thirteen thousand pounds are carried forward in the present accounts, against 12,900*l.* last year.



THE report of the Gas Light and Coke Company possesses an interest for even a wider class of readers than the owners of gas works or the consumers of gas. It throws much light on both the general depression of business, and the steady increase of the pressure of taxes than on urban residents. A steady increase has taken place in the sale of gas, which, with some other items show an improved receipt for the half-year of 41,783L. Against this, however, has to be taken into account a decrease of 51,000L. in the receipts for residual products, or about one-seventh of the selling value. This the directors attribute to the depression of trade. On the other hand, there has been a reduction of 12,500L. in payments for coal, forming part of a general economy of 27,753L. in the expenditure for the half-year. During the year the company had paid rates and taxes to the amount of 123,000L., which as nearly as possible comes to 4 per cent. on their gross revenue of 3,095,000L. The other features of the report are satisfactory, and the Company reports the annual feature of a reduction in their capital account. The good results of the virtual partnership which is established by means of the sliding scale between the company and their customers are most conspicuous in the accounts of this great company, of which the capital amounts to nearly four-fifths of that of all the metropolitan gas companies taken together.

IN strong contrast to the general reduction in net earnings, and increase both in capital and its working expenditure, of the railway companies of the United Kingdom for 1885, is the 10 per cent. dividend, with a 1L. 5s. bonus, amounting in all to 12½ per cent. per annum, of the London General Omnibus Company. The net profit thus declared amounts to 38,305L., while a balance of 7,440L. is carried over to the next account. The omnibus company shares with the companies that carry on ocean navigation the great advantage of having no capital invested in roadway or works. Thus, while their working costs amount to between 94 and 95 per cent. of their receipts, the remaining 5 per cent. is enough to pay this handsome dividend on the small amount of capital that is invested in vehicles and horse stock. Next to road vehicles in net earning powers come tramways; while the cost of the road is kept so low that with a working cost-coefficient of 80 per cent., from 5 to 6 per cent. dividend is earned. On lines like the Metropolitan Railway, where the working expenses are reduced to some 35 per cent. of revenue, the cost of capital is such as to reduce the net dividend below that of either the tramway or the road vehicles. What will ultimately be the consequences of the steady increase of capital, now amounting to more than 42,000L. per mile for the whole of the United Kingdom, accompanied by the steady growth in the proportion of working cost to revenue on our railways, it is more instructive than agreeable to contemplate.

DR. SEPTIMUS GIBBON, the Medical Officer of Health to the Holborn District Board, calls attention in his Annual Report, which has just been issued, to what he calls the intimate relation which exists between the existence of rookeries and slums . . . and the injurious, immoral, and obstructive buying and selling in the public thoroughfares of the metropolis," and gives it as his opinion that the character of these places would be greatly improved if Parliament were to set some limit to street trading, the worst of the tenement houses in the Holborn district being occupied by posternmongers and persons of a like description. Dr. Gibbon thinks that little permanent good can be effected unless measures are taken to reform the inhabitants of rookeries, and this, he believes, can only be done by legislation. It is difficult to perceive the connexion between street trading and unsanitary dwellings, or how street trading can be suppressed without the provision of some substitute for the present system. There can be no doubt that the practice of selling from barrows placed in the public thoroughfares is rough, untidy, and perhaps demoralising, but the remedy

would be the establishment of markets, and this is within the power of the Sanitary Authority. Dr. Gibbon's suggestion that, if the people are improved the houses will improve, is a very topsy-turvy idea, and is worthy of the author of the "Bab Ballads." The District Board appear, however, to act upon this principle. The only houses within the district to which the Artisans and Labourers' Dwellings Act, 1868, has been applied during the past year were four houses in Fleur-de-lis-court, and to those acquainted with the miserable tenements in the rear of the houses in Gray's Inn-road, this fact will speak conclusively.

THE discovery has just been made at Tanagra of a tomb decorated with encaustic paintings. Unhappily, before the proper authorities could be on the spot the tomb had been secretly rifled and the painted slabs dragged from their original position. As they could not be observed *in situ* they were at once removed by the Inspector of the Tanagra Antiquities to Skirmari, where they are housed in safety. Here they were seen by Dr. Fabricius, who gives a full account in the "Mittheilungen des Deutschen Archäologischen Instituts," x. 2. It will be remembered that Dicaearchus, in his invaluable account of Tanagra, notes (Fragm. Hist. Græc., ii. 257), that the city was famous for its encaustic votive offerings (*ἡ πόλις . . . καὶ ἱερὰ μασὶν ἀναθηματικαῖς κάλλιστα κατισκευασμένη*) so that these encaustic tomb decorations acquire a special interest. Of the four slabs the two narrow end ones are decorated as follows:—The slab broken in four pieces is painted with the head and shoulders of a horse seen in profile, the style is lively and naturalistic, the colours employed chiefly red and black. To the right of the horse are painted a sword, scabbard, and belt, evidently the arms of the buried warrior. On the second narrow slab is painted, in not very distinct outline, a loom, with much less detail than the loom of Penelope on the Chiusi skyphos, but still quite unmistakable. These two end slabs of the tomb tell an evident tale. The horse and armour are the symbols of the buried warrior, the loom the fitting emblem of his thrifty wife. The tomb probably belongs to the third century B.C. A description of the designs of the side slabs we reserve till the paintings are published, as their meaning is less clear.

FROM the 'Eoria (No. 495) we learn that excavations are being carried on by an Italian of the name of Albert. All objects discovered are to be placed in the Museum of the Herakleion, which already contains important remains of archaic Cretan art. Archaeologists now-a-days incline to attach much importance to this early Cretan art. Tradition connected the names of Dædalus and his pupils, Diponeus and Soyllis, with the island, and it may be that Crete will eventually furnish us with specimens of archaic sculpture, which may rightly be regarded as the ancestors of the earliest Peloponnesian statues that remain to us. It is very desirable that Cretan remains should be collected into one museum; at present what little we possess is scattered far and wide. A fine bit of archaic bronze work representing the meeting of two hunters, one of which carries the wild creatures he has shot on his shoulders, is now in the Louvre, in the room devoted to recent acquisitions.

A CURIOUS and most unusual appeal case was tried in the Law Courts before the Lord Chancellor, which is worth recording, though in all probability such a one never occurred before, and never will again. A certain Mr. Ainslie owned extensive plantations on his estates in Cumberland, which, in the severe storms of 1883-4, suffered terrible damage, some twenty thousand larches having been blown down, to the value of 3,500L. While Mr. Ainslie, who was a very old man, was considering what should be done with all this wreck, he was felled, in his turn, by Father Time, and he slept with his ancestors before he had been able to give any orders as to clearing away the timber. Of course, this was a promising subject for a dispute between the executors and the owners of the real estate, both of whom

considered themselves entitled to it. The case was argued before Mr. Justice Pearson, who gave it in favour of the former, on the ground that the trees which were blown down could no longer grow as trees should, and that they therefore did not belong to the estate,—in fact, that they became personally. On the appeal, one day last week, this decision was reversed pretty unanimously, on the broad proposition that, as long as the trees were attached to the ground by ever so slender a fibre, they were really, but, once severed, they were personally. If a tree, said the Lord Chancellor, with its roots, was severed, even though some of the broken fibres were covered with earth, it would then belong to the executors; but if any attachment to the ground remained, it would belong to the estate. A tree might be fixed and yet as unlike a growing tree as possible, while, also, a dead tree might be, and often is, perfectly fixed. Mr. Justice Lindley, perhaps, put it in the best logic, by remarking that the storm was an accident, but for which the executors would have had nothing to do with the trees; and supposing they had been subject to some great blast or blight, the executors would still have been in the same position. On the face of it, it certainly seems as if the executors were rather sharp practitioners, and, as they lost on the appeal, they would have been better advised if they had left the real estate owners in possession of their wreckage.

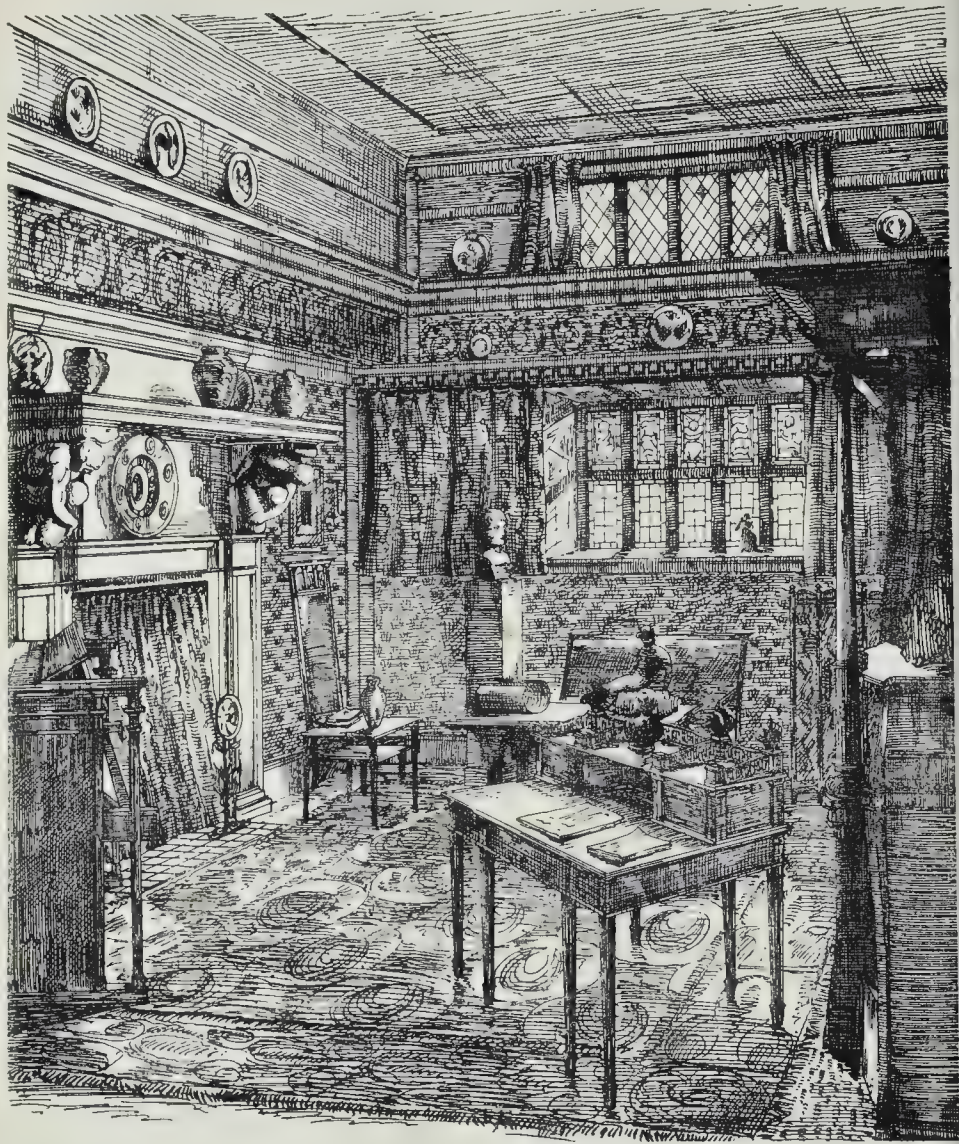
SINCE the burning of Aberystwith College, there has been some proposition made of erecting an entirely new building on another site, but the idea does not seem to have received much support among those specially interested, and we hope it will not be carried out. The present building can be restored for 25,000L. according to Mr. Seddon's estimate, and was insured for 10,000L., leaving only 15,000L. to make up. According to the report of a meeting on the subject a few days ago, there is a widespread feeling in favour of restoring the college, and we hope this will prevail, and that Wales will retain in its essentials a building which must be considered to be one of the most original and characteristic monuments of the Gothic revival.

MR. A. BRUCE JOY has been commissioned to execute a memorial, in the form of a recumbent figure, to Bishop Berkeley, to be placed in Cloyne Cathedral. The work is being subscribed for in England as well as in Ireland, as befits the wide fame of the "immaterial" bishop.

WE have received during the last week specimen numbers of two provincial architectural sketch-books; "The Draughtsman's Sketch-book," which dates from Liverpool, and is published in monthly numbers; and the Sketch-book of the Glasgow Architectural Association, Part I., for Session 1885-6. The style of drawing in the Liverpool book contains some sketches in a free and artistic style ("Porch, Wigmore Church," "Ironwork from Durham"), and some (as "La Boucherie, Antwerp," and "Doorway, West Kirby") which are very feeble in style and deficient in feeling and "touch." The variety in the Glasgow book is greater, in regard to subject; the merits of the drawings also vary greatly, but there is a proportion of good work. The most effective page, as a drawing, is Mr. McGibbon's "Glasgow Old College"; the same contributor's perspective of Glasgow Cathedral, and his measured drawings of Glasgow Athenæum, may be mentioned, and Mr. Shanks's measured drawings of the Old College, with its curiously varied ornamental window heads. If these books are fair samples, however, it would seem that architectural sketching in the provinces is still far behind the standard of such a body as the London Architectural Association.

Refuse Destructor.—We understand that the "Bee-hive" refuse destructor, the invention of Mr. Stafford, the borough engineer of Burnley, has been adopted by the municipality of Bombay.





View of Music-Room, designed by Artists of "The Century Guild."

#### INVENTIONS EXHIBITION.

FURNITURE BY "THE CENTURY GUILD."

In one of the rooms in the Old London Street in the Inventions Exhibition may be seen a "music-room" (of which we give a sketch above), the result of the united labours of the members of a society which calls itself "The Century Guild." The objects of this Guild are to invest the ordinary accessories of a furnished house with distinct artistic merit and originality. It is a society of artists primarily, and a trading concern secondarily, which is an inversion of the ordinary trading method. This Century Guild, therefore, will be watched by not a few with interest as an experiment, for it has not been constituted sufficiently long to enable one to judge of the measure of success that awaits it.

The main advantage of such a society, where the artist is brought into direct contact with

the purchaser, is in the freedom which it gives to the artist. A painter will tell you that when he works to order he never works as well as when his work is but the expression of his own thoughts. A painter should have his own message to deliver, and not have one found for him, which he has to make concrete. We know what poets do when they write for occasions. Our own Laureate is hardly an exception to the rule when he writes wedding greetings. And in the ordinary course of business a man who works for manufacturers has not so much himself as the manufacturer to please. The manufacturer has certain predilections, or, as Herbert Spencer would say, bias; and the designer must try to do two things, carry out his own ideas under the limitations imposed upon him by the manufacturer; and as a rule manufacturers are certainly not in advance of public opinion. In many instances we could name, the man who sits in judgment

on new designs or new goods is a man who is supposed to know what the public wants and likes. The buyer in a large firm is supposed to represent the public. In the case of goods already manufactured these buyers purchase those things that will find a ready sale. They really purchase the things they think the public will buy, and it is astonishing how wedded to custom and precedent these buyers are. They have generally no special training for the duties they undertake, and yet so powerful are they that manufacturers have to defer to their opinions. The consequence is that the designer is virtually judged by the buyers of the large houses, for the manufacturer has to study these buyers, and the designer has to do the same; and the consequence is that originality and individuality are looked at to a great extent as evils, unless a tight rein be kept over them. There are buyers and buyers doubtless, but too many of them are ignorant and unfitted to



every way to represent the public. It is quite amusing sometimes to hear them passing judgment on some new thing, giving it forth with all the seriousness of a weighty truth that such and such a thing will not sell, and the public is consequently prevented from exercising its own judgment in the matter through the narrowness or stupidity of a buyer.

The restrictions placed upon a designer are often so stringent that any man with strong individuality feels himself so confined that he is conscious he cannot do his best for the want of a free hand. In the majority of cases a designer is asked to work in this or that way; to follow this or that school; and not to show what is in him,—what he could do if left to himself. And one of the most hopeful signs of this Century Guild is that the designer comes directly in contact with the public. The designer works out the idea that is within him, subject, of course, to practical considerations, and the public is his only judge.

Now, the public is more ready and willing to appreciate the best than is sometimes supposed. The public is not as stupid as those who ought to know it seem to imagine. And, furthermore, originality and individuality are appreciated by the public at their true value, which is more than can be said of those who, by their position and training, one would think ought to value these two qualities highly. Manufacturers are still apt to prefer the conventionalities of a "school" to the freedom and distinction of originality and individuality; to prefer a designer, we will say, designing Louis V. furniture to designing furniture after his own heart; and as long as this principle dominates our crafts so long will they be lacking freshness, meaning, and oneness.

We have preferred to dwell upon the indirect results that may accrue from this movement for greater freedom and scope for our craftsmen, in order that our manufactured art may reflect the spirit of the age, rather than upon the work of the guild itself in detail, more especially as we are able to give a few sketches of some of the work exhibited by the Guild. The architects, Messrs. Macmurdo & Horne, have succeeded in giving us an original room, and, at the same time, a very simple one. The woodwork is painted white throughout. The lower part of the wall and the frieze above it are papered with a dark low-toned paper. The frieze, consisting of a series of figures playing on divers instruments of music, surrounded by conventional foliage, emphasises the purpose to which the room is intended to be put, which is further carried out in the curtains, the design of which consists of angels blowing trumpets, powdered over a dark ground. The painted glass in the lower windows also is suggestive of music, and is originally treated, and, considering the little light absorbed by the painting, is rich in effect. Glass for domestic purposes cannot be too delicate and unobtrusive, otherwise the feeling of repose so essential in our every-day surroundings is absent.

The cabinet work which is perfect in workmanship (it is manufactured by Messrs. Wilkinson & Son, of Old Bond-street, who act as business agents to the Guild), is well designed, every detail being carefully thought out, and the proportions well considered. The cottage piano is so designed as to be able to be placed in the room, and not with its back turned to the wall,—an obvious improvement on the ordinary piano design, and one that should be generally adopted. One of the chairs, with a painted fretwork back of very original design, pleased us. This breaking away from custom cannot fail to produce striking results in the hands of a skilful craftsman. The getting out of a groove is the first necessity towards originality.

The fireplace has a projecting shelf supported by two figures, and is a somewhat new feature. The figures themselves are well modelled, and are in every way works of art. The metal work, consisting of beaten brasswork, is excellent in workmanship, two large repoussé dishes being particularly notable. The brass is left dull, and not lacquered, and a certain "quality" is imparted to the work, which one misses in the bright staring polished yellow metal one generally sees.

The colouring of some of the textiles is rich and harmonious, and, like most of the work exhibited by the Guild, they possess a style of their own,—a fact we are glad to chronicle in these days of revived fashions. Revivals are most excellent, where the spirit is retained to the exclusion of the letter, for, after all, the best

style is "individuality," and works of any kind, from a wall-paper to a picture, are interesting in proportion as they are dominated by the spirit of the worker.

Fig. 1 is reproduced from the working cartoons for the lower window in the room. White glass is used, and the tracing is delicate, little stain being introduced. The other three

© Macmurdo.



Fig. 6.

lights consist of figures playing on musical instruments.

Fig. 2 is one of a series of five painted panels for the back of a rosewood bench.

Figs. 3 and 4 are reproduced from the frieze and filling used in the Music-Room. The colour of both is neutral and dark, to throw up the light woodwork.

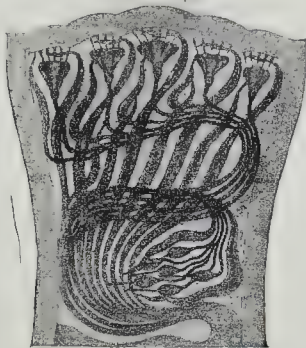


Fig. 7.

Fig. 5 is taken from a very carefully-wrought repoussé brass dish.

Of the two cuts in the text, Fig. 6 is taken from one of the wrought-iron dogs, the flower being repoussé brass; fig. 7 is the back of a chair in open fret-work; a design which may be regarded as a youthful eccentricity, but which is at least original and suggestive.

In addition to the work figured here, there is exhibited in the Music Room at the Inventions Exhibition some sculpture by Mr. Creswick and Mr. Roscoe Mullins; some needlework wrought in the School of Art Needlework; a novel carpet, designed by Mr. Macmurdo, who is responsible for the furniture; and some cabinet work, excellent alike in design and workmanship.

#### THE DERBY MEETING OF THE ROYAL ARCHAEOLOGICAL INSTITUTE.

CONCLUDING NOTICE.

We this week bring to a conclusion our special report of the Derby Archaeological Congress.\*

On Monday, August 3, a large number of members started in carriages from the Strand (a modern Derby street which does not appear to be a financial success, but which was the scene of unwonted animation on the carriage-days of the Institute's week, it being selected as a convenient and central point for the marshalling and freighting of the vehicles), proceeding first of all to Repton, midway between Derby and Barton, and formerly the capital of the kingdom of Mercia. The exceedingly graceful and delicate spire of the church was greatly admired as it was approached by the visitors. The church is dedicated to St. Wystan, and has several noteworthy features, especially its small chancel or sanctuary, with its peculiar crypt or undercroft. According to the Rev. Dr. Cox, whose views met with the acceptance of the other visitors, the small sanctuary or chancel just mentioned contains a great deal of undoubted Saxon work, much of which is plainly visible on the exterior. The walls were slightly raised during the Early Decorated period, when the present four-light windows were inserted. The crypt or undercroft is 17 ft. square, and was approached from the church by two curved passages, which still remain almost intact. The confessional window at the west end also remains. Although the crypt is described in some architectural glossaries and other works as "Saxon," it is not (as Dr. Cox pointed out) entirely so. The external walls are, no doubt, of Saxon work for the most part, but the vaulted roof and its supporting columns and wall-pilasters appear to have been inserted in Norman times.† At the same period the original nave (which Mr. Irvine thinks was of wood) was rebuilt. The two eastern bays of the nave (on each side) remained until 1854, when, according to Mr. St. John Hope, they were replaced by the present ones, "for the sake of uniformity." Two of the pillars of the displaced bays are now to be seen stuck up inside the porch. The old portions of the nave arcade, and some of the windows, are of the Decorated period. The tower and spire are of Early Perpendicular work, and the spire, as before remarked, is very graceful. The church was "restored and beautified" in 1792; until that time there was a good tomb, with the effigy of a knight, at the east end of the north aisle; but the tomb appears to have been demolished, though the effigy, much mutilated, is now in the crypt. The church contains a number of monuments to the Thacker family. It appears that further works of restoration are contemplated, and in reference to these Dr. Cox and other members of the party pleaded for the most conservative treatment, strongly deprecating the proposed removal of the present Decorated east window for the sake of inserting a window of earlier character,—an operation which was likely to be attended with serious consequences to the surrounding and superincumbent Saxon masonry.

The visitors next proceeded to the adjoining remains of Repton Priory, which were described by Mr. St. John Hope. Of the Decorated gatehouse only the outer arch remains. Nothing is left of the Almonry and other buildings of the outer court, and of the main buildings the Cellarium is the only part standing, though it has been much altered. The Priory was granted at the Suppression in 1538 to one Thacker, who, according to Fuller, "pulled the church down on a single Sunday" on hearing of the news of Queen Mary's accession,—no doubt (if the story

\* See pp. 147, 182, ante.

† Dr. Cox, among other observations with reference to this part of the church, remarked that it was thought that in Saxon days there was "a double chancel" to the church, in connexion with which he referred to the arrangement described in Mr. Butler's work on the Coptic Churches of Egypt, in which it was usual to have one chapel over another.



be true) inspired by the thought that "the better the day the better the deed." The Cellarium was purchased of Thacker by Sir John Porte, and appropriated to the use of the grammar school he founded here in 1556. Some of the pillars of the undercroft or lower story of the cellarium still remain. In 1866 some of the boys of the school were levelling a field to the north of the Priory when they came upon an ancient tile-kiln filled with tiles which had never been drawn after firing. This shows that probably most of the tiles found at Repton were made on the spot, though they are very similar to those found at Dale Abbey, and, perhaps, many of them were made from the same moulds.\* The kiln and its contents still remain, though not properly secured against damage or plunder. On one of the walls of the cellarium (now used as the big schoolroom) are cemented for preservation some very interesting specimens of the tiles found here,—notably one very good set of (if we remember right) sixteen, each of which contains part of the complete design which is spread over the whole series. The site of the Priory Church (which is stated by Mr. St. John Hope to have been purely conventual), has of late years been excavated with very good results. The greater part of the work appears to have been of the Decorated period. The church was about 200 ft. long. But for the lithographed plan of the Priory, which was inserted in Mr. St. John Hope's "Notes," the visitors would not so readily have comprehended the "bearings" of the structure, although most of the remains are uncovered; for, in striking contrast with the remains of the massive piers of the crossing of the church, a steam-driven edge-runner mortar-mill is planted right in the middle of the choir, while other building appliances and piles of material are spread over the site of the church, part of which, indeed (viz., the south side of the nave) is being covered by the new grammar-school buildings, now in course of erection from the plans and under the superintendence of Mr. A. W. Blomfield, M.A. In reply to questions put by some of the visitors, it was stated that all existing remains of the priory church will be retained *in situ*—the bases of the piers of the south arcade of the nave being retained under the floor of the school, and their precise position permanently marked on the surface of the floor above. A great number of stones, consisting of arch-moulds, rib-vousoirs, bosses, caps, bases, and other details, have been roughly built up for preservation in a wall opposite the new school building, but they form a curious *alla potrida*, no intelligent supervision having been given to their arrangement, as may be inferred when it is stated that most of the stones are placed in impossible juxtaposition with each other, and many of them upside down. Their higgledy-piggledy collocation is probably only intended to be temporary.

Thanks having been given to the vicar of Repton and to the head-master of the Grammar School for the facilities which they had afforded to the excursionists,

The carriages were resumed, and a pleasant drive of about eight miles, through Melbourne, brought the visitors to Breedon Church, which is all that remains of the Priory Church of Breedon, the situation of which, on Breedon Hill, is very striking. Breedon Hill itself is an outlier of carboniferous limestone, rising boldly above the surrounding Keuper sandstone. So prominent a landmark may well have been chosen as a stronghold, and on ascending the path to the summit it is apparent that the top has been encircled by an earthen rampart with an outer ditch, these works being locally known as "The Bulwarks." The south-eastern part has been removed by the quarrying operations, but the greater part of the remainder of the circuit can be traced. It was stated by Mr. Hope that no systematic plan or examination of this extensive earthwork has yet been made. Almost in the centre of the plateau which forms the top of the earthwork is all that survives of the Priory Church of St. Mary and St. Hardulf, which was described by Mr. St. John Hope. The church was given about 1144 by Robert de Ferrers to the Augustinian Priory of St. Nostell, Yorkshire, and a prior and five canons were thereupon established here. The church, which was parochial and

conventual, was purchased of the king at the suppression of the Priory by Francis Shirley of Staunton Harold, and given by him to the parish, so that the whole building thus became parochial. Only a portion of the church bought by Francis Shirley now remains. It consists of a choir and aisles of four bays, the once central tower (which from its massiveness and elevated position is a prominent object for many miles around), and the south transept (converted into a vestry and porch). The nave and its aisle have been demolished. There appears never to have been a north transept. Mr. St. John Hope thinks that the abode of the canons was probably a house on the north side, and not a cloister with a circuit of buildings. The choir-piers are curiously variable in plan, the central pillar being hexagonal and the one on each side of it quatrefoil, while the responds are again different. The capitals are plain, except that of the north-east respond, which has good foliage. The north aisle retains its vault, but that of the south aisle has been destroyed. The walls and arcades are Early English, but during the Decorated period larger windows were inserted in place of the original lancets. Only three of the latter are left: one at the west end of the north aisle, and the other two in the east ends of the aisles. The great east window has been replaced by the present Georgian monotony. The south aisle windows are Early Decorated, but those on the north side are somewhat later, with flowing tracery, circa 1335. There are some fragments of old glass in the north aisle. A band of incised work running beneath the east window, and some pieces over the arcades internally, and on the exterior of the porch, are very curious, and deserve attention, the carving being very good. Some of the visitors were of opinion that these details date from the Saxon period. The tower was raised in the Perpendicular period; externally the lower part of it is Norman. The whole of the ancient fittings have disappeared. When the Shirleys bought the choir the north aisle was raffled off for their burying-place; here are some good late tombs. With reference to one of these, Mr. St. John Hope read an indenture dated August 9, 27 Elizabeth (1565), but unexecuted, between George Shirley, of Staunton Harold, esq., and Richard and Gabriello Rogley, of Burton-on-Trent, tomb-makers, whereby the Rogleys were to undertake to make, and set up at Breedon, an alabaster tomb, with effigy of John Shirley, with heraldic devices, &c. The tower and the foundations thereof, to be at Mr. Shirley's cost, he undertaking to pay the tomb-makers 22*l.* for the tomb itself. A notable feature of the church is the Ferrers pew, a large canopied structure erected by Sir Henry Shirley, and bearing the date 1627.

On leaving Breedon Church the visitors resumed their carriages, and drove to Melbourne Church, which was inspected under the direction of the Rev. J. R. Boyle. This church is one of the finest and most interesting of the whole series of churches visited by the Institute. Dedicated to St. Michael, it is a cruciform structure, consisting of a chancel, central tower, north and south transepts, nave with aisles, and western portico flanked by two small towers. With the exception of the upper part of the tower and the eastern half of the chancel, the whole church is, in the main, of Norman work, circa 1120. The nave is separated from each aisle by five skilled Norman arches, 20 ft. high, resting on circular pillars 4 ft. in diameter, on square bases. Both transepts and the chancel once had eastern apses. The Perpendicular rood-screen remains. There is evidence to show that over the groining of the chancel apse was an upper chamber, which it is conjectured may have been the separate chapel of a religious community, who may have had access to it through a doorway (still apparent) at the eastern end of the south wall of the south aisle, by the stairs in the south transept, and by the arcaded passages or triforia in the transept, and in the south and east sides of the central tower. The upper part of this central tower is of post-Norman work, but of uncertain date. The church was restored by Sir Gilbert Scott in 1862, at which time the small western towers received their present slated pyramidal roofs, which were adversely criticised by some of the visitors to the church last week. There is a fine Norman doorway at the west end of the church.

From the church the visitors adjourned to Melbourne Hall, formerly the seat of Lord

Melbourne, who was Prime Minister of England at the time of Queen Victoria's accession to the throne, and additionally noteworthy as the place where Baxter wrote his "Saints' Rest." The northern wall of the hall is stated to be of the date 1629. The eastern front (that towards the trimly-kept and pleasant gardens) was built by Mr. Vice-Chamberlain Coke about the year 1722, from a design (it is supposed by Mr. W. D. Fane, the present tenant) of Gibbs, who was engaged about the same time in rebuilding the body of the Church of All Saints, Derby. Having inspected the grounds and some of the contents of the hall, the visitors, after partaking of tea and other light refreshments kindly provided by Mr. Fane, left for Derby, a pleasant drive of eight miles, crossing the Trent by Swarkeston Bridge, which is nearly three-quarters of a mile long. Only 138 yards of its length, however, actually cross the river, the remainder of the bridge (which is for the most part of stone) being necessitated by the oft-times flooded state of the adjoining meadows in winter. Much of the bridge is of early date, but the portion over the river has been rebuilt in modern times. There is record of the existence of a bridge-chapel here in 1552. The southern end of Swarkeston Bridge is said to mark the point reached by the advanced guard of Prince Charles Edward Stuart's army in 1754.

In the Free Library, in the evening, there was a meeting of the Historical Section, presided over by Mr. R. P. Pullan, and an interesting paper was read by Mr. Theodore Bent on "The Survival of Mythology in the Greek Islands." This was followed by a meeting of the Antiquarian Section, presided over by the Rev. Dr. Cox. The Baron de Cosson read a paper on English Monumental Effigies, of which we gave a *résumé* in our last number (p. 203). On Tuesday, August 4, a large number of the members and their friends left the Midland Station at Derby at 8.30, and proceeded per special train to Chapel-en-le-Frith, where carriages were in waiting. A drive of about six miles, nearly all up hill, brought the excursionists to the head of Hope Dale. The first five miles is through a wild and rugged district, but on turning the corner beneath the hill called Mam Tor, the beauty of the valley suddenly bursts into view. A pleasant and invigorating walk through the picturesque pass known as "The Winnats" (stated to be an abbreviation of "Wind-gates") brought the party to the little town of Castleton. Thence the somewhat precipitous ascent to Peak Castle was made. Of this stronghold little besides the keep remains, and this is far from perfect, much of the ashlar-work, which is of a fine-grained grit, having been ruthlessly stripped off for the purpose of repairing the church in the valley below. The keep is notable not so much for its size and extent as for its remarkably strong position, three of its sides being practically inaccessible for offensive purposes, and the fourth almost so. The main features of the existing remains were pointed out by Mr. St. John Hope, who observed that this stronghold was not (as was too commonly supposed) the scene of the story told by Sir Walter Scott in his novel "Peveril of the Peak"; the building indicated in that story was undoubtedly Huddersfield Hall. There are some traces of horring-bone masonry in the basement, and also in the west side of what remains of the curtain wall. The garde-robe exists in tolerably perfect condition. The keep is rectangular, and is nearly 60 ft. high, in three stories. It measures about 21 ft. 3 in. by 19 ft. 2 in. internally. There is a record of the site in Domesday, and in 1068 the Honour of Peveril, with other large possessions, were given by the Conqueror to William Peveril. In the second year of Henry II. the castle was in the possession of the Crown.

After luncheon at the Bull's Head Inn, Castleton, the visitors again took to the carriages, and were driven to Tidewell Church, where they were very kindly received by the vicar, the Rev. Canon Andrew. The church is dedicated to St. John the Baptist, and consists of an unusually large chancel, north and south transepts, a nave with aisles and south porch, and a western tower. All the church, except the tower, is of good Decorated work, but of different dates, and the interior, as a whole, is very effective. The church is, in fact, as Canon Andrew pointed out, one of the most perfect parish churches extant in Derbyshire, or in any

\* In reference to the tiles and other fragments (including the effigy) at Dale Abbey, the last museum in which they are preserved on the spot was by a misprint in our last (p. 186, col. 1) described as the "Art Museum."

\* Locally pronounced "Sworn'n."



other county, and is remarkable for the fact that no enlargement or curtailment of it has taken place since it was built. It is asserted that not a single window has lost the original form of its tracery, and that most of the windows still retain their original mullions and tracery, though somewhat damaged in places. The woodwork of the church has, in the lapse of time, suffered most. The roof of the chancel is new, and the roofs of the nave and transepts, except the tie-beams, principal rafters, and constructive timbers forming the principals, have been lately renewed, in well-seasoned English oak, of somewhat larger scantlings than were found on the building, and the lead renewed. The old chancel-screen of oak, till lately in a dilapidated condition, and mutilated at the top, has been restored, after investigation as to its original form. The restoration of the great west window of the tower has just been accomplished. The chancel-windows are square-headed. In the centre of the chancel is a large altar-tomb, the covering slab of which has an inscription to Sir Sampson Meyerevell (ob. 1462). Against the north wall is the brass of Robert Pursglove, Suffragan Bishop of Hall, who was a native of Tidesswell, and founded the Grammar School there in 1570. In the south aisle is a brass to Robert Lytton and Isabella his wife, of date 1493. The tower is Perpendicular, with pinnacles of singular design, the effect of which is to give the upper part of the tower (when seen from a distance and from certain points) the appearance of being cloven or split at the top. Canon Andrew observed with reference to this point that he had lately had some correspondence with the Society for the Protection of Ancient Buildings, and had been able to assure them that although the tracery was in so dangerous a condition as to require, in great part, absolute renewal, yet that it had been found possible to preserve portions of the upper tracery, and almost the whole of the remarkable transom of the window, and to replace them, thus affording proof of the accuracy of the restoration. With regard to the chancel, Canon Andrew stated that by a mistake between the builder and the architect, when the chancel was restored, its new roof was somewhat altered in pitch. The most really useful document for the elucidation of the church was a copy of the Charter of Richard II., dated 1392, refounding the Guild of St. Mary, formerly existing in the church. Mr. Gilbert Scott, son of the late Sir Gilbert Scott, in his "Essay on the History of English Church Architecture" (published in 1881), also made reference to the church, some of the statements therein made being, according to Canon Andrew, erroneous. For instance, the reredos described by Mr. Scott as having two doorways, never possessed more than one, and neither of the two niches in the reredos is above the doorway. Further, the statement made by Mr. Scott that Bishop Pursglove died of the parish in 1579 requires proof; no record of his holding the living is to be found in the Lichfield Registers. The statements that Bishop Pursglove did not wear the vestments in which he is represented upon his tomb in the chancel, "when first raised to the episcopacy by Edward VI." was a mere assertion, based on a glaring mistake, for it was in 1538, in Henry VIII's reign, that Pursglove was made a bishop. In conclusion, Canon Andrew invited the attention of his visitors to a string of twenty-one questions which he had drawn up with regard to moot points in connexion with the ecclesiastical and architectural history of his church. It may be added that he south transept contains a (restored) high tomb, with the figures of Sir Thurstan de Bower and his lady. Upon these effigies the Baron de Boscawen offered some remarks, observing that they were very good though much mutilated examples. It was stated that the architect for the restoration of the chancel was Mr. J. D. Sedding.

The visitors having partaken of tea in the dining-hall of the Grammar School, by the kindness of the head-master (the Rev. A. C. Fox) and his wife, drove to Miller's Dale Station, where they returned by special train to Derby.

In the evening the general concluding meeting was held at the Free Library, when congratulations were exchanged as to the success of the Congress. Mr. J. T. Micklethwaite, F.S.A., presided over this meeting, when thanks were given to the Mayor and Corporation, to the Free Library and Museum Committee, to the

local committee, to the country clergymen and gentlemen who had given facilities for visits to churches and other buildings, and to the Midland Railway Company,—who, with characteristic enterprise, made very liberal arrangements in connexion with the Institute's excursions.

Wednesday, August 5th, was the last day on the programme. Proceeding by train shortly after nine o'clock to Hassop Station, the visitors took carriages at Hassop, and drove to Padley Chapel,—a two-storied building, now used partly as a cow-shed and partly as a hay-loft. This interesting specimen of a private chapel is all that remains of Padley Hall, the ancient home of the Eyres. It is believed that Padley Hall consisted of a quadrangular court, surrounded by buildings,—the chapel itself (now used as a hay-loft), with the offices beneath, forming the south side. The chapel has a very good old hammer-beam roof, with angels holding shields. Most of the windows are now mutilated or blocked up, and the whole building seems likely to become a mere heap of materials unless some of the buttresses are made good. Regret was expressed by the visitors that so interesting a fragment of Medieval domestic architecture should be put to its present uses. The Rev. Dr. Cox gave some interesting historical particulars as to the persecution of the Eyres and Fitzherberts after the Reformation.

From Padley Chapel the visitors made their way (many of them through the woods, along Millstone Edge, and across the moorland) to the Carl's Wark, believed to be a pre-historic stronghold of great interest, and which is described in an early volume of the *Archæologia*. It is situated on a ridge of rock which (to quote Mr. St. John Hope's "Notes") rises in a singular manner out of the middle of a boggy moor, a little to the east of Hathersage, and some eight or ten miles west-south-west of Sheffield. The rock is roughly an oval in shape, precipitous on three sides, but sloping down to the moor at one end. Three sides have been scaped, and artificially strengthened by the insertion of large stones. The fourth side, that commanding the descent to the moor, is defended by a wall of masonry (built of large blocks, and believed to be Celtic), and backed by an earthen vallum. The entrance is very cleverly arranged so as to give the minimum of advantage to the attacking party. Descending and crossing a part of the moor again, the carriages were soon reached and driven to Hathersage, where luncheon was partaken of two hours late. In the meantime rain had set in. After luncheon most of the visitors visited Hathersage Church, and then proceeded to Brookfield, where Mr. and Mrs. Cammell (a name which will be well-known in connexion with armour-plates and Sheffield) entertained them to tea,—doubly welcome through the rain. Some of the more enthusiastic of the party, accompanied by Mr. Cammell, crossed some fields and went to see North Lees (or Leye) Manor-hall, an interesting Elizabethan mansion, now partially used as a farmhouse.

Subsequently (but not until Mr. T. H. Baylis, Q.C., had in their name thanked Mr. and Mrs. Cammell), the visitors drove to Hassop Station, returning to Derby by train two hours later than at first arranged, and rather the worse for rain and mud, though well pleased in general with their ten days' outing, in which, as already mentioned, they were fortunate enough to be favoured with fine weather until the concluding afternoon.

#### ARCHITECTURAL ASSOCIATION.

##### VISITS IN SURREY.

The Architectural Association made their third Saturday afternoon visit in the neighbourhood of Merstham, Surrey, the first place visited being Gatton Hall. The manor of Gatton,—the name Gate ton is supposed to have been derived from its position on a Roman military road in the Roman period,—seems to have been a place of considerable importance, numerous coins and other relics having been found. In the reign of William Rufus, Gatton was held by the Bishop of Bayeux, but he forfeited the manor through joining Robert, Duke of Normandy, in an attempt to dethrone William. In the middle of the sixteenth century the manor was vested in the Crown, and Henry VIII. granted it to his queen, Anne of Cleves, after her divorce.

The place was made a borough in the twenty-

ninth year of Henry VI., and authorised to return two members to Parliament. It is supposed that this was done as a reward to the owner, John Tymmerley, for services he had rendered. There is a curious old indenture in the Rolls Chapel of the date of the thirty-third year of Henry VIII., in which Sir Roger Copley, knight, who is described as "Burgess and only inhabitant of the borough and town of Gatton" is stated to have freely elected and chosen "its two members of Parliament." As recently as the commencement of the present century Colonel Sir Mark Wood, who was owner then, was the only elector. It is related of this gentleman that he united in his own person the functions of M.P., magistrate, churchwarden, overseer, surveyor of highways, and collector of taxes. The borough was disfranchised by the Reform Act of 1832.

After the death of Sir Mark Wood the estates were purchased by the trustees of the fifth Lord Monson, he being a minor at the time. On attaining his majority he greatly improved the house, and commenced the rebuilding of the Hall on a most magnificent scale, and collected the pictures and fine library. He died, without issue, in 1841. At his death, the Hall was built up to the level of the main cornice, and his mother, to whom the property reverted, hastily completed it with a temporary ceiling, painted to imitate the dome proposed in the original design. This Hall is modelled on the Corsini Chapel in the Church of St. Giovanni de Laterano. The Hall is square on plan, with two arches opening in two sides, and two semicircular recesses in the other two sides; these contain the stoves and some statuary. The pilasters and cornice are in white marble; the other part of the wall-space is covered with elaborate marble panels, in which a set pattern is produced by cutting the marble block and reversing those placed together, the veins thus balancing each other, the other part of the wall-space being covered with fresco painting. The floor of the hall is very elaborate work in Roman marbles; it is said to have cost 10,000*l.*, and the inlaid mosaic marble table 2,000*l.* There are two drawings hanging in the hall, a plan and section of the Corsini Chapel; they are simple geometric figures finished in colour, and dated 1840. The drawing-room has a good mantel-piece of Sienna marble, with a mirror over it, the frame of which was carved by Grinling Gibbons. In the drawing-room the mantel-piece, mirror, and clock of bronze and dark marble, were formerly in the possession of the Emperor Napoleon. The exterior of the house is faced with the local Gatton stone, which is decaying fast.

Gatton Church was founded in the Anglo-Norman age. The dedication is unknown. It was entirely renovated in 1834 by Lord Monson. It has a nave and chancel, with recesses on the north and south, forming kinds of transepts; a small tower, with a shingle spire. The general entrance is by a Tudor porch on the north side. There is a private entrance from Gatton House. The interior is fitted with elaborated carved panelling and oak stalls, procured from different parts of the Continent, the stained glass in the windows being of great merit. The wainscoting of the nave, together with the canopies and glass, were brought from the cathedral at Aürschot, in Louvain, that of the chancel from Burgundy, the communion-rails from Tongres, in Flanders. The double row of stalls in the nave belonged to a Benedictine monastery at Ghent. The screen at the west end of the church is English.

After visiting the church the party walked through the park, which is splendidly timbered, to the new buildings for the St. Anne's School at Redhill, which are situated close to the railway, and form a very striking feature as you enter the station. The central block contains the administrative department, with the dining-room in the rear, the main entrance running through to the dining-room. On the right of the entrance are placed the assistant-masters' rooms, senior boys' reading-room and head-master's private room. Beyond this, at right angles to the centre block, are placed the two school-rooms for the senior and junior boys. These rooms are divided into class-rooms by means of glazed partitions which have large doors in them, so that they can be thrown back and thus form a lecture-room for each division. The head-master's class-room is so placed that he has complete command of all the rooms. The school provides accommodation for 240



boys and 160 girls. The girls' school is placed on the left-hand side of the entrance, and the central block contains governesses' rooms to correspond with the masters' rooms. On account of the nature of the site, which slopes away on each side from the centre block, covered playgrounds have been arranged for the children under the school-rooms. The dining-room is a handsome room, with a coved roof and a large lantern-light in the centre. There is a recess opposite the main entrance, with a dais for prize distributions, &c. In the rear of the dining-room is placed the swimming-bath and gymnasium, which communicate with the school buildings by means of covered ways. The swimming-bath is 30 ft. by 40 ft., and is formed of concrete, and finished with granolithic paving. On the first-floor, over the schools, are the dormitories. The chapel is placed on the right-hand side of the school buildings.

The whole of the buildings are faced with red and stock bricks, very little plaster being used internally in the school buildings. The architects, Messrs. Crickmay & Son, of Westminster, met the party, and showed them over the building.

#### SCIENCE AND ART DEPARTMENT OF THE COMMITTEE OF COUNCIL ON EDUCATION, SOUTH KENSINGTON.

The following is the list of successful candidates in the competition for the Whitworth Scholarships, 1885:—Clarkson, Thomas, aged 20, engineer, Manchester, value 200*l.*; Bennie, Hugh O., 20, engineer, Glasgow, 150*l.*; Unsworth, Robert H., 20, engineer, Pendleton, near Manchester, 150*l.*; Martin, Harold M., 21, engineer, Gateshead, 150*l.*; Calderwood, William T., 25, mechanical draughtsman, Glasgow, 150*l.*; Richards, John, 22, blacksmith, Cardiff, 150*l.*; Dolby, Ernest R., 23, engineer, Leeds, 150*l.*; Rorison, James, 21, engine-fitter, Paisley, 150*l.*; Moulton, Arthur J., 20, engineer apprentice, Preston, 150*l.*; McNeill, William, 22, mechanic, Birmingham, 100*l.*; Moreton, George W., 24, fitter, Crewe, 100*l.*; Mallinson, Stephen E., 24, assistant analyst, London, 100*l.*; Jenkins, Henry C., 23, engineer and millwright, London, 100*l.*; Smith, Robert, 24, engineer, Glasgow, 100*l.*; Nash, Thomas W., 21, engineer, London, 100*l.*; Burstall, Henry F. W., 19, engineer apprentice, London, 100*l.*; Stopher, Arthur J., 22, mechanical engineer, Nottingham, 100*l.*; Wells, Sidney H., 19, marine engineer apprentice, London, 100*l.*; Mines, George, 24, fitter, Charlton, Kent, 100*l.*; Begbey, Henry, 22, engineer, Old Charlton, Kent, 100*l.*; Goodman, John, 23, engineer, Brighton, 100*l.*; Crummie, Mark H., 21, mechanical engineer, Hull, 100*l.*; Marsh, Oliver, 22, fitter and turner, Crewe, 100*l.*; Galbraith, Thomas, 23, pattern-maker, Manchester, 100*l.*; Bowles, Joseph H., 23, engine-fitter, Stratford, 100*l.*

#### Illustrations.

##### THE ROYAL EXCHANGE ASSURANCE OFFICES, 29, PALL MALL.

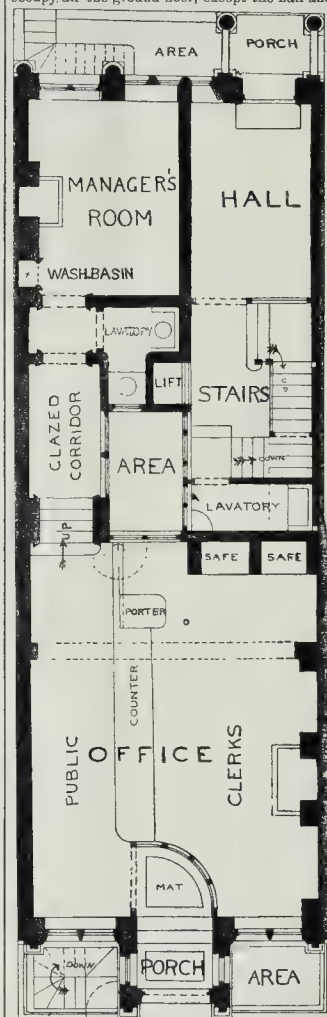
**W**E give this week a view of the front of this building, lately erected in Pall-mall, from the designs of Mr. G. Aitchison, A.R.A. A plan of one floor is appended. The architect has done wisely in giving independent character to his building, for, flanked as it is by the imposing mass of the Junior Carlton Club, it might without special treatment have been mistaken for the servants' offices of the Club.

The architect has aimed at effect by well-balanced proportions, with only a moderate amount of carefully-considered ornament. The panels of glass mosaic between the trusses of the cornice form a somewhat novel and pleasing incident, the green aventurine ground contrasting well with the pale red Mansfield and the copper-coloured ornament. The Caryatides afford a pleasing contrast to much of our architectural sculpture; they are the work of Mr. Boehm, R.A. The railings and the fine grille in the porch are excellent examples of decorative work.

The interior is designed as a specimen of what may be adopted in the offices of our larger trading companies, and have we not (writes Mr. Aitchison) the Sala del Cambio, at Perugia, for an example? A harmonious but

restrained tone of colouring has been aimed at, the lower part of the walls being panelled with walnut with a carved frieze, while above they are covered with green marble mosaic; a green bronze cornice enriched with gold and silver ornaments finishes the walls, and above is a cream-coloured embossed ceiling.

The building combines with the offices a separate dwelling-house, with an entrance in St. James's-square; the house occupies the whole of the upper part and basement of the building, while the Insurance Company's offices occupy all the ground-floor, except the hall and



staircase to the house, as will be seen by the accompanying plan. The builder was Mr. John Woodward; the stone-carving was by the late Mr. W. Plows; the ironwork by Messrs. Brawn & Co.; the glass mosaic by Messrs. Salvati & Burke; the wall mosaic by Messrs. W. Drake & Co.; the inside cabinet-work by Messrs. Mitchell & Hendry; the marble work and floor mosaic by Messrs. Burke & Co.; the canvas plaster by Messrs. G. Jackson & Son; the modeller was Mr. A. Bowcher; and the wood-carver, Mr. J. Wilson.

The illustration is engraved by Mr. J. D. Cooper from a photograph taken for the purpose.

#### DECORATIONS IN MUSIC ROOM, INVENTIONS EXHIBITION.

These will be found referred to in an article on Furniture, &c., by the "Century Guild" at the Inventions Exhibition, p. 216.

#### ST. PADARN CHURCH, LLANBERIS.

We give an interior view of this church, supplementary to the exterior view which published in our number for February 7th. Mr. Arthur Baker is the architect. The method which Mr. Baker has adopted for carrying the weight of the tower at the crossing with a minimum of obstruction in the shape of piers (and to which we have on a former occasion referred) is shown by the drawing.

#### TOMB OF LORD DE LA WARR.

This tomb was erected to the memory of Thomas, Lord de la Warr, who died at Offing in 1526, and stands on the north side of the chancel of Broadwater Church, Sussex. The figures in the niches were hacked away by Puritan times, but otherwise it is in a very good state of preservation. Originally the tomb was painted and gilt; later on it annually received its share of the whitewash used on the interior of the church; but when the latter was restored some years ago this whitewash was removed and the whole tomb cleaned down. The scroll at the level of the pendants is relieved by a panelled fan vaulting. The only inscription beyond the initials on the shields is the motto "Hony soit qui mal y pense" round the garland on the largest shield. An old tilting helmet stands on the tomb; it presumably belonged to Lord de la Warr, and is considered by antiquaries to be a very fine specimen.

F. J. KENNARD.

#### DESIGN FOR THE "THREE CUPS" HOTEL, COLCHESTER.

This was a design submitted in a competition for rebuilding this hotel, and appears to have been published, though unsuccessful, as a good attempt in the way of giving an inviting and homelike character to an inn. We find such a design is more in keeping with the old-fashioned ways and manners of inkeepers than with the modern style, but it is not worse for that. Design and drawing are Mr. R. A. Briggs.

#### REINDEER INN, BANBURY.

The fine old window and gable, of which we give a sketch and measured detail, is in the yard of the Reindeer Inn in Parson's-street, Banbury, and will be visited by the members of the Architectural Society on Saturday, the 15th inst. Cromwell is said to have used the room as a council chamber, and it may well have been for the neighbourhood was a "hot quarter" during the civil wars; the loyal little totipole itself stood two sieges before it came under the protection of the "man of destiny."

#### THORPE MANDEVILLE CHURCH.

This church is on the west side of the road adjoining the road from Moreton Pinkney to Middleton Cheney. The tower is almost entirely covered with ivy and creepers, but the numerous and interesting gabled top is well worth seeing. The east gable is set back from the parapet about 17 in., with a doorway in it, giving access to the gutters on the north, south, and east sides, the west gable being carried up flush with the face of the west wall.

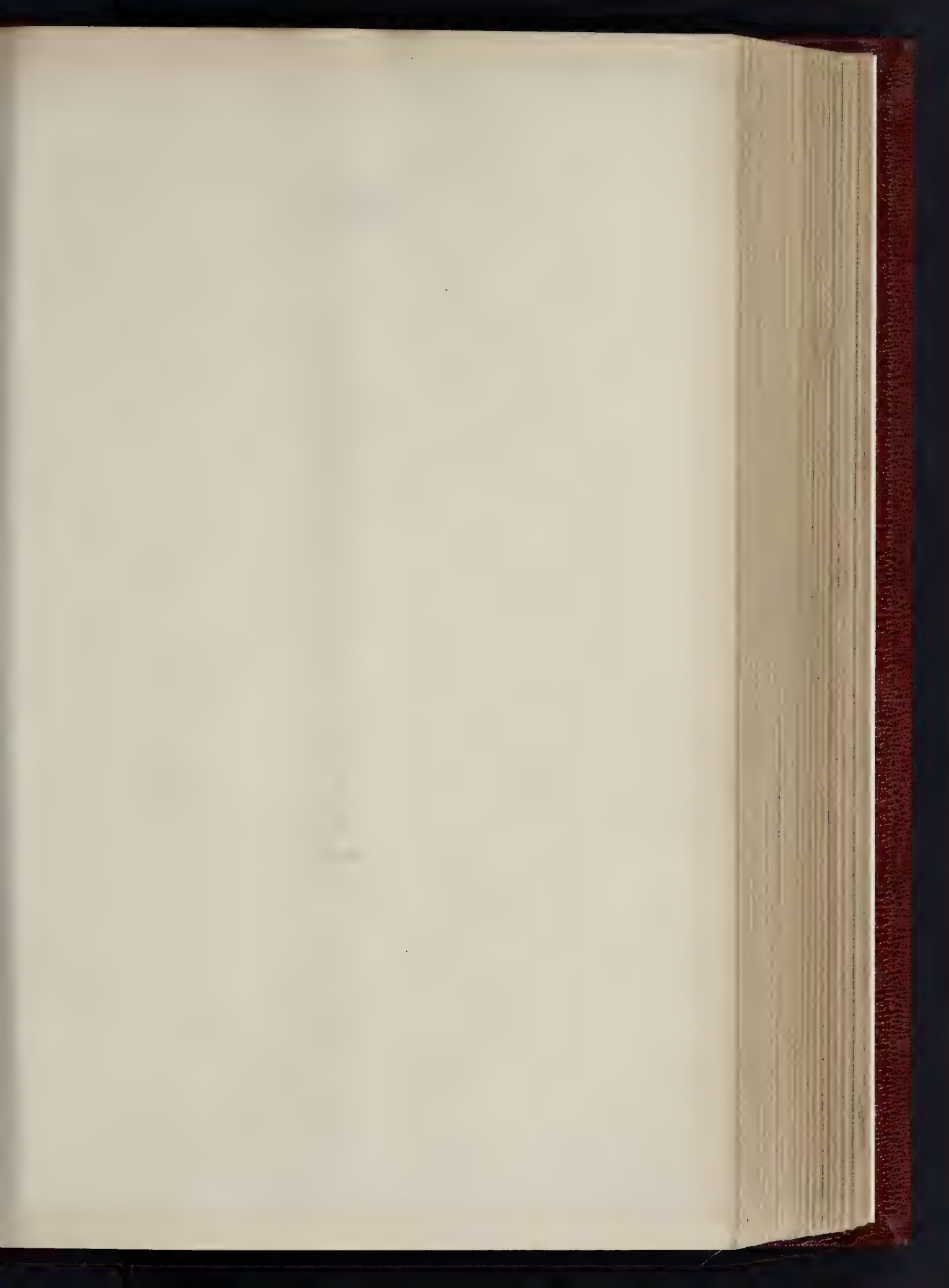
#### SLOUGH PUBLIC HALL.

We publish the accepted design for this building, of which we made mention in our last issue (p. 151).

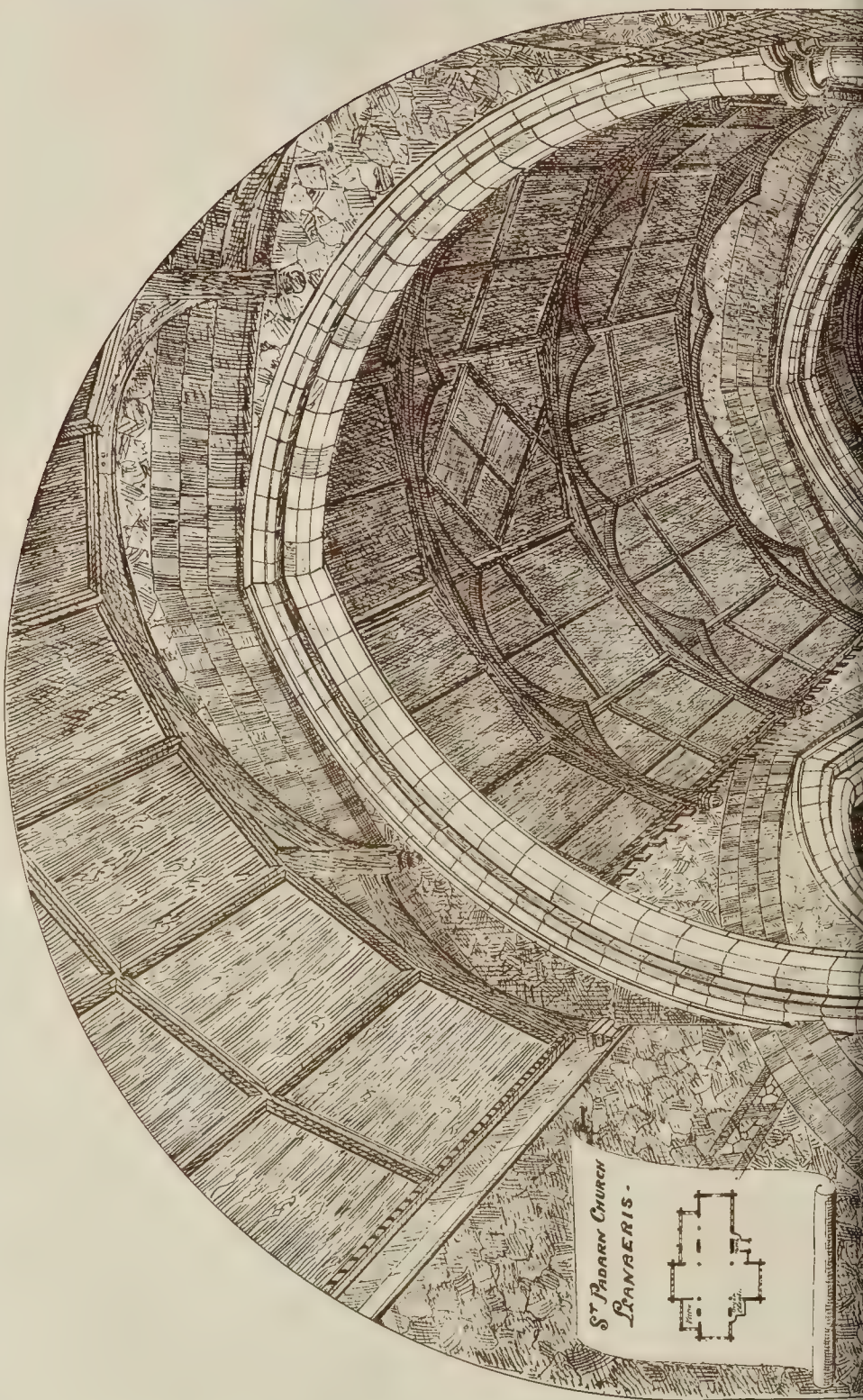
**Cost of Mouldings.**—Mr. H. Westman, Birmingham, sends us some useful tables, in condensed form, of values of scantlings of mouldings, per 100 ft. run, compared with the cost of timber per foot cube.

\* June 13th, 1885.

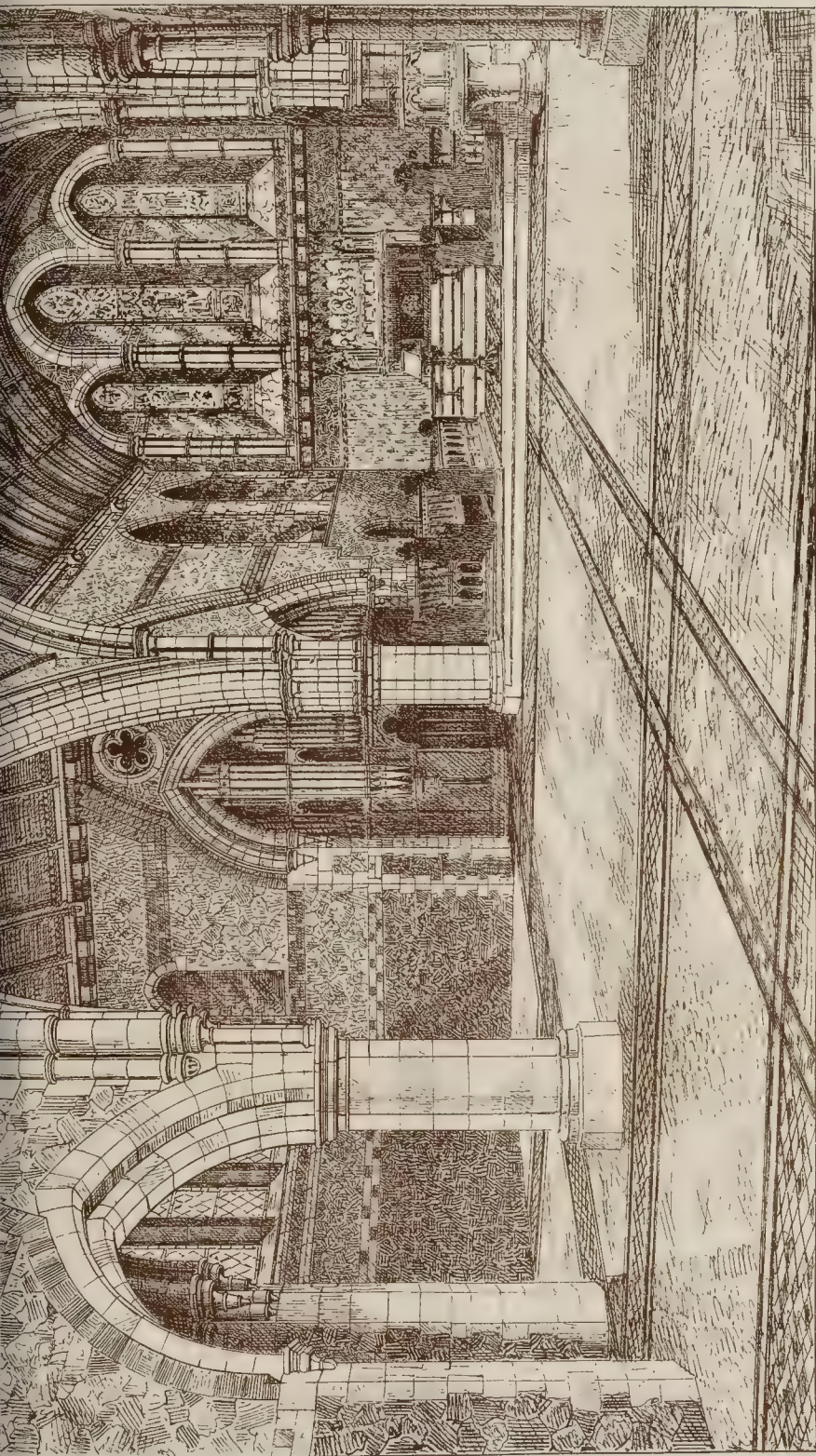




THE BUILDER. AUGUST 15, 1885.





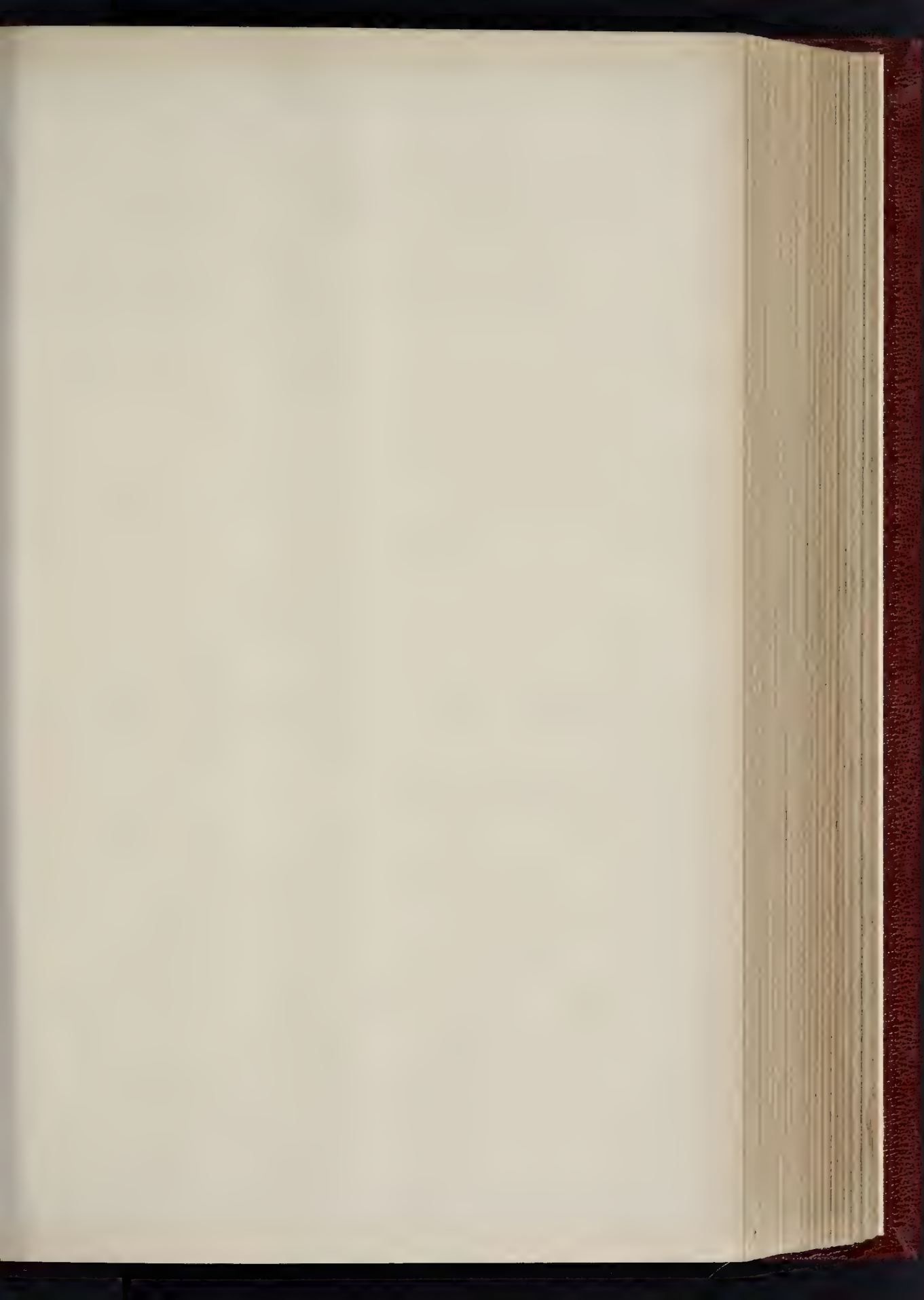


FRANCIS & JOHN SMITH, 4, C. LONDON

S. PADARN CHURCH, LLANBERIS, N. WALES.  
INTERIOR VIEW LOOKING EAST.  
MR. ARTHUR BAKER, ARCHITECT.

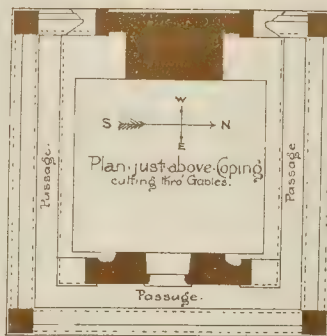
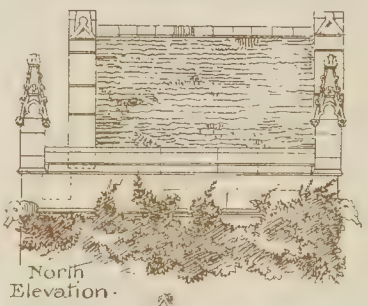
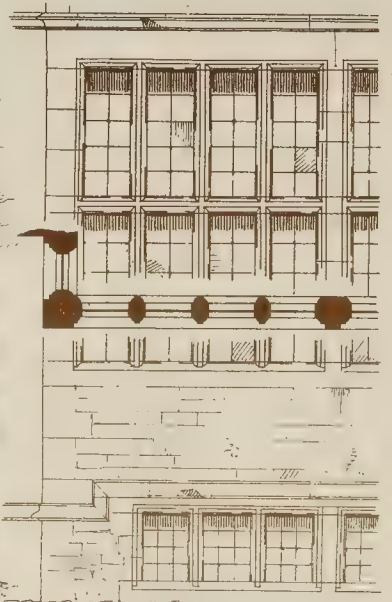






"Reindeer Inn" Banbury.

Scale of Feet.



Tower of Thorpe-Mandeville Ch.

Scale of Feet.

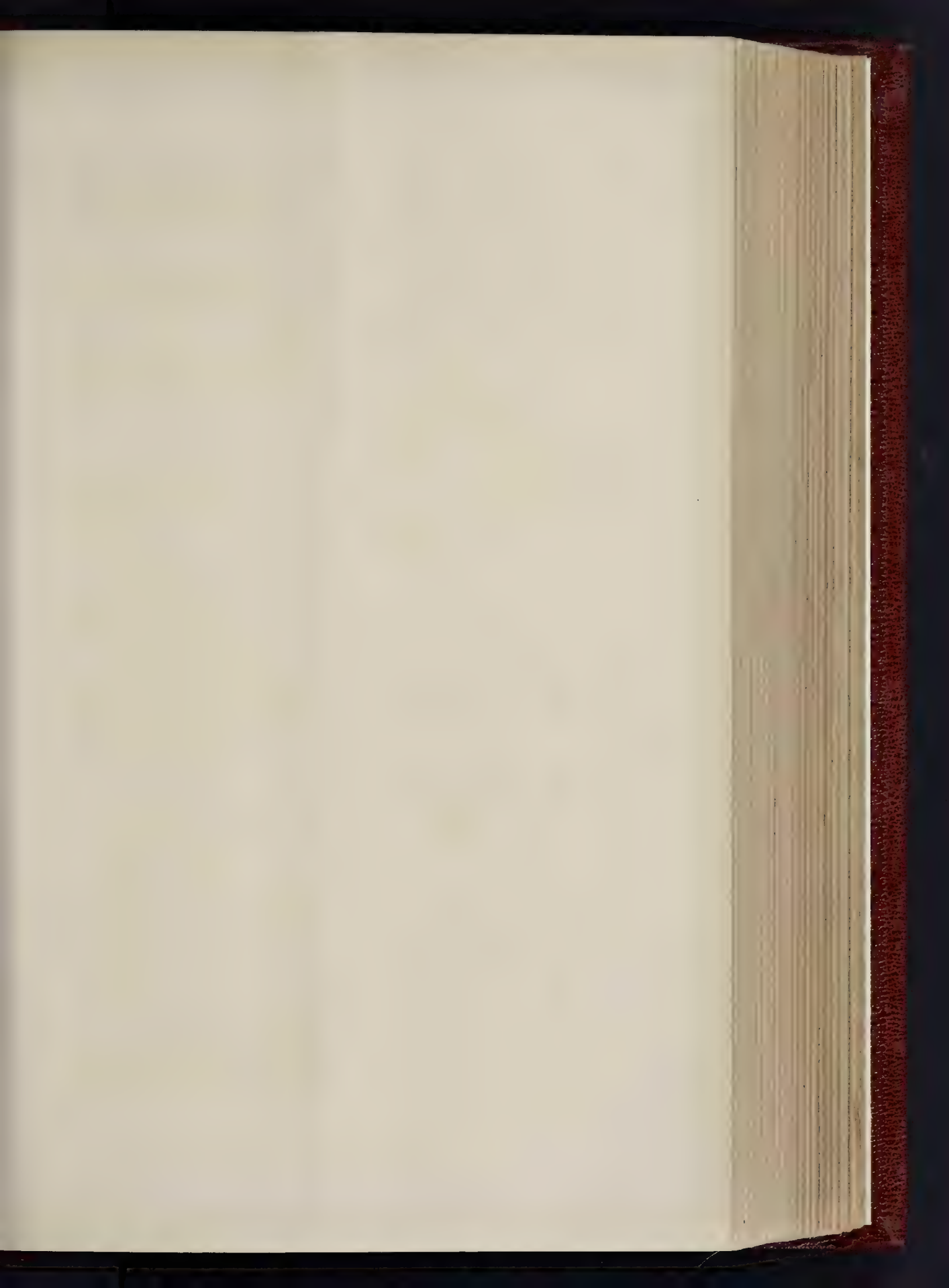
Thos. Garratt, del. Jan. 1885.

Wymann & Sons Photo Lith.



Queen's London W.C.





Three Cups Hotel.  
Colchester. View. *London*

A detailed black and white architectural engraving of the Three Cups Hotel in Colchester. The image shows a perspective view of the building's facade, which is a multi-story structure with a complex roofline featuring several gables and chimneys. The facade is characterized by numerous windows, many of which are grouped in bays or have decorative surrounds. A prominent arched entrance is visible on the right side. The foreground shows a street with a few figures and a horse-drawn carriage, suggesting a busy urban environment. The style is typical of 19th-century architectural illustrations, with fine lines and cross-hatching for shading. The text 'Three Cups Hotel. Colchester. View. London' is printed in the upper left corner.

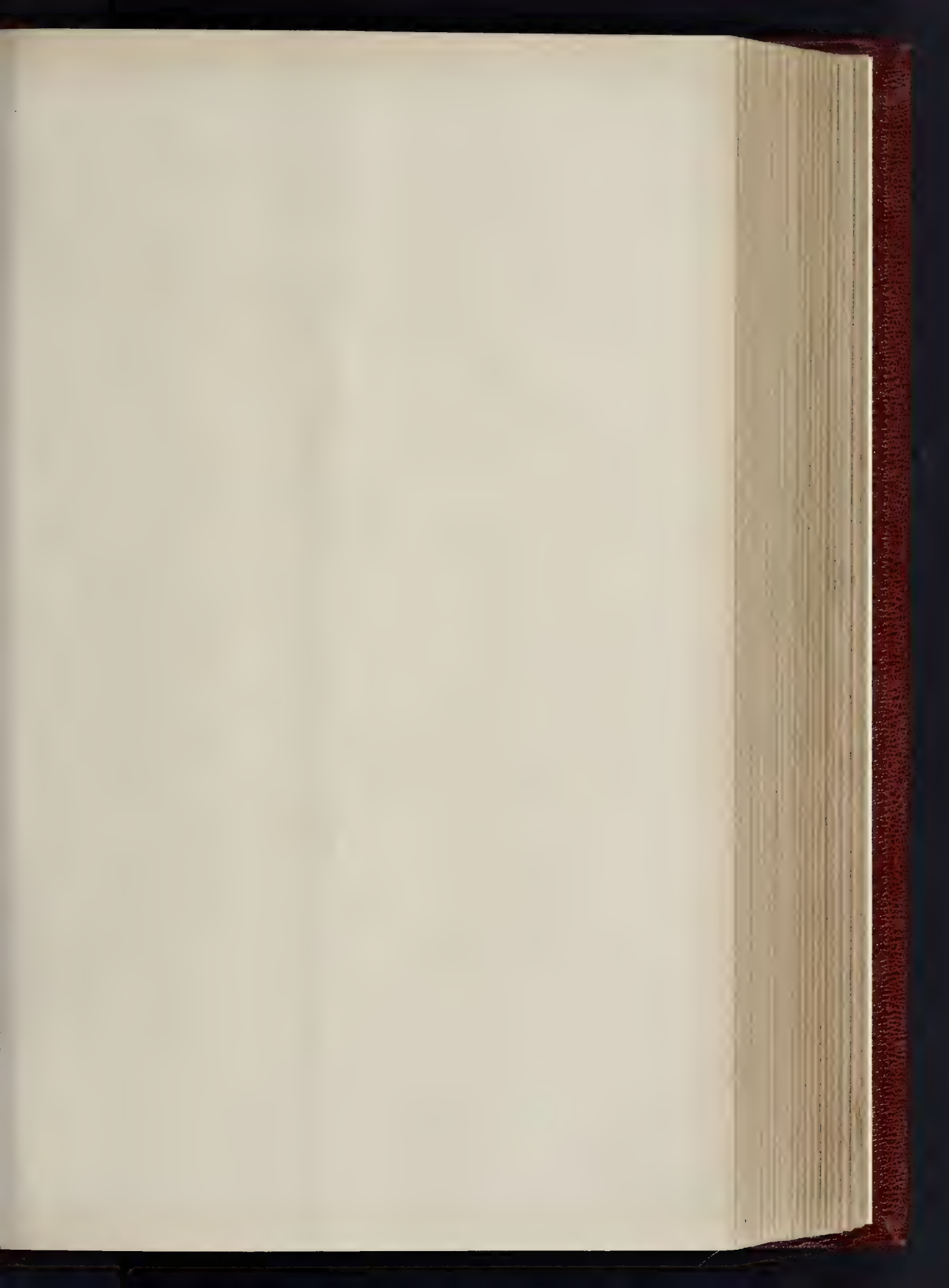
Three Cups Hotel.  
Colchester.  
Perspective View. *Reuben*

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ROYAL EXCHANGE ASSURANCE OFFICES, PALL MALL.

MR. G. AITCHISON, A.R.A., F.R.I.B.A., ARCHITECT.





Fig. 1



Fig. 3.



© P. C. W. Fig. 2.



Fig. 4.

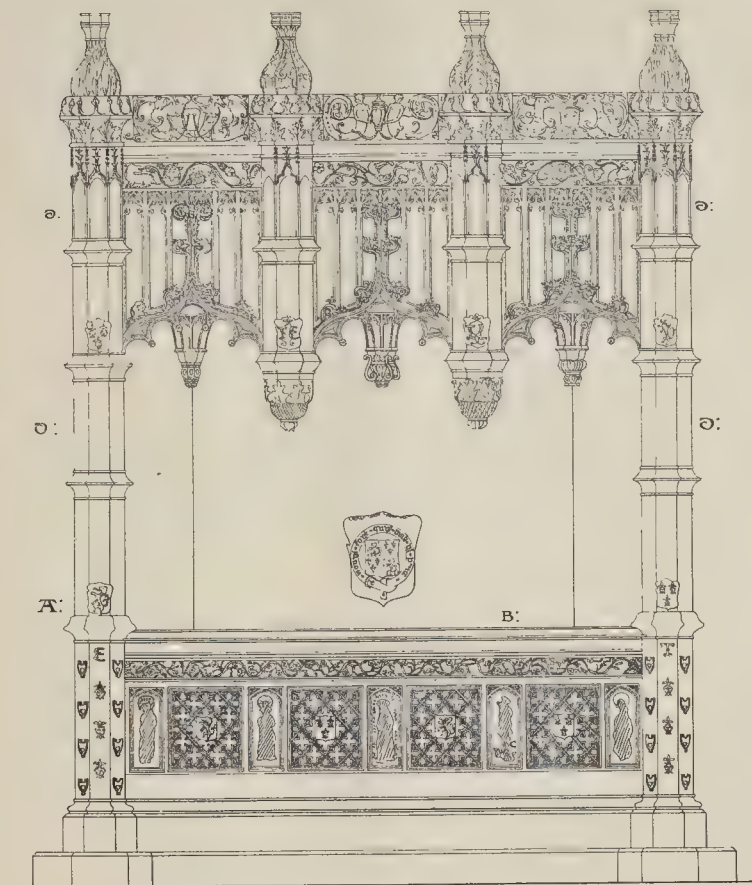


Fig. 5.



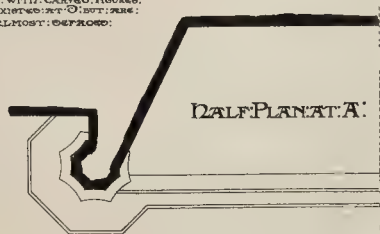


TOMB OF LORD DE LA WARR:  
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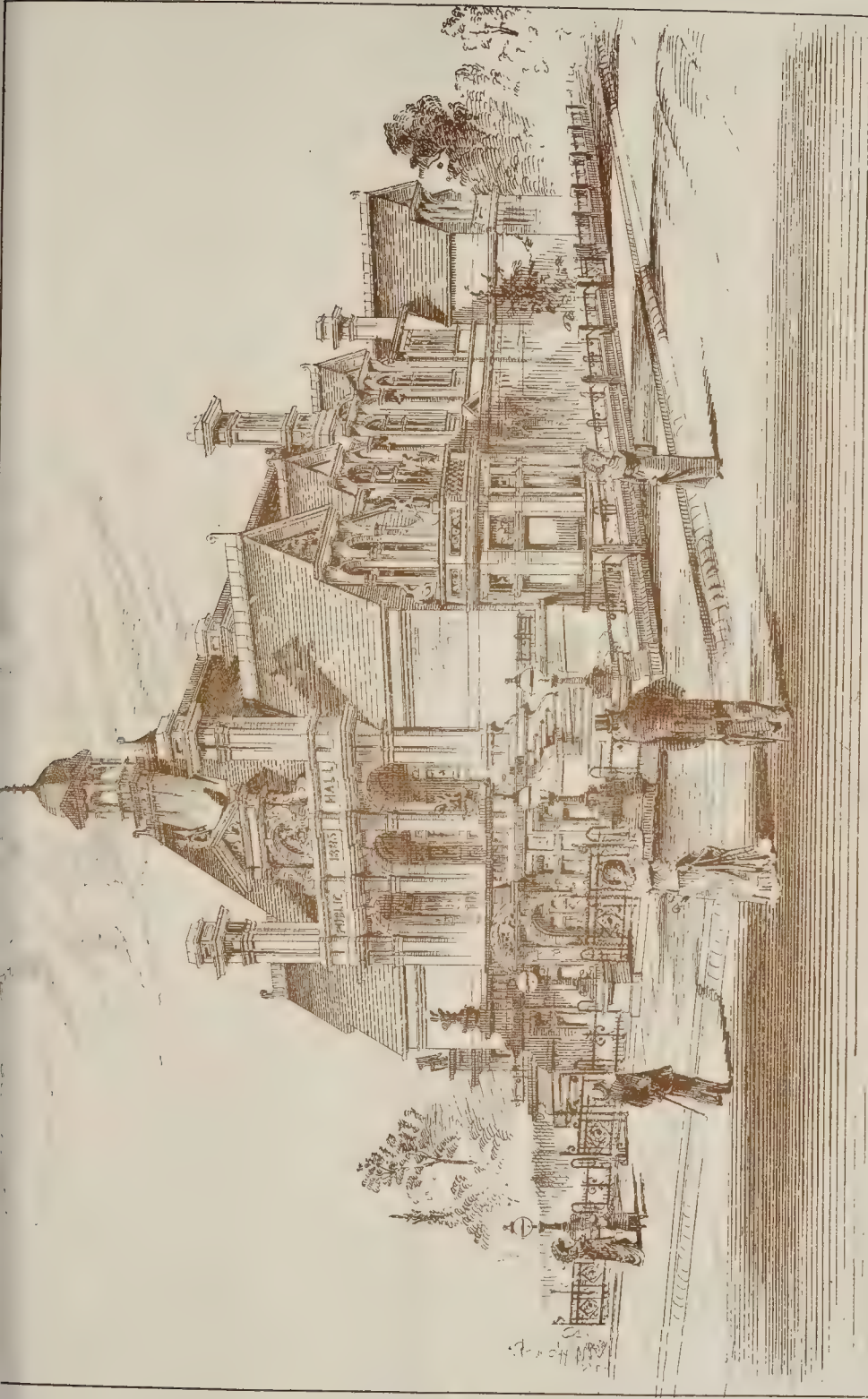


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ACCEPTED DESIGN FOR NEW PUBLIC HALL AND INSTITUTE, SLOUGH. MR. H. A. CHURCH, ARCHT.

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THE ANNUAL EXCURSION OF THE ARCHITECTURAL ASSOCIATION.

The annual excursion of the Association commenced on Monday last, the headquarters this year being Banbury. The first place visited on Monday morning was Swalcliffe, the home of the Wykehams, many of whom have monuments in the church. A large barn in the village is said to have been built by the greatest of all the family, William, bishop of Winchester. The church has work in it of many periods, beginning even in Saxon times; for over the Norman arcade, and mutilated by it, are some small round-headed windows, probably those which, far up from the floor, dimly lighted the rough building in which the predecessors of the knightly Normans worshipped. Towards the chancel the Norman arcade suddenly becomes Decorated; the junction is clumsy, the later artists having taken no pains to blend the two styles. They are sometimes caught napping, those Decorated men; all Gothic work is not perfection, though labelled with a good adjective. The furniture of the church is chiefly of the seventeenth century. An inscription records that the pulpit was given in 1639; the pews are dated 1637; and the south doors do credit to their donor, Thomas Chaberylayne, who gave them in 1639. An unusual feature is a flight of steps from the street to the churchyard, which seems to be of the same date as the pews.

From Swalcliffe the way led up and down steep hills, and across the border of Warwickshire to Compton Winyates, the early home of the Comptons, Marquises of Northampton. Right down in a valley, among tall trees, and rising from the shaven lawns, which replace the scarcely smoother surface of the moat, lies the many-coloured house,—surely the most picturesque place in England. What is Hengrave Hall,—of last year's excursion,—to this? a dull leaden mass, sans light, sans life, sans everything. Here gables and turrets, and chimneys in the red, and gold and grey of brick, and the black of ancient oak, rise above each other to where, amid a wilderness of chimneys, the great corner tower stands. Surely all this was done of set purpose. The turrets and the towers,—what object do they fulfil if not to please the eye? Inside, as adjuncts to the rooms against which they are placed, they have but little use. Indeed, Compton Winyates, if the truth were confessed, would be found to give more pleasure to the owner's neighbours than to himself, which, though tending perhaps to the greatest good of the greatest number, can hardly be said to be the highest praise that can be awarded to a house, *quâ* habitation. No doubt when it was built it fulfilled its purpose well enough, but the nineteenth century asks to be conducted from one room to another by some other route than through several intermediate apartments, or the open court-yard. The house is quadrangular in plan, with most surprising ramifications, and an excess of little staircases, and, ample as was the time allowed for sketching, it was not enough to master the intricacies of the plan as well.

No date is given for the erection of the house, but it is known to have been built, probably previously to his enclosing the park in 1519, by Sir Wm. Compton, who was from his twelfth year upwards a close friend of Henry VIII. They were companions in arms, and on the Field of the Cloth of Gold and many others, successfully challenged all comers. It was during the time of the king's first wife that the front porch was built, for in the label are the Tudor rose and the pomegranate of Arragon intertwined. In the spandrels of the arch, too, are the Castle of Castille, and the portcullis of the Tudors. In the various scraps of coloured glass, again, occur the arms and badges of England and Spain, and of the Comptons. Sir William, as a special mark of royal favour, was granted an honourable augmentation to his arms out of the king's own royal ensigns and devices, namely, a golden lion, and the half of a red dragon within a golden crown, all of which may be seen in various places about the house. Some features of the building,—notably the bay window and roof of the hall,—are said to have been brought from the destroyed castle of Fulbrook, of which Sir William had custody by the king's grant; and very possibly it was so, especially in the case of the roof, which hardly seems to have been made for its place. But when tradition goes on to say that the twisted chimneys were brought

entire as well, we must reluctantly part company with it. The great hall lies on the side opposite to the entrance, so that the courtyard has to be traversed to reach it. The "screens" still remain with the old battery-hatch intact, the door to the kitchen and the carved wooden screen separating the passage from the hall. There is much fine work in this screen. The ornaments in the spandrels over the doors are very ingenious and vigorous; in some of the panels are represented deeds of the house of Compton, but with nothing to show what is referred to; while in the cornice a vine curls in and out amid "a wilderness of monkeys" occupied in various kinds of human employments. A good deal of plain panelling remains about the house, and some stone chimney-pieces, but the best of the carved work upstairs was brought from Canonbury Tower, and has been successfully fitted into its new abode. One door, however, there is which seems to occupy its original position in the topmost room of the tower, and which is an exquisite specimen of delicate Renaissance carving. In this secluded room, approached by three staircases, it is said that mass was said in troublous times, owing to the facilities the various accesses offered for escape; and an oak plank built in as a window-cill is pointed out as the altar. But the Comptons do not seem to have been a Roman Catholic family, and it is possible that tradition may err.

Certainly it was no Roman Catholic, nor even a lover of strict Anglican ritual, that built the church which stands a stone's throw off the house. It is remarkable as having been built, not only after the Reformation, but after the Restoration, and is nearly half a century later than the very similar structure at Steane, in Northamptonshire, a few miles the other side of Banbury. The plan of the church at Compton is singular, and the details of the work are of great interest. The plan consists of two equal aisles without a nave, or two equal naves without an aisle, separated by a Pointed arcade of good proportion, but poor detail; the western tower stands centrally with the general block, so that the arcade comes right down upon the middle of the small tower arch, and is there finished with a keystone corbel. The outside is better than the inside, being treated with much originality of detail. The disposition of the east end is quaint, and while the general outline of the windows is Gothic, the labels and their terminations are distinctly of the Renaissance. The tower, too, at first sight, might be taken for Decorated work, from the form and filling in of the belfry windows, but all the details are clearly quite late, and the Jacobean ornament beneath the string under the battlements displays an originality which is quite refreshing. The south side and door, and the angle buttresses, are all as carefully designed as most Gothic work, but the barrel-vaulted plaster ceilings of the interior, with their vague and badly-executed representations of Day and Night, are far below the rest of the work in spirit. The church seems to have been planned expressly to set at naught the Anglican ritual, for there is no attempt at a chancel, and the altar stands under the arcade which divides the church in two. The building was begun in 1663, and is said to have replaced an earlier one destroyed during the Civil War in 1646; the Gothic features may be the result either of imitation or the re-use of mutilated materials. Full accounts of the moneys disbursed in the erection are preserved at Castle Ashby, another seat of the Marquis of Northampton, from which the following extracts will be of interest:—

Endorsement:—

"This Book doth: shew the charge of the Church; the Reholding ther of: the which was entered on by som workmen upon March the 12th, in the year 1663."

First entry:—

"March the 12th, 1663. s. d.  
Paid Nicholas Hands for two dayes  
squaring stone ..... (2 08"

From summary:—

|                                    |            |
|------------------------------------|------------|
| "The Masons' Bills .....           | £ s. d.    |
| Carpenters' Bills .....            | 103 02 09  |
| For Slat, Lime, Carriage, &c. .... | 019 12 04  |
|                                    | 053 17 04  |
|                                    | 175 12 05" |

The total cost is said to have been something over 300l.

\* We are indebted to Mr. R. G. Scriven, of Castle Ashby, for these particulars.

Tuesday saw the excursionists on their way to Canons Ashby by way of Cropredy and Chipping Warden. Cropredy Church is of considerable interest, but by some at least the time at their disposal was devoted, with the kind assistance of the rector, to an examination of the registers, which date back to an unusually early time, 1538, when they first began to be kept as a matter of law. At that time one William Overton was "curatt," and for twenty years he made his entries in the same stolid fashion, through the reigns of Henry, Edward, and Mary, without note of any kind to indicate the fierce storms which we are accustomed to think agitated the whole religious world at that time. In 1558 the good man died and his successor was appointed by Philip and Mary. The next entries of interest occur in 1576-7-8, when collections were made (a few poor pounds was all that could be mustered) to aid in the defence of the coasts which were being threatened by the Spaniards already, ten years before the mighty failure. Then we pass on to 1644, when, on the last day of June five soldiers were buried, and one "Edward Woll [? Wells], Maister of the King's horse," who had fallen the day before in the skirmish at Cropredy Bridge, one of the last of those encounters in which fortune smiled on Charles I. Some nine years later that particular register quietly dies. The parson finished off the year 1653, drew a line across the narrow page and began "Anno Domini 1654," but added nothing more. The old order gave place to new, persons no longer were allowed to do the work, and with that mute involuntary protest the register ends. Another book then begins with a magistrate's order for the appointment of the necessary officers to keep it. Yet one more entry. On the 8th July, 1694, one Millicent Coleman, who had loved "not wisely, but too well," did penance for her sins by standing in a white sheet during evening service. Poor Millicent! Of course, it was all her fault. The other one, whose name is also given, was probably led astray, as he seems to have got off scot-free; it was Millicent who was guilty, for she had to bear the blame.

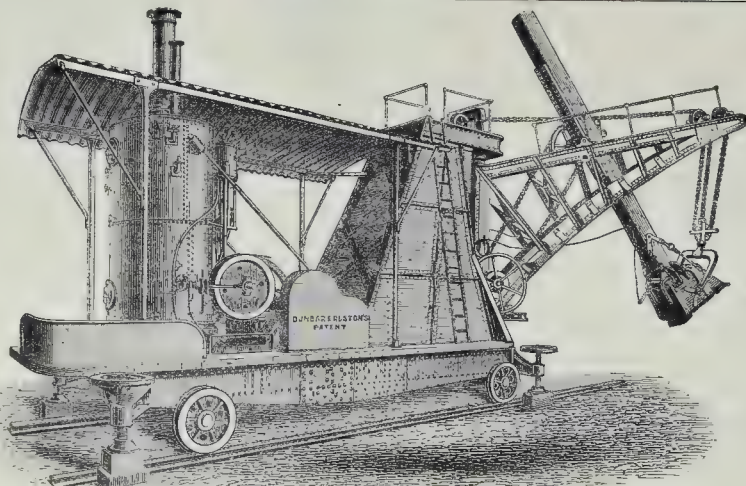
Not the least impressive thing about Cropredy is the pendulum of the clock silently and solemnly swinging to and fro before the little west window. Not so silently, however, but what you can hear it if you go near the tower. Its grave thuds are less kind than the imperceptible march of the shadow on the sundials at Compton. There is no desire there to thrust upon any one's notice the flight of time, but if you have any curiosity on the subject wait for the sun-shine, and on any wall you may gratify it.

"Thou, by thy dial's shady stealth mayst know,  
Time's thievish progress to Eternity."

Chipping Warden Church offers all the charm conferred by an absence of restoration. It is a good church, chiefly Decorated in character, with much excellent flowing tracery. The arcade and west tower are Perpendicular, and the tower is so much like that at the neighbouring church of Edgcott that it is supposed they were the work of one designer. Among the lesser features of interest are a small but pronounced hagioscope and a small recess, perhaps a credence, in the north wall of the chancel, with a seventeenth-century door. In the churchyard, as in all the churchyards hereabouts, are some excellently designed and executed tombstones, dated principally between 1670 and 1720.

The great visit of the day, however, was to Canons Ashby (illustrated in last week's *Builder*), where the cordial hospitality of Sir Henry and Lady Dryden at once made the visitors free of the whole place. Canons Ashby is so called from a Priory of Augustinian Canons, which existed from the time of Henry II. "Essebi Canonicoorum" is the name it goes by in old deeds. The whole place consists of the church, the house, and three or four cottages. The church is the remnant of the old church of the Priory, now reduced to less than a fourth of its former extent. The west front is a particularly happy mixture of early and late work. The lower arcade and the door belong to the crispest period of Early English; the great Perpendicular window alone marks the period of large design. The massive tower, which aligns with the west front, is singularly dignified; and the whole group makes one regret that no more is left. Work like this conveys a constant reproach to designers. There is nothing in it, you may say; there is no effort,





Dunbar &amp; Ruston's "Steam Navy."

it seems to be there because that was its place. Who designed it? No one; it wanted no designer, it grew. And yet how much beautiful work there is in which the designer is evident in every stroke. Take an interlacing Celtic pattern; how ingenious it is! What patience, what skill the designer must have possessed! and yet the work itself is nothing much when it is done. Admiration of the work is lost in admiration of the workman. But not so in such an arcade as this at Canons Ashby. No one thinks of its ever having been designed. How does the nineteenth-century smart young fellow like that? Is he content to lose his individuality, and let his name die if his work may live?

After the Dissolution, the possessions of the priory in this parish were granted to a Sir Francis Bryan, about the same time as the earliest Dryden came hither from Cumberland. From this Sir Francis Bryan they passed to the Cope family, who converted the domestic buildings of the Priory into a house. The church was probably left to go to decay, and among other things went the chapel of St. Bartholomew, in which a lamp burned night and day, so ordered by Emma de Lege (a descendant of the founder of the Priory), who, about the year 1200, "gave the dovecot in Podington with toft and croft and other pertinencies for her health and the souls of her husband Bartholomew de Lege and Nicola her daughter," and for the support of the said lamp in the chapel "where their bodies rest." Short-sighted Emma de Lege! where is the chapel now, and where the bodies that rested in it; and the lamp?

"The lamp is shattered,  
The light in the dust lies dead."

And the souls of Bartholomew the husband, and Nicola the daughter, how do they fare now that the dovecot in Podington has gone, with toft and croft, to some one else? But to return to the Copes, who lived in the renovated Priory buildings. A daughter of the family married John Dryden, who had already built a house a little way up the hill, and in fulness of time the Copes died out or disappeared, and the whole place came into the hands of the Drydens, who meantime had enlarged their house considerably. The converted house of the Copes was finally destroyed, and the place thereof knew it no more. Meantime the home of the Drydens had been growing old and grey, with a few of those golden streaks which it is the privilege of houses only to acquire with age. The baronet who pulled down the house of the Copes added to and altered somewhat his own home. He built walls and piers and steps, he put in sash-windows and a central door to the hall, all between 1708 and 1710, and since then nothing has been done. The trees have grown and distorted the steps; the greyiness has spread over the more recent work; but the terraces slope away in front of the house very much as they did then, and but for the increased size of the

cedars and yews, Samuel Richardson could hardly detect any change since he came down here to write "Sir Charles Grandison." "Glorious John," however, would hardly feel so much at home, for his descendants have built many garden-walls and altered the aspect of the place considerably since the time when he courted his cousin, the daughter of the reigning baronet. Canons Ashby will not vie with Compton Winyates in colour and form, but it has this same delightful air of quietude and peace, and it has this advantage over many historical houses, that its owner is a born antiquary, with a wide knowledge of all branches of his favourite study, and a keen appreciation of the value of a piece of archaeological evidence that has never been tampered with.

We will continue our notes of the excursion next week.

#### INSTITUTION OF MECHANICAL ENGINEERS. MEETING AT LINCOLN.

THE Summer Meeting of the Institution of Mechanical Engineers was held at Lincoln last week, and there was a large attendance of members and visitors from all parts of the kingdom and some from the Continent.

The proceedings commenced with a reception of the members in the Masonic Hall by the Mayor of Lincoln, Mr. Francis Jonathan Clarke, who, on behalf of the town and the Local Executive Committee welcomed the members to Lincoln. After some formal business the address of the President of the Institution for the year, Mr. Jeremiah Head, was read by the secretary. This extended to a very considerable length, and dealt with the relative advantages of iron and steel for various constructive purposes. The general conclusions drawn by the author were that steel was superior to iron for rails and tyres, marine and other boilers, but that wrought iron is still preferred for heavy forgings, general blacksmith work, and bridge and roof building. In speaking of the quality of the materials essential for bridges and roofs the author placed, as of primary importance,—1st, high elastic limit under tension and compression in one direction; and, 2nd, non-liability to corrosion under atmospheric conditions; and, of secondary importance,—1st, ultimate tensile strength; and, 2nd, ductility. Referring to rolled joints for building purposes, he said there steel, as in that material they are more difficult to get sound at the edges, less easy to straighten, and generally more costly to produce. If made thinner than the ordinary sections for iron, in order to reduce their cost in steel, they are deficient in stiffness. He also remarked that, at their present market price of 4l. 2s. per ton free on board at Antwerp, rolled joints are the cheapest form in which finished iron of any kind is, or, perhaps, ever has been, produced.

A vote of thanks for the President's address was proposed by the Mayor of Lincoln and seconded by Mr. Nathaniel Clayton.

The first paper read was one by Mr. Joseph Ruston, M.P., on Dunbar & Ruston's "steam navy," a form of machine considerably introduced of late years on railway, dock, and other contracts where large excavations have to be made. It was claimed by the author of the paper that his steam navy can excavate and deliver into wagons any material capable of being cut, such as sand, gravel, chalk, and all kinds of clay; that it can also deal with these materials when interspersed with stones and boulders, and without being unduly strained, it can cut through seams of flints, shale, slate, or even sandstone. The author also asserts that, under favourable conditions, his navy can raise and fill into wagons nearly 1,000 cubic yards of earth per day of ten hours. The general construction of the "navy" will be understood from the accompanying illustration. It may be described briefly as a strong rectangular wrought-iron frame, on which the engine, boiler, and working parts are mounted. The job is of twin construction, carrying an adjustable arm, to which the working scoop is attached; the scoop is raised or lowered by the main chain passing over the extremity of the job. The working movements are controlled by two men,—a driver and a wheelman. The driver raises the scoop while making its cut, swings it round into position for discharging, and back again afterwards, and lowers it down. The wheelman regulates the depth of the cut, releases the scoop from the face of the bank, and opens the door or bottom for discharging its contents. The engine is of the ordinary vertical type, worked by a cross-tube boiler, carrying some 80 lb. pressure of steam. The main winding drum is tapered, so as to give the engine the most power when the chain is pulling at least advantage, and vice versa; it is loose on the shaft, is driven by a clutch, and controlled by a powerful foot brake. In excavating, when making a cutting, the navy first drives a "gullet," and double railroads, one on either side of the navy, and connected with a central road by short "jump" lines, are provided for getting rid of the excavated material.

The author calculates that, under ordinary circumstances, the working expenses of his navy, allowing for depreciation, repairs, and interest on capital would amount to about 4l. 15s. per day, which, divided by the output, gives as the cost of excavation say three halfpence per cubic yard for sand or gravel, and twopence for hard clay, or a saving over hand labour of from 2d. to 6d. per cubic yard. It is estimated to dispense with the labour of about seventy men. A desultory discussion followed the reading of this paper, and although the economic value of the machine was admitted, it was generally concluded that the successful



working of the machine depended to a considerable extent on the skill of the driver in charge.

Amongst the works visited in Lincoln on the first day were those of Messrs. Clayton & Shuttleworth, and Messrs. Ruston, Proctor, & Co. As our readers are probably aware, Messrs. Clayton manufacture what may be called the staple products of Lincoln, viz., portable and other engines, thrashing-machines, grinding-mills, and other agricultural implements. The works themselves may be said to be built on a swamp, and the foundations have necessarily been of a most expensive character, it having been found necessary to drive piles, not only for the buildings, but for each separate forge, engine, or boiler, and for most of the heavy tools. It was also stated that scarcely a brick in the present works, which cover about twenty acres of ground, occupies the same position it did in 1851.

In the erecting shop, a building some 250 ft. by 90 ft., the management have apparently endeavoured to reduce the cost of lifting heavy weights about to as low a point as possible. We noticed several over-head travelling cranes, and also somewhat of a novelty in the shape of a travelling jib-crane, running on a single rail through the whole length of the shop.

The largest shop in the works is the boiler-shop, 255 ft. by 180 ft., which is well supplied with all necessary appliances, including one of Tredwell's hydraulic presses for flanging boiler plates, which we have already noticed in a previous issue of the *Builder*. Speaking generally, manual labour appears to have been reduced to the lowest limits, and neatness, order, and high-class workmanship are exemplified throughout the works.

The first day's proceedings were brought to a conclusion by a musical service in the Cathedral, to which the members were specially invited by the Bishop and Dean and Chapter. The Bishop delivered an address to the members, in which he eloquently urged the advisability and necessity of religion and science, which were not in themselves antagonistic, going forward hand in hand.

The other papers read of special interest to our readers were "On recent adaptations of the Robey Semi-portable Engine," by Mr. John Richardson; and "Private Installations of Electric Lighting," by Mr. Ralph H. C. Neville. Mr. Richardson's paper was a very short one, and described recent improvements in engines for sinking purposes, and he claimed that, as in the Robey Engine, all the working parts were fixed together on a massive foundation plate, the whole of the strains due to the working of the machinery are absorbed by the base plate and brought near to the position of greatest stability, viz., the ground line, consequently the boiler was set free from all mechanical strain. Where engines are required for sites difficult of access and where transport is very expensive, the author employs in the construction of his engines wrought iron and steel in lieu of cast, thus effecting a large saving in dead weight and consequent cost of carriage. The paper concludes with some remarks on compounding and governing the engines for various duties.

Mr. Neville's paper on private electric lighting was an interesting one, but our space prevents at present more than a passing notice. The author in his installation used an ordinary 6-h.p. portable engine, some ten years old, in conjunction with a Siemens S D 9 compound shunt-wound dynamo. The driving band was a 4-inch linked leather belt, which ran very steadily; the lamps used were mostly 100-volt 20-candle-power lamps. On starting, everything worked well except the governor of the engine, which proved utterly unsuitable; in place of the ordinary ball governors the author substituted a Richardson's electric regulator, with the result that there was a remarkable improvement in the lights, which now remained perfectly steady. The paper next dealt with various improvements in electric lighting private houses, the duration of the lamps, &c., and the author asserted that a good governor will soon save its own cost by an increased life for the lamps, and is of vital importance in electric lighting. About this we should imagine there could be no dispute.

A long discussion ensued, in which Sir James Douglas, Mr. Crompton, Mr. Walker, Mr. Fairfield, Mr. Williams, and others took part.

We cannot help thinking there was one very important omission in this paper, and that was the one of cost, as compared with other methods of lighting private houses, and as,

unfortunately in these days, everything must be looked at in its commercial aspect, the author has left us unable to judge of his results in this direction. Before his paper is printed in the Proceedings of the Institution, we trust he may be able to add this very necessary information.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

THE forty-second Annual Congress of this Association will be held at Brighton, commencing on Monday next, August 17th, and terminating on Saturday, the 22nd, with two extra days to Tuesday, the 25th inst. The president is the Duke of Norfolk, E.M., and there is a strong list of vice-presidents, besides an influential local committee.

The following is a synopsis of the programme of the proceedings of the Congress:—

*Monday, August 17.*—Opening meeting at the Royal Pavilion at 2 p.m. Reception by the Mayor and Corporation, and delivery of the inaugural address by Sir James Picton, after which Mr. F. S. Sawyer will read a short paper on "Old Brighton." Visit to the Church of St. Nicholas, which Archdeacon Hannah will describe. Afterwards visit the Museum, where Mr. Henry Willett will give an account of the local antiquities and ceramic ware, assisted by Mr. Benjamin Loxax. Opening dinner at the Grand Hotel at 7.30 p.m.

*Tuesday, August 18.*—Leave by special train at 8.30 a.m. for Chichester; visit the Museum, where Mr. C. Roach Smith will describe Roman inscriptions; thence to the excavations, made for the Association, of Roman remains at the south walls of the city, in the grounds of the Dean and Chapter; thence to the inner part of the walls, in the grounds of the Bishop of Chichester, and the bastion of original work, which Mr. C. Roach Smith will comment upon. At 11 a.m. visit the cathedral, where Mr. Gordon M. Hills will conduct the party. Luncheon at the Dolphin Hotel at 1 p.m.; afterwards at 2, proceed by carriage to Boxgrove, by the Bognor road to Stretington (the Stratonoe of "Domesday Book") for remains of Priory Church, &c., of which Mr. C. Lynam will give a description. Leave, en route for Goodwood, 2½ miles, by Hainaker, for remains of ancient house. At Goodwood, by the invitation of the Duke of Richmond and Gordon, K.G., view the pictures, and examine the celebrated Roman inscription referring to "Claudia and Pudens," and on which Dr. Birch, F.S.A., will probably say a few words. Return by carriages to Chichester, and thence by special train to Brighton. Evening meeting at the Royal Pavilion, 8.30.

*Wednesday, August 19.*—Leave by train at 8.50 a.m. for Lancing, where carriages will be in waiting to drive to Sornington, where the church will be visited, and described by Mr. Loftus Brock, F.S.A.; thence to Broadwater, where the church will be inspected and described; thence to Cissbury, which famous encampment will be commented on by Mr. Walter Myers; afterwards drive to Findon, where, after seeing the church, luncheon will be partaken of at 1.30 p.m., drive to Clapham, and examine the church and its brasses; thence to West Tarring and Salvington, inspect the church at West Tarring, and then leave for Worthing Station in time for train to Brighton at 5.55. Evening meeting at the Royal Pavilion at 8.30.

*Thursday, August 20.*—Leave the Grand Hotel by carriages at 9 a.m., for New Shoreham, reaching there about 9.45, to visit the church, which will be described by Mr. E. P. Loftus Brock; thence drive to Old Shoreham, and inspect the church; thence drive by Upper Beeding to Bramber, for church and remains of the castle, where Mr. M. H. Bloxam will meet the party, and say a few words on its history, &c. About 12.45 p.m. leave for Steyning Church, which will be described. Luncheon at 2 p.m. at the White Horse Hotel. Leave at 3 p.m., and drive to Wiston Park, where, if possible, the house will be visited; thence proceed to the church, for its examination, and the famous Shirley monuments. Afterwards drive to Steyning Station for ordinary train to Brighton at 5.50. Evening meeting at the Royal Pavilion at 8.30.

*Alternative Plan,* should Wiston Park, by any accident, not be able to be visited on Thursday, August 20th. Leave Grand Hotel by carriages at 8.30 for New Shoreham, and carry out same proceedings till after luncheon at Steyning; then leave by the carriages at 2.30 p.m., and drive to Edburton Church, and examine its curious old font; thence drive, at 3.45, to Poyning's Church, where there is another lead font; and at 4.30 drive to Wolstantonbury Camp; afterwards to Pycombe Church, leaving at 6.15 p.m. for drive to Brighton. Evening meeting at Royal Pavilion at 8.30.

*Friday, August 21st.*—Leave by ordinary train at 8.50 a.m. for Arundel Station, arriving at 9.45; thence to the castle by carriage, and, by the invitation of his Grace the Duke of Norfolk, E.M., visit the interior of the castle, the keep, and the Fitzalan Chapel. Afterwards proceed to the parish church, Roman Catholic Church, and remains of Hospice, or Maison Dieu, at end of the town, and return to Norfolk Arms for luncheon at about 1 p.m. At 2 p.m. drive to Bognor, through Arundel Park,

walk across the fields to the Roman pavements, which Mr. C. Roach Smith will describe. Thence drive to Amberley, for the examination of the remains of the castle, and then visit the church, which the Rev. E. G. A. Clarkson will describe. Thence by special train, at 6 p.m. (from Amberley) to Brighton. A full-dress *conversations* will be held at the Pavilion, by the invitation of the Mayor of Brighton at 8.30 p.m.

*Saturday, August 22nd.*—Leave the Grand Hotel by carriages at 9 a.m. for Patcham Church, where the fresco over the chancel arch will be inspected. Thence drive to Ditchling Beacon, by "The Lady's Mile," and leaving at about 12 o'clock, drive to Hollingbury Camp (an ancient British earthwork), which Mr. Thomas Morgan will describe, as well as Ditchling Beacon; then proceed to Hollingbury Cope, by the invitation of Mr. J. O. Halliwell Phillips, where an examination of his unique collection of Shakespearian deeds, prints, books, &c., will be made under his guidance. Afterwards, about 4.30 p.m., drive to Preston Church, which will be examined and described, and thence to Brighton. Closing meeting will be held at the Royal Pavilion at 8.30.

Extra Days.

*Monday, August 24th.*—Leave by special train for Lewes at 9.30 a.m.; stop to visit Southover Priory and Church, then proceed to the castle and museum. At 11 a.m. proceed to Berwick, where carriages will be in readiness to drive to Michelham for remains of priory, thence drive to Alfriston for luncheon. At 2.15 p.m., the drive will be continued to Wilmington, where the church and priory ruins will be visited. At 3.30 p.m., drive to Polegate Station for special train to Pevensey, where the castle and church will be examined. Leave Pevensey by same train at 5.30 p.m.

*Tuesday, August 25th.*—Leave by ordinary train at 8.55 a.m., especially stopping at Three Bridges Station, where, about 10 a.m., carriages will be in readiness to convey the party to Worth Church, which will be examined and described. Leave at 12 o'clock and drive to Crawley for luncheon at the George Hotel; and thence by Handcross, through Tilgate Forest and Staplefield to Cuckfield, visit the church and Cuckfield-place, and drive to Haywards Heath in time for the 7.3 train to Brighton.

ELECTION OF TWO DISTRICT SURVEYORS.

At the meeting of the Metropolitan Board of Works, on the 7th inst., the first business proceeded with was the election of District Surveyors for (a) Bethnal-green East and South Bow, and (b) the Northern Division of Marylebone. There were thirty-one candidates. The number of candidates for each appointment was first reduced in the usual way by show of hands to six. The subsequent votings were as follow:—

Bethnal-green, East and South Bow.

|                      | Second Vote. | Third Vote. | Fourth Vote. | Fifth Vote. | Final Vote. |
|----------------------|--------------|-------------|--------------|-------------|-------------|
| Ashbridge, A. ....   | 25           | 18          | 21           | 13          | —           |
| Clarkson, S. F. .... | 18           | 16          | 12           | —           | —           |
| McLachlan, H. ....   | 18           | 16          | 17           | 15          | 7           |
| Mundy, T. E. ....    | 15           | —           | —            | —           | —           |
| Saunders, M. L. .... | 19           | 14          | —            | —           | —           |
| Street, E. ....      | 30           | 28          | 28           | 30          | 27          |

Mr. Street was therefore declared elected District Surveyor for the district of Bethnal-green East and South Bow.

North Marylebone.

|                      | Second Vote. | Third Vote. | Fourth Vote. | Fifth Vote. | Final Vote. |
|----------------------|--------------|-------------|--------------|-------------|-------------|
| Ashbridge, A. ....   | 21           | 19          | 20           | 21          | 20          |
| Clarkson, S. F. .... | 16           | 11          | —            | —           | —           |
| Edmeston, J. S. .... | 17           | 13          | 10           | —           | —           |
| McLachlan, H. ....   | 21           | 19          | 20           | 19          | 17          |
| Mundy, T. E. ....    | 16           | 19          | 18           | 13          | —           |
| Saunders, M. L. .... | 10           | —           | —            | —           | —           |

Mr. Ashbridge was therefore declared duly elected for the district of the Northern Division of Marylebone.

**Scientific Experiments regarding Dry-Rot.**—The *Breslau Gewerbe Blatt* records some interesting experiments made by Prof. Polek with the view of illustrating his theory that the development of the germ of dry-rot increases in rapidity according to the proportion of phosphoric acid and potassium in the wood. It has been found that wood felled in winter contains much less of these agents than that felled in spring, this assertion being proved by the impossibility of cultivating dry-rot spores in the former wood, although with the latter Prof. Polek was completely successful, the other conditions being alike in both cases. His experiments likewise establish the facts that these spores require a certain time for their development, that they first attack the wood itself, and that a considerable infection has taken place in the wood before the mycelia appears on the surface where it then rapidly spreads.

## The Student's Column.

## DESCRIPTIVE GEOMETRY.—PART II.

XII.

**C**ONTINUING the same subject with which we were dealing last week, we take another aspect of the same problem.

We can find the plane  $Q$  tangent to the torus in a point  $m$  by the same method used for other surfaces of revolution, as shown in fig. 139, but we shall find that planes such as  $Q$  tangent to the inner surface of the ring cut the torus, whereas planes such as  $S$  tangent to the surface of the torus in a point  $n$  outside the parallels  $D$  touch the surface only in one point, as we have seen before, for other surfaces of revolution. The outer and the inner surfaces of the torus differ very much in character, for the one is convex and the other concave, like the throat of a pulley-wheel. In convex surfaces all curves drawn through a point of the surface are on the same side of the plane tangent in that point, but we can see in fig. 142 that if we take the meridian curve and the parallel which pass through the point  $m$ , the meridian will be on one side of the tangent plane  $Q$ , whereas the parallel will be on the other side of that plane, so that necessarily the plane  $Q$ , although it contains all the tangents to the surface of the torus in  $m$ , yet must cut the surface of the torus as well. (It seems nonsense to call a tangent plane one that cuts the surface; we must take a broader view of the word "tangent" than the usual acceptance, and understand as a tangent plane the plane to which the point  $m$  belongs when  $m$  is considered as an infinitely small surface.) The section made by a tangent plane inside the torus is found by the same method shown for any plane in fig. 143, but the curves meet in the point  $m$ , and we cannot find the tangents to the curves of intersection in that point; for the tangents to the meridian and to the parallel are in the plane  $Q$ , so that we can get no intersection of planes. Another method has to be used which we shall explain at some future time, as it depends on properties of surfaces which we have not yet seen. It can be demonstrated by algebraical calculation that if the plane  $P$  is so inclined as to be twice tangent to the torus, it will cut the torus according to two plane equal circles intersecting one another in the points of contact  $m$ . (See fig. 142.)

To find the intersection of a torus by a plane, the easiest way is to rotate the plane round the axis of the torus so that the plane  $P$  be perpendicular to the elevation. In our figure  $Q^h$  is the trace of the plane tangent to the torus in the point  $m$  of the section, and  $m^t$  is the tangent to the section itself. We have also turned down the plane  $P$  round its horizontal trace  $P^h$  to show the real shape of the section. (See fig. 143.)

## SLOUGH INSTITUTE COMPETITION.

SIR,—With reference to your notice of my design for the Slough Institute, perhaps you will pardon my pointing out that in addition to the Mackenzie-street entrance to the public hall, there are two other entrances to it from the adjoining road, each having a roomy lobby in connexion opening directly on the hall, and these latter would be the entrances chiefly used for this section of the building. There is also special platform entrance.

The separate reading-room was intended for newspapers and periodicals, and, therefore, it was thought that no inconvenience could arise by the passage intervening between it and the library, and that same with its reading-room would benefit in greater privacy and quietness, for so being apart.

As regards the ventilation, all roofs are ceiled at collars, ventilating trunks being placed above connected with vents in ceilings and air-pump ventilators on roofs, wall-floes being taken up from lower rooms. Fresh air supplied by Tobin's tubes. I think this is fully explained in written particulars accompanying design, if not perhaps indicated on drawings as clearly as might be.

Of course, the money at command precluded anything but the simplest treatment.

THOS. R. RICHARD.

## PROPOSED NEW THEATRE.

SIR,—With regard to the "Note" in the *Builder* of last week re the Proposed New Theatre on the site of the "Occidental" I am the architect, and not Mr. William Emden, as stated. Will you kindly correct this?

WALTER EMDEN.

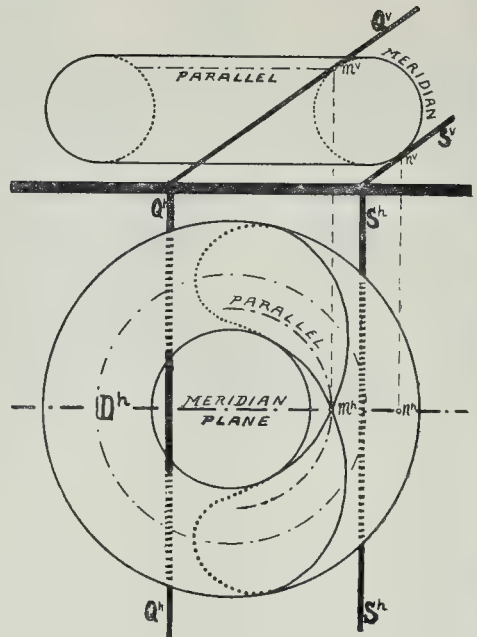


Fig. 142.

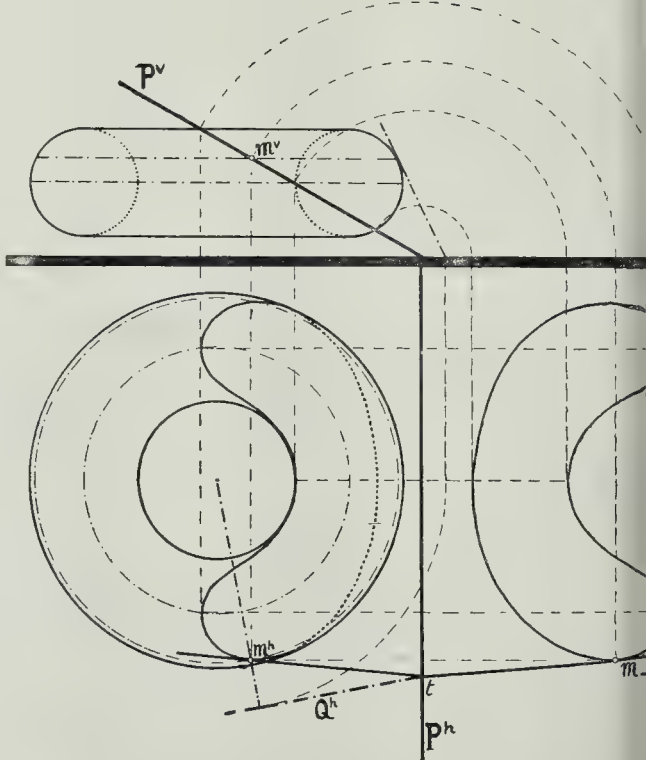


Fig. 143.



"PREHISTORIC AMERICA."

Str.—Why is all recognition of a possible early communication so peremptorily shut out? You may call it improbable, but it should not be utterly ignored. North America approximates to Europe and Greenland and Iceland; and far more nearly so to Asia, *via* Behring's Straits.

Many authorities favour the suggestion that early Buddhist missionaries, in an advanced stage of civilisation, may easily have reached the Esquimaux and wandered south; the key pattern ornament is no less Egyptian and far more Indian, though called Greek. Our King Alfred has let us into the secret of early whaling in the North Atlantic; why may not such early explorers have visited Greenland and wintered there; then, not succeeding in the return voyage, have visited Newfoundland, thence travelling south.

There is no occasion here to dwell upon supposed results, analogies, and plausible coincidences; we learn from Oriental sources that the natural set of currents may carry unwilling navigators from the Pacific shores of Eastern Asia to the coasts of Chili and Peru; it appears also that, from all time, a possible communication has existed from West Africa to the mouth of the Orinoco.

If all similarities of habit, custom, ornament, language, utensils, structures, &c., be fully accumulated, the probabilities will incline in favour of such lost communication, and the balance of opinion will turn thereto, rather than support the theory of separate originals.

A. H.

Aug. 7, 1885.

PROVINCIAL NEWS.

Oswestry.—The Oswestry Town Council are about commencing a new water-storage reservoir at Pen-y-gwely, seven miles from Oswestry, for which they obtained Parliamentary powers during the last session. Messrs. Fillett & Rofe, of the East Parade, Leeds, are acting as consulting engineers, and Mr. H. T. Wakeham, Assoc. M. Inst. C.E., Borough Surveyor, Oswestry, as local engineer.

Exeter.—The architect of the City of Exeter Lunatic Asylum, Mr. R. Stark Wilkinsons, A.R.I.B.A., having reported to the Town Council on lighting this Asylum by gas or by electricity, the Council decided to adopt the electric light, and invited tenders for installing 400 20-c.p. incandescent lamps, including all fixtures, dynamos, storage batteries for half the lights, engines, and all cabling and fixing, the engines to be supplied by steam from the asylum boilers at the cost of the Council, but tenders were to state the yearly cost of keeping the installation in working order, including renewals of lamps, repairs to cables, engines, dynamos, and storage batteries. Fourteen electric firms sent tenders, and the Council have accepted that of the Consolidated Electric Company (Limited), of 66a, Cow Cross-street, for 1,945*l.*, and the company agree to keep the same in proper working order for seven years for 175*l.* per annum.

STAINED GLASS.

Fulham.—A stained-glass window has recently been placed in the north aisle of All Saints Church, Fulham, to the memory of the late Bishop of London, Dr. Jackson. The subject represented illustrates the Conversion of St. Paul. There is a memorial inscription on a brass beneath the window, which reads thus:—"To the Glory of God, and in reverent memory of the Right Reverend Father in God, John Jackson, D.D., Bishop of Lincoln 1853-1869, Bishop of London 1869-1885, who rested from his labours on the Feast of Epiphany, 1885. This window is here placed by his neighbours and friends and others connected with the Parish of Fulham." This window (as, indeed, nearly all in the church) is from the studios of Messrs. Heaton, Butler, & Bayne. The same firm have also decorated the reredos in gold and colours, and painted the five panels with figure-work. Mr. Blomfield is the architect of the church, and has supervised the work throughout.

Bradford.—A large four-light stained-glass window has just been unveiled in St. John's Church, Bradford. It represents, in the chief lights, the Adoration of the Magi, and in the tracery, Christ blessing children. It has been erected by way of memorial to the late Mr. Pilling, of Bradford; and the artists are the Messrs. Powell Bros., of Leeds, who have also just completed a new window for one of the lancet lights in the south side of the nave of Rathmell Church, Yorkshire.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JULY 30.

By DANIEL SMITH, SON, & OAKLEY.  
Bristol—3, Upper Old Park-hill, freehold ..... £285  
Henbury, near Bristol—A plot of freehold land, 1a. 3c. 13p. .... 145  
Thornbury—"Street Farm," 66a. 1r. 10p., freehold "Shellar's Lane Farm," 68a. 1r. 10p., freehold... 2,000  
Freehold house and shop, 2a. 3p. 8p. .... 290  
Numerous enclosures of land, 128a. 0r. 14p., in lots ..... 6,340

AUG. 4.

By DEBENHAM, TWEED, & CO.  
New Sampford, Essex—"The Fighting Cocks," public-house, and 11a. 0r. 31p. freehold ..... 1,000  
Sutton—2, 3, 4, 7, and 8, Park-terrace, 78 years, ground-rent 41*l.* ..... 4,060

By E. LEWIS & CO.  
Birchington, Kent—1 to 4, Tower Bungalow, freehold ..... 5,000  
Three plots of freehold land ..... 500

By BELTON & SON.  
Fulham-road—No. 18, term 30 years, ground-rent 6*l.* ..... 420  
Chelsea—43, Blenheim-street, 23 years, ground-rent 4*l.* 16s. .... 185

By S. & G. KINGSTON.  
Spalding, near—"The Manor House," and 107a. 0r. 38p. .... 5,600  
House, and 49a. 1r. 19p. .... 1,680

AUG. 6.

By Messrs. GROVE.  
Ightham, Kent—"Oldbury House," and 1a. 2r. 30p., freehold ..... 500  
Three freehold cottages ..... 275  
A plot of fruit land, 1a. 1r. 18p. .... 340  
Four freehold cottages ..... 400

By F. J. BIXLEY.  
Bermundsey—203, Southwark Park-road, 41 years, ground-rent 4*l.* ..... 615  
Nos. 4 to 14 even, Francombe-street, freehold ..... 1,410

By DANIEL SMITH, SON, & OAKLEY.  
Golden-square—16, Broad-street, freehold ..... 1,830  
Stoke Newington—Ground-rents of £127 2s. a year, reversion in 99 years ..... 3,370  
Dartford—"The Smith's Arms" public-house, freehold ..... 1,600

By J. P. HOPKES.  
Chiswick—1, 2, and 3, Hope-cottages, copyhold ..... 427  
Acton—1 and 2, Berlin-villas, freehold ..... 280

AUG. 8.

By BELL, NORRIS, & HADLEY.  
Brunswick-square—83, Kenton-street, 21 years, ground-rent 15*l.* 16s. .... 350  
Shepherd's Bush—83, Bloomfield-street, 88 years, ground-rent 5*l.* 10s. .... 340

By SENGWICK, SON, & WEALE.  
Notting-hill—42, Peel-street, freehold ..... 325  
No. 83, Peel-street, freehold ..... 340

By NEWSON & HARDING.  
Islington—25, Highbury-grove, 67 years, ground-rent 30*l.* ..... 490  
Pentonville—31, Great Percy-street, 34 years, ground-rent 6*l.* ..... 570

By HARDS & JACKINSON.  
Streatham—11, 13, and 15, Wellfield-road, freehold ..... 525  
Ilford—An improved rectory of 40*l.*, and reversion, 1,260  
Dalston—9 and 10, Appleby-road, 59 years, ground-rent 6*l.* 16s. .... 605

By PROCKT & FRANKS.  
Nos. 10 and 12, Gayhurst-road, 63 years, ground-rent 10*l.* ..... 655  
Bethnal-green—40 and 51, Hare-street, 22 years, ground-rent 20*l.* ..... 280

AUG. 6.

By BRADSHAW & CO.  
Stevenson, near—"Ochil's Farm," and 470a. 0r. 17p., freehold ..... 8,250  
Walkers—"Box Wood," containing 61a. 3r. 20p. .... 800  
Baldoak, near—"Darnall's Hall," and 431a. 1r. 21p. Enclosures of land, 73a. 3r. 35p. (the lot) ..... 8,500  
"Quickwoods Farm," containing 814a. 1r. 14p., freehold ..... 18,000  
Enclosures of land, 25a. 0r. 34p., in nine lots ..... 510  
Manorial residence, and 41a. 1r. 32p., and the advowson and right of presentation to the Rectory of Caldecote ..... 13,600

AUG. 7.

By GIBBS & SON.  
Enfield, Rosemary-avenue—A plot of freehold land, 6a. 1r. 21p., seventeen plots of freehold land, also "Montague House," and a freehold ground-rent of 7*l.* 10s. a year ..... 3,040  
Gray's Inn-road—84, Acton-street, freehold ..... 640  
Twickenham—"The residence," "Meadowcroft," 99 years, ground-rent 10*l.* ..... 620  
The residence, "Mabel Lodge," 96 years, ground-rent 10*l.* ..... 600

By BAXTER, PAYNE, & LEPPER.  
Bromley, Kent—116, High-street, freehold ..... 1,225  
Orpington, High-street—Two freehold cottages ..... 300  
St. Mary Cray—"The Rising Sun" public-house, freehold ..... 865  
The freehold residence, "Hawkhurst," ..... 240  
The freehold villa adjoining ..... 250  
Sileup—3 and 4, Birkbeck-street, freehold ..... 700  
Gravesend—18, High-street, freehold ..... 1,850

By WEATHERALL & GREEN.  
Croydon—Seventeen plots of freehold land ..... 1,910

Proposed Bridge across the Straits of Messina.

A project was a short time since submitted to the Italian Minister of Public Works for the construction of a bridge, connecting the Island of Sicily with the main land of Italy. The Straits of Messina at the point where it is proposed to erect the bridge, are four thousand metres, or two miles and a half across. The greatest depth of water at this spot is one hundred metres.

Miscellaneous.

Proposed Thames Embankment at Isleworth.

At the meeting of the Hounslow and Isleworth Local Board on Tuesday last, a proposal was discussed of constructing an embankment on the side of the Thames at Isleworth. It transpired that the Vicar of Isleworth, the Rev. H. W. P. Richards, who is taking an active interest in the movement, received a communication from the Thames Conservancy Board on the subject, in which that river authority made the offer to the Hounslow and Isleworth Local Board to supply the necessary material for the construction of the embankment if the Local Board would undertake to carry out the work, which, it was stated, would involve an expenditure of several thousand pounds. The vicar urged the Board to accept this exceptionally favourable offer, as the proposed embankment would make Isleworth Reach one of the most attractive spots on the river; and be the starting point or terminus of a riverside way extending to London. He considered the Local Board, as the Sanitary Authority, should take the matter up on these grounds, if on no other. Such an offer as that of the Conservators might not be renewed. An embankment road had been constructed by the Metropolitan Board of Works on the opposite side of the river, on Crown property. Some of the members thought that although the embankment might beautify the place, it would be detrimental to the trade of Isleworth, one member remarking that he did not see why the vicar should desire to get rid of the poor people in the parish. The matter was dropped, and disappointment is generally expressed in Isleworth at the supineness of the Local Board in the matter.

Liverpool Architectural Society.

The sixth meeting of the Junior Debating Club, in connexion with this Society, was held at the Rooms, No. 9, Cook-street, on the evening of the 10th inst. Mr. Charles R. Chidson was elected chairman for the evening. There was a fair attendance of members. Mr. James Dod (visitor) gave a description of the box sextant, and of the many uses that it may be put to by the surveyor, particularly in measuring accurately the elevations of buildings to which (as often happens in light and air cases) access is forbidden. He pointed out the value of the instrument in surveying irregularly-built property and for laying down base lines in crowded thoroughfares where the use of chain or tape is inconvenient. Mr. Dod gave many illustrations of its application from his own experience as assistant for many years with one of the leading light and air experts in London, and remarked that a man could scarcely be considered a thoroughly-educated surveyor who could not fix his position on the earth's surface with the aid of the sextant. Even the small instrument he ordinarily used would give one's latitude correctly within two miles. Mr. Dod closed his remarks with an explanation of the necessary allowances for parallax and some practical hints on the working of the instrument. At the close of the discussion it was announced that the next meeting (August 24th) would be devoted to considering whether the club should hold a winter session, and to discuss any suggestions for varying the proceedings.

Awards at the Inventions Exhibition.

As soon as we have the official list complete, we will publish a list of the awards given for subjects within the classes in which our readers are specially interested. We must decline to publish statements privately furnished by the recipients of medals and awards. We may, however, mention that Gold Medals have been awarded by the Society of Arts (on the recommendation of the juries) to, amongst others, Sir Henry Bessemer, F.R.S., for the invention of Bessemer steel; Percy Gilchrist, for the Thomas-Gilchrist basic process of steel making; Hathorn, Davey, & Co., for their domestic motor (medal offered under the Howard trust); Samson Fox, for the invention of corrugated iron flues for steam boilers (medal offered under the Howard trust); Crossley Brothers, for the "Otto" gas-engine (medal offered under the Howard trust); Ralph Tweddell, for his system of applying hydraulic power to the working of machine tools, and for riveting and other machines which he has invented in connexion with that system (medal offered under the Howard trust)—some of which were lately illustrated in the *Builder*.



**South Africa.**—The new Dutch Reformed Church at Jansenville was formally opened on Saturday, the 20th of June last, amidst such a concourse of people as never before assembled in the little village. Representatives came from the neighbouring towns, including Port Elizabeth and Kimberley, and in all not less than 2,000 visitors were present. The proceedings were opened by prayer in the old church, after which a procession was formed and marched to the new building, where the key was handed to the authorities by the architect in due form. The building has been erected from the design, and under the superintendence of Mr. A. H. Reid, A.R.I.B.A., architect, of Port Elizabeth, the builders being Messrs. Grant & Downie, of Uitenhage. All the concrete jambs, arches, and tracery of windows, &c., and plaster modelling, were prepared by Messrs. J. O'Connor, of Port Elizabeth. The total cost of the building and fittings amount to 7,000*l*. The plan is cruciform, 90 ft. long, 40 ft. wide, 81 ft. across transepts, and 51 ft. high, from floor to ridge. It is lighted by paraffin standard and bracket lamps, supplied by the firm of Hart, Son, Peard, & Co., of London and Birmingham, and both lighting and ventilation, as well as the acoustic properties of the building, gave perfect satisfaction, under the severe test to which they were put,—upwards of 1,200 persons being present at the service.—*Uitenhage Times*.

**Sir G. H. Chubb.**—Her Majesty has been pleased to confer upon Mr. George Hayter Chubb the honour of knighthood. The gentleman in question is one of the managing directors of Chubb and Sons' Lock and Safe Company, Limited. He is son of the late Mr. John Chubb, and it was Sir George's grandfather who first made the name of Chubb famous in connexion with locks and safes. Sir George Chubb is comparatively speaking a young man, lacking still some few years of forty, but since he entered the business, now nearly twenty years ago, his efforts have been unceasing in the direction of promoting the welfare of the firm's employees. It is in recognition of his earnest, practical, and unremitting efforts to lighten the labours and brighten the lives of the working-class, that Her Majesty had bestowed upon him the high honour that has thus early in life fallen to his lot. Some few months ago we gave a description of the new dwellings and workmen's hall which Messrs. Chubb have lately erected in connexion with their works in the Old Kent-road.

**Northern Architectural Association.**—The members of this Association had their annual excursion on Thursday, the 6th inst. to Naworth Castle. Several important additions and improvements having during the last six years been made to the historic edifice, the members were desirous of inspecting the works. Every facility for so doing was kindly granted by the noble owner, and also by the architect, Mr. Chas. J. Ferguson, F.S.A., who conducted the members over the whole of the buildings, and explained the various works. Mr. Ferguson also conducted the party through the Priory Church at Lanercost to see the works recently carried out under his superintendence. The members afterwards adjourned to the Shaws Hotel, Gilsland. The president, Mr. W. H. Dunn, proposed the health of Mr. Ferguson, and expressed the thanks of the members for the very kind and courteous way in which that gentleman had, at some inconvenience to himself, come to Naworth to meet them.

**Wood-Block Flooring.**—Messrs. Geary & Walker, of 7, John Dalton-street, Manchester, have received instructions to lay their patent wood-block flooring at, amongst other places, the Parish Church Salwarpe, Droitwich; St. John's Church, Stoneford, Accrington; Parish Church, Wednesbury; Higley Manor, Balcombe; chapels at Stockport and Bollington, and St. Ann's Church, Waterfoot. This firm exhibit specimens of their improved system of flooring at the Inventions Exhibition.

**Technical Education.**—The Saddlers' Company have established four studentships, each of the annual value of 30*l*., and tenable for two years, at the Finsbury Technical College of the City and Guilds of London Institute. The studentships will be competed for at the entrance examination to be held at the College on October 1st, and are open to pupils above fourteen years of age who are attending, or who have attended, any public elementary school in the United Kingdom.

### The Club Stand, Epsom Grand Stand.

The works in connexion with the erection of the New Stand at Epsom have now been commenced, and the building is to be completed so as to be ready for use at the Spring Meeting. The accommodation will provide entrance-hall, leading to lawn and also to the dining-hall, which is to be 40 ft. by 45 ft. The balconies and rooms on the upper floors will be approached by a wide staircase which is continued up to roof standings; this will be lighted and ventilated by means of a large lantern light and by windows on the landings. Luncheon and refreshment rooms, with cloak-room and lavatories, are provided for the members of the Jockey Club on the first balcony floor. The rooms for the Prince and Princess of Wales are placed on the second balcony floor. The jockeys' rooms, &c., are to be placed at the east end of the building, and will consist of clerk of the course's rooms, jockeys' and weighing rooms, with telegraph-room for the receipt of telegrams. On the first floor, a large instrument-room, 35 ft. by 45 ft., will be provided. The balconies for trainers and reporters are continued in a line with the first balcony of the club-stand. Roof standings will be placed over. Considerable alterations will be also made in connexion with the grand stand. A new staircase is to be provided, leading to balconies, and a saloon, 40 ft. by 50 ft., with a refreshment-bar, &c., is to be placed adjoining. The buildings are to be constructed of brick, with iron columns and girders supporting the balconies. The plans have been prepared by Mr. J. Hatchard Smith, architect, Moorgate Station-buildings, E.C., and the works are being carried out by Messrs. Colls & Sons, builders, of London and Dorking, under the superintendence of the architect.

### Association of Municipal and Sanitary Engineers and Surveyors.

—A Lancashire and Cheshire district meeting of this Association is to be held at Blackburn on Friday, August 28th. A meeting will be held in the Town-hall at eleven a.m., when Mr. J. B. McCallum, the Borough and Water Engineer, will give a short paper descriptive of Blackburn and its public works. After luncheon the members will proceed to visit the following places and works of interest:—Blackburn Park, Free Library and Museum, Town Hall and Municipal Offices, the Exchange, Markets, Public Baths, Corporation Storeyard and Workshops, Public Abattoirs and Cattle Market, Audley Destructor Depot, Water Supply to Canal, Audley Recreation Ground, Fishmoor and Guide Reservoirs, and the Sewage Outfall at Witton. If time permits, visits may be paid to the Lancashire and Yorkshire New Railway Station, and Darwen-street Bridge; to the Corporation Gas Works; to Messrs. Yates' Foundry; and to the Lancashire and Cheshire Telephonic Works. At six p.m. the members will dine together at the White Bull Hotel. For those who can remain in Blackburn on Saturday, Mr. McCallum will arrange an excursion to the new Bowland Water Works.

**A Plumbers' Feast.**—The employees of Mr. John Smeaton, sanitary and hot-water engineer, of Ludgate-circus and King's-cross, had their annual outing on Saturday last at the Bee Hive, Staines. The party left the works in two brakes at 8:30 a.m., and the weather being fine, a most enjoyable day was spent. After the usual loyal and patriotic toasts had been duly honoured, "Success to the Firm" was given in a genial way by Mr. A. McKay, foreman of plumbers, and acknowledged by Mr. Smeaton, who remarked that he was greatly pleased to see so many old faces still to the fore year by year. Another toast was "Absent Friends," proposed by Mr. Gilchrist, manager of the Brighton branch establishment, and responded to on their behalf by Mr. Broadbridge.

**Newport (Mon.).**—New Board schools in Duke-street were opened on Monday, the 10th inst. These schools are arranged to accommodate 600 children in three departments, having masters' house and spacious covered play-sheds. The design of building being about 4,000*l*. The design is Gothic, built with red brick, having Bear stone dressings. The latrines are fitted with Bowes Scott & Read's trough closets. Boyle's ventilators are freely used, and by the above means the sanitary and ventilation arrangements are most satisfactory. The contract has been carried out by Mr. Wm. Price, builder, of Newport, under the supervision of the architect, Mr. E. A. Lansdowne, Mr. John F. Williams being the clerk of works.

### How Buildings are Disfigured.—As

have often protested against the disfigurement of buildings by advertisements, we are glad to read the following protest in the *Common World*.—The recent improvements in the widening Queen-street, Cheshire, 1 brought into prominence the chief office of the Atlas Assurance Company, one of the architectural ornaments of the City of London. The elevation is in the purest style of classical art, and it is much to be regretted that the directors have allowed it to be marred by staring, not to say vulgar, advertisements. Surely this sort of thing might be left to the lower class of shopkeepers; it is altogether beneath the dignity of insurance, to say nothing of the dignity of a company having such history as the Atlas.

### Cupola of the Nice Observatory.

—Eiffel has recently presented to the *Société d'Encouragement pour l'Industrie Nationale* drawings of the cupola of the above building constructed under the direction of M. Chas. Garnier, the architect of the Observatory, the expense of M. Bischoffsheim, its found. This cupola is said to be the largest of its class in existence, its internal diameter being 73 ft. 6 in. and its external diameter 78 ft. 6 in. 1 movable portion weighs 95 tons and the proportion 65 tons. The patented system of Eiffel has been adopted in its erection, a means of which there is comparatively little effort required in moving the portion intended for that purpose.

### Colonial and Indian Exhibition, 1885.

We understand that it is proposed to add the attractions of this Exhibition by providing for a practical illustration of the handicrafts of India, which will be given in the form of a Royal "Karkhana," or series of Palace workshops, feature in Eastern palaces. Arrangements are now being made to fulfil the conditions of such a palace workshop, and for the representation of a Palace Court-yard, the entrance to which will be the magnificent Gateway presented by H.H. the Maharajah Scindia, K.C.S.I., to the South Kensington Museum.

### Statement to Mr. Mark H. Judge.

On Saturday evening last, a number of the subscribers to the testimonial of Mr. Mark H. Judge, A.R.I.B.A., assembled at the Great Western Hotel, Strand-street, to present to the gentleman an address in recognition of the manner in which he had performed his duties as a member of the Paddington Vestry, together with a gold watch.

### PRICES CURRENT OF MATERIALS.

| TIMBER.                          |          | £. | s. | d. | £. | s. | d. |
|----------------------------------|----------|----|----|----|----|----|----|
| Greenheart, B.C.                 | ton      | 8  | 10 | 0  | 7  | 10 | 0  |
| Teak, B.I.                       | load     | 12 | 10 | 0  | 5  | 10 | 0  |
| Sequoia, U.S.                    | ft. cube | 0  | 2  | 6  | 0  | 2  | 0  |
| Ash, Canada                      | load     | 3  | 0  | 0  | 5  | 0  | 0  |
| Ash                              | load     | 3  | 0  | 0  | 4  | 10 | 0  |
| Elm                              | load     | 3  | 10 | 0  | 0  | 0  | 0  |
| Fir, Dantisc, &c.                | load     | 1  | 10 | 0  | 4  | 10 | 0  |
| Oak                              | load     | 3  | 0  | 0  | 5  | 0  | 0  |
| Canada                           | load     | 6  | 0  | 0  | 7  | 0  | 0  |
| Pine                             | load     | 3  | 0  | 0  | 4  | 0  | 0  |
| Larch, D.C.                      | load     | 3  | 15 | 0  | 5  | 5  | 0  |
| Lat. D.C.                        | load     | 5  | 0  | 0  | 8  | 0  | 0  |
| St. Petersburg                   | load     | 5  | 0  | 0  | 7  | 0  | 0  |
| Waincoat, Riga                   | load     | 3  | 0  | 0  | 4  | 10 | 0  |
| Doals, Finland, 2nd and 1st.     | std. 100 | 8  | 0  | 0  | 9  | 0  | 0  |
| Oster, 4th and 3rd               | load     | 6  | 10 | 0  | 7  | 10 | 0  |
| Riga                             | load     | 7  | 0  | 0  | 8  | 10 | 0  |
| St. Petersburg, 1st yel.         | load     | 10 | 0  | 0  | 17 | 0  | 0  |
| " 2nd                            | load     | 8  | 0  | 0  | 9  | 15 | 0  |
| " white                          | load     | 6  | 10 | 0  | 11 | 0  | 0  |
| Swedish                          | load     | 7  | 0  | 0  | 17 | 0  | 0  |
| White Sea                        | load     | 8  | 10 | 0  | 19 | 0  | 0  |
| Canada, Pine 1st                 | load     | 18 | 0  | 0  | 33 | 10 | 0  |
| " 2nd                            | load     | 12 | 0  | 0  | 18 | 10 | 0  |
| " Spruce 1st                     | load     | 9  | 0  | 0  | 13 | 0  | 0  |
| " Spruce 2nd                     | load     | 8  | 0  | 0  | 12 | 0  | 0  |
| New Brunswick, &c.               | load     | 5  | 0  | 0  | 7  | 10 | 0  |
| Battens, all kinds               | load     | 4  | 0  | 0  | 13 | 0  | 0  |
| Flooring, Boards, sq. 1 in.—Free | load     | 0  | 9  | 0  | 0  | 13 | 0  |
| Second                           | load     | 0  | 7  | 6  | 0  | 8  | 0  |
| Other qualities                  | load     | 0  | 5  | 0  | 0  | 7  | 0  |
| Oster, Chile                     | load     | 0  | 3  | 0  | 4  | 0  | 0  |
| Honduras, &c.                    | load     | 0  | 3  | 0  | 0  | 0  | 0  |
| Australian                       | load     | 0  | 3  | 0  | 0  | 0  | 0  |
| Mahogany, Cuba                   | load     | 0  | 5  | 0  | 0  | 0  | 0  |
| St. Domingo cargo                | load     | 0  | 4  | 0  | 0  | 0  | 0  |
| Mexican                          | load     | 0  | 4  | 0  | 0  | 0  | 0  |
| Tobacco                          | load     | 0  | 42 | 0  | 0  | 0  | 0  |
| London                           | load     | 0  | 6  | 1  | 0  | 0  | 0  |
| Rose, Rio                        | load     | 0  | 0  | 0  | 17 | 0  | 0  |
| Bahia                            | load     | 6  | 0  | 0  | 15 | 0  | 0  |
| Satin, St. Domingo               | load     | 0  | 8  | 0  | 0  | 1  | 0  |
| Porto Rico                       | load     | 0  | 8  | 0  | 0  | 1  | 0  |
| Walnut, Italian                  | load     | 0  | 4  | 0  | 0  | 5  | 0  |
| METALS.                          |          | £. | s. | d. | £. | s. | d. |
| Iron—Pig in Scotland             | ton      | 2  | 1  | 6  | 0  | 0  | 0  |
| Bar, Welsh, in London            | ton      | 4  | 15 | 0  | 5  | 2  | 6  |
| " " in Wales                     | ton      | 1  | 7  | 6  | 4  | 12 | 0  |
| Sheet, in London                 | ton      | 6  | 0  | 0  | 7  | 0  | 0  |
| Sheets, single, in London        | ton      | 7  | 10 | 0  | 9  | 0  | 0  |
| Hoops                            | ton      | 6  | 10 | 0  | 7  | 10 | 0  |
| Nail-roads                       | ton      | 6  | 0  | 0  | 7  | 0  | 0  |



| METALS (continued).     |         |         |        | METALS (continued).    |         |         |        |
|-------------------------|---------|---------|--------|------------------------|---------|---------|--------|
| British, cke. and ingt. | ton     | 47 0 0  | 48 0 0 | IC charcoal            | 17 0 0  | 20 0 0  |        |
| Best selected           | 68 0 0  | 49 0 0  |        | IX ditto               | 26 0 0  | 27 0 0  |        |
| Sheets, strong          | 65 10 0 | 66 0 0  |        | OILS.                  |         |         |        |
| Indian                  | 12 10 0 | 13 0 0  |        | Linseed                | ton     | 32 17 6 | 33 5 0 |
| Australian, fine comb.  | 54 10 0 | 55 0 0  |        | Cocunut, Cochia        | 32 0 0  | 32 10 0 |        |
| Phil. bars              | 43 5 0  | 43 12 6 |        | Ceylon                 | 27 5 0  | 0 0 0   |        |
| Low Metal               | 0 0 4   | 0 0 4   |        | Copa                   | 26 0 0  | 0 0 0   |        |
| an-Pig, Spanish         | 11 17 6 | 12 0 0  |        | Palm, Legns            | 29 10 0 | 30 0 0  |        |
| English, com. brands    | 12 10 0 | 0 0 0   |        | Palm, Kernel           | 29 10 0 | 0 0 0   |        |
| Alumina, special        | ton     | 13 17 6 | 14 0 0 | Rapeseed, English pale | 25 10 0 | 26 0 0  |        |
| Ordinary brands         | 13 15 0 | 0 0 0   |        | do brown               | 24 0 0  | 0 0 0   |        |
| Alumina                 | 90 0 0  | 90 10 0 |        | Cottonseed, refined    | 23 15 0 | 24 0 0  |        |
| Australian              | 90 0 0  | 90 10 0 |        | Tallow and Oleum       | 7 0 0   | 10 0 0  |        |
| English ingots          | 93 0 0  | 0 0 0   |        | do Refined             | 8 0 0   | 15 0 0  |        |
| Alumina                 | 14 6 0  | 16 8 0  |        | TURPENTINE—            |         |         |        |
| IX ditto                | 21 0 0  | 25 0 0  |        | American, in cks.      | 1 7 6   | 1 7 9   |        |
|                         |         |         |        | Tar—Stockholm          | 1 2 0   | 1 2 6   |        |
|                         |         |         |        | Archangel              | 0 13 0  | 0 13 6  |        |

## CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

### CONTRACTS.

| Nature of Work, or Materials.                                                        | By whom required.                       | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page.  |
|--------------------------------------------------------------------------------------|-----------------------------------------|-----------------------------------|--------------------------|--------|
| Building Cavalry Barracks                                                            | War Department                          | Official                          | August 18th              | ii.    |
| for Abutment, Pair of Villas, &c.                                                    | Lee-on-the-Solent                       | do.                               | August 20th              | xviii. |
| roughing and Cast-Iron, for Bridges                                                  | Midland Railway Co.                     | A. A. Langley                     | do.                      | ii.    |
| Painting and Painting                                                                | do.                                     | do.                               | August 25th              | ii.    |
| Supply of Broken Gravel                                                              | Cor. of Rochester                       | Official                          | do.                      | ii.    |
| Construction of Engine and Boiler-House, &c., also about 17,000 yards of Pipe Sewers | Walthamstow Lel. Bd. G. W. and L. N. W. | do.                               | August 28th              | ii.    |
| Building, &c., West Kirby Extension                                                  | do.                                     | do.                               | do.                      | ii.    |
| Police-Station, Wantstead                                                            | Metro. Police District                  | R. E. Johnston                    | August 29th              | ii.    |
| Works, and Laying-down Pipes, &c.                                                    | Epsom Local Board                       | Official                          | do.                      | ii.    |
| Abutment, Pair of Villas, &c.                                                        | Southam Co.                             | G. B. Andrews                     | do.                      | ii.    |
| Market Hall, Shops, and Dwelling-houses, &c.                                         | Hull Corporation                        | T. A. Hawley                      | August 31st              | ii.    |
| Sorting Office, Walthamstow                                                          | Com. of H. M. Works                     | Official                          | do.                      | ii.    |
| Additional Works, &c., Guildford                                                     | Ryl. Surrey Co. Hospd.                  | W. G. Lower                       | Sept. 1st                | xviii. |
| Shilling, Co. Slacks, &c.                                                            | Journeymen Com.                         | G. B. Andrews                     | Sept. 2nd                | xviii. |
| Things and Pictures                                                                  | Wandsworth & Clapham U.                 | T. W. Aldwinckle                  | Sept. 3rd                | ii.    |
| largement, &c., of Sewage-Purification Works                                         | Coventry Corporation                    | J. O. Mallis                      | Sept. 5th                | ii.    |
| section of Pier                                                                      | Met. Asylums Board                      | Official                          | Sept. 14th               | ii.    |
| Financing                                                                            | do.                                     | do.                               | do.                      | ii.    |
| widening Windmill Bridge                                                             | Croydon Town Council                    | do.                               | Sept. 15th               | ii.    |

### PUBLIC APPOINTMENTS.

| Nature of Appointment.              | By whom Advertised.   | Salary.    | Applications to be in. | Page. |
|-------------------------------------|-----------------------|------------|------------------------|-------|
| Surveyor and Inspector of Nuisances | Cleveland Local Board | Not stated | August 24th            | xvi.  |
| Surveyor                            | Teddington Local Bd.  | 200l.      | Sept. 14th             | xvi.  |

### TENDERS.

|                                                                                                                                                                                                                                                                                                |             |          |        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------|--------|
| <b>BIRMINGHAM.</b> —For new buildings, Park-road, Birmingham, for Mr. G. Toye. Mr. W. C. Howitt, architect, urdock-road, Handsworth. Quantities by the architect:—                                                                                                                             |             |          |        |
| J. Webb                                                                                                                                                                                                                                                                                        | £1,338 0 0  |          |        |
| T. Ellis                                                                                                                                                                                                                                                                                       | 1,245 0 0   |          |        |
| T. Hughes                                                                                                                                                                                                                                                                                      | 1,175 0 0   |          |        |
| T. Purcell (accepted)                                                                                                                                                                                                                                                                          | 1,975 0 0   |          |        |
| <b>BROCKLEY.</b> —For building six villas, Hazeldon-road, ockley, for Mr. H. Connors. Mr. F. J. Handsombody, architect:—                                                                                                                                                                       |             |          |        |
| Hale & Twicken, Bow Common-lane                                                                                                                                                                                                                                                                | £1,800 0 0  |          |        |
| (accepted)                                                                                                                                                                                                                                                                                     |             |          |        |
| <b>BROMLEY (Kent).</b> —For the erection of new residence, yth-road, Bromley, Kent. Mr. Arthur Vernon, architect, Great George-street, Westminster, and High ycombe:—                                                                                                                          |             |          |        |
| Silver & Sons                                                                                                                                                                                                                                                                                  | £2,820 0 0  |          |        |
| Holland & Hansen                                                                                                                                                                                                                                                                               | 2,768 0 0   |          |        |
| Woodbridge                                                                                                                                                                                                                                                                                     | 3,423 0 0   |          |        |
| Hunt                                                                                                                                                                                                                                                                                           | 2,435 0 0   |          |        |
| Crosley                                                                                                                                                                                                                                                                                        | 2,426 0 0   |          |        |
| Payne                                                                                                                                                                                                                                                                                          | 2,415 0 0   |          |        |
| Arnand & Son                                                                                                                                                                                                                                                                                   | 2,348 0 0   |          |        |
| Balding                                                                                                                                                                                                                                                                                        | 2,330 0 0   |          |        |
| <b>BURY ST. EDMUNDS.</b> —For erecting Wesleyan dle Class School and residence, for the East Anglian elayan Middle Class School Company (Limited), Bury dmunds. Mr. William Eade, architect. Quantities r. A. Field:—                                                                          |             |          |        |
| R. Dye, King's Lynn                                                                                                                                                                                                                                                                            | £2,982 15 0 |          |        |
| J. Robinson, jun., Bury St. Edmunds                                                                                                                                                                                                                                                            | 2,938 0 0   |          |        |
| J. L. Glasscock & Son, Bishop's Stort-                                                                                                                                                                                                                                                         | 2,720 0 0   |          |        |
| ford                                                                                                                                                                                                                                                                                           | 2,650 0 0   |          |        |
| T. H. Kingley, Oxford                                                                                                                                                                                                                                                                          | 2,649 0 0   |          |        |
| R. B. Smith, Ipswich                                                                                                                                                                                                                                                                           | 2,600 0 0   |          |        |
| J. Shillitoe & Son, Bury St. Edmunds                                                                                                                                                                                                                                                           | 2,600 0 0   |          |        |
| J. Wood & Co., Camberwell                                                                                                                                                                                                                                                                      | 2,599 0 0   |          |        |
| G. Dobson, Colchester                                                                                                                                                                                                                                                                          | 2,585 0 0   |          |        |
| W. Saint, Cambridge                                                                                                                                                                                                                                                                            | 2,498 0 0   |          |        |
| G. Grimwood & Son, Sudbury                                                                                                                                                                                                                                                                     | 2,435 0 0   |          |        |
| H. Everett & Son, Colchester                                                                                                                                                                                                                                                                   | 2,460 0 0   |          |        |
| A. Andrews, Bury St. Edmunds                                                                                                                                                                                                                                                                   | 2,444 0 0   |          |        |
| * Accepted.                                                                                                                                                                                                                                                                                    |             |          |        |
| <b>DANNING-TOWN.</b> —For alterations to new premises r. D. Molekenr, jeweller, Victoria Dock-road, E. r. Moore Smith, architect, Bishopsgate-street:—                                                                                                                                         |             |          |        |
| S. W. Hart, Barking-road                                                                                                                                                                                                                                                                       | £356 0 0    |          |        |
| (No competition.)                                                                                                                                                                                                                                                                              |             |          |        |
| <b>CHARLTON (Kent).</b> —For extension of warehouse, land-wharf, Charlton, Kent, for Messrs. White, lmer & Co. (Limited). Mr. Alexander W. Hensell, architect:—                                                                                                                                |             |          |        |
| T. Grover & Son (accepted)                                                                                                                                                                                                                                                                     | £1,176 0 0  |          |        |
| <b>CHATHAM.</b> —For new shops at Chatham. Mr. F. Pinches, architect:—                                                                                                                                                                                                                         |             |          |        |
| Allen & Sons                                                                                                                                                                                                                                                                                   | £784 0 0    |          |        |
| J. O. Richardson                                                                                                                                                                                                                                                                               | 779 0 0     |          |        |
| Skinner                                                                                                                                                                                                                                                                                        | 615 0 0     |          |        |
| <b>CHELSEA.</b> —For the erection and completion of new Vestry-hall, Chelsea. Mr. J. M. Brydon, F.R.I.B.A., architect. Quantities supplied by Mr. C. Fitz Roy Doll, F.S.I.:—                                                                                                                   |             |          |        |
| J. Gerrick                                                                                                                                                                                                                                                                                     | £20,000 0 0 |          |        |
| Tompeck & Kingham                                                                                                                                                                                                                                                                              | 19,479 0 0  |          |        |
| O. Craike                                                                                                                                                                                                                                                                                      | 18,883 0 0  |          |        |
| T. L. Green                                                                                                                                                                                                                                                                                    | 18,879 0 0  |          |        |
| Lackey Bros.                                                                                                                                                                                                                                                                                   | 17,900 0 0  |          |        |
| H. Hart                                                                                                                                                                                                                                                                                        | 17,734 0 0  |          |        |
| Stimpon & Co.                                                                                                                                                                                                                                                                                  | 17,700 0 0  |          |        |
| Downs                                                                                                                                                                                                                                                                                          | 17,678 0 0  |          |        |
| Priestley & Gurney                                                                                                                                                                                                                                                                             | 17,600 0 0  |          |        |
| Patman & Fotheringham                                                                                                                                                                                                                                                                          | 17,472 0 0  |          |        |
| Brass & Son                                                                                                                                                                                                                                                                                    | 17,436 0 0  |          |        |
| W. & H. Castle                                                                                                                                                                                                                                                                                 | 17,143 0 0  |          |        |
| B. E. Nightingale                                                                                                                                                                                                                                                                              | 17,079 0 0  |          |        |
| A. & E. Braid                                                                                                                                                                                                                                                                                  | 16,850 0 0  |          |        |
| J. T. Chappell                                                                                                                                                                                                                                                                                 | 16,846 0 0  |          |        |
| Martin, Wells, & Co.                                                                                                                                                                                                                                                                           | 16,800 0 0  |          |        |
| Howell & son                                                                                                                                                                                                                                                                                   | 16,490 0 0  |          |        |
| G. Stevenson                                                                                                                                                                                                                                                                                   | 16,350 0 0  |          |        |
| J. O. Richardson                                                                                                                                                                                                                                                                               | 16,200 0 0  |          |        |
| C. Wall (accepted)                                                                                                                                                                                                                                                                             | 14,944 0 0  |          |        |
| <b>CLERKENWELL.</b> —For Spas-fields new Church, Lloyd-square, Clerkenwell. Messrs. Lander & Bedells, architects. Quantities by Mr. Sidney Young:—                                                                                                                                             |             |          |        |
| Dove Bros.                                                                                                                                                                                                                                                                                     | £28,975 0 0 |          |        |
| Williams                                                                                                                                                                                                                                                                                       | 9,960 0 0   |          |        |
| L. & R. Roberts                                                                                                                                                                                                                                                                                | 8,839 0 0   |          |        |
| B. E. Nightingale                                                                                                                                                                                                                                                                              | 8,779 0 0   |          |        |
| Grover & Son                                                                                                                                                                                                                                                                                   | 8,749 0 0   |          |        |
| Matlock Bros.                                                                                                                                                                                                                                                                                  | 8,691 0 0   |          |        |
| J. Brown & Son                                                                                                                                                                                                                                                                                 | 8,650 0 0   |          |        |
| Wall Bros.                                                                                                                                                                                                                                                                                     | 8,390 0 0   |          |        |
| Allen & Sons                                                                                                                                                                                                                                                                                   | 8,200 0 0   |          |        |
| Thos. Wontner Smith & Son                                                                                                                                                                                                                                                                      | 7,900 0 0   |          |        |
| <b>COLCHESTER.</b> —For the erection of a warehouse, &c., Wyre-street, for Mr. H. Branch. Mr. J. W. Start, Colchester, architect:—                                                                                                                                                             |             |          |        |
| S. Start                                                                                                                                                                                                                                                                                       | £219 7 0    |          |        |
| H. Ambrose (accepted)                                                                                                                                                                                                                                                                          | 194 14 0    |          |        |
| <b>DULWICH.</b> —For alterations and additions to house, Alleyne-road, Dulwich. Mr. R. E. Tyler, architect:—                                                                                                                                                                                   |             |          |        |
| Philips                                                                                                                                                                                                                                                                                        | £270 0 0    |          |        |
| J. O. Richardson (accepted)                                                                                                                                                                                                                                                                    | 149 0 0     |          |        |
| <b>ELTRINGHAM (Northumberland).</b> —For new mixed school for the Eltringham School Board. Mr. Fred. B. Leighton, architect, Fence Houses:—                                                                                                                                                    |             |          |        |
| Lishman, Ryton-on-Tyne                                                                                                                                                                                                                                                                         | £1,147 14 0 |          |        |
| Weatherley, Newcastle-on-Tyne                                                                                                                                                                                                                                                                  | 1,141 3 0   |          |        |
| Smithson, Prudhoe-on-Tyne                                                                                                                                                                                                                                                                      | 937 14 10   |          |        |
| Robson & Fawcett, Corbridge-on-Tyne (accepted)                                                                                                                                                                                                                                                 | 750 0 0     |          |        |
| Hall, Prudhoe-on-Tyne                                                                                                                                                                                                                                                                          | 628 18 4    |          |        |
| [Architect's estimate, £800.]                                                                                                                                                                                                                                                                  |             |          |        |
| <b>GUNNERSBURY.</b> —For alterations to the "John Bull" Tavern, Gunnersbury, for Mr. Harrison:—                                                                                                                                                                                                |             |          |        |
| Burman                                                                                                                                                                                                                                                                                         | £1,200 0 0  |          |        |
| Goddard                                                                                                                                                                                                                                                                                        | 1,100 0 0   |          |        |
| Walker                                                                                                                                                                                                                                                                                         | 1,007 0 0   |          |        |
| Lambie                                                                                                                                                                                                                                                                                         | 998 0 0     |          |        |
| B. Cook (accepted)                                                                                                                                                                                                                                                                             | 987 0 0     |          |        |
| <b>Peuster.</b>                                                                                                                                                                                                                                                                                |             |          |        |
| Davidson                                                                                                                                                                                                                                                                                       | £113 10 0   |          |        |
| Helling                                                                                                                                                                                                                                                                                        | 103 8 0     |          |        |
| Reath                                                                                                                                                                                                                                                                                          | 95 0 0      |          |        |
| Saunders                                                                                                                                                                                                                                                                                       | 73 10 0     |          |        |
| <b>HIGHGATE.</b> —For alterations and additions to Nos. 108 and 110, Archway-road, Highgate. Mr. W. Smith, architect:—                                                                                                                                                                         |             |          |        |
| Horwood                                                                                                                                                                                                                                                                                        | £397 10 5   |          |        |
| Metcock Bros.                                                                                                                                                                                                                                                                                  | 590 0 0     |          |        |
| Dunford & Langham                                                                                                                                                                                                                                                                              | 467 0 0     |          |        |
| Lake                                                                                                                                                                                                                                                                                           | 560 0 0     |          |        |
| Hirst                                                                                                                                                                                                                                                                                          | 545 0 0     |          |        |
| J. O. Richardson (accepted)                                                                                                                                                                                                                                                                    | 543 0 0     |          |        |
| Stevens                                                                                                                                                                                                                                                                                        | 433 10 0    |          |        |
| <b>LLANGARRON (Herefordshire).</b> —For enlarging Tre-warna Farm, near Llangarron, Herefordshire, for Mr. G. Parry. Messrs. Muggerside & Powell, architects:—                                                                                                                                  |             |          |        |
| C. Morgan (accepted)                                                                                                                                                                                                                                                                           | £334 0 0    |          |        |
| <b>LONDON.</b> —For the construction of a brick sewer and subway, and the formation of paved footways and carriage-ways in an intended new line of street between Regent-circus, Piccadilly, and West-street, St. Giles, for the Metropolitan Board of Works. Sir J. W. Bazalgette, engineer:— |             |          |        |
| W. J. Bonveris                                                                                                                                                                                                                                                                                 | £34,622 0 0 |          |        |
| Neave                                                                                                                                                                                                                                                                                          | 28,700 0 0  |          |        |
| Killingback                                                                                                                                                                                                                                                                                    | 33,000 0 0  |          |        |
| Moss                                                                                                                                                                                                                                                                                           | 31,575 0 0  |          |        |
| Stubbs                                                                                                                                                                                                                                                                                         | 31,637 0 0  |          |        |
| Novell & Robson                                                                                                                                                                                                                                                                                | 31,5 9 0    |          |        |
| Webster                                                                                                                                                                                                                                                                                        | 31,468 0 0  |          |        |
| Mowlem & Co.                                                                                                                                                                                                                                                                                   | 31,000 0 0  |          |        |
| Williams, Son, & Wallington                                                                                                                                                                                                                                                                    | 30,400 0 0  |          |        |
| Treherne & Co.                                                                                                                                                                                                                                                                                 | 29,336 0 0  |          |        |
| C. Wall                                                                                                                                                                                                                                                                                        | 28,760 0 0  |          |        |
| T. Adams                                                                                                                                                                                                                                                                                       | 28,700 0 0  |          |        |
| Turner & Son (accepted)                                                                                                                                                                                                                                                                        | 28,087 0 0  |          |        |
| <b>LONDON.</b> —For the erection of a destructor, chimney shaft, &c., at Wentworth-street, Whitechapel, for the Board of Works for the Whitechapel District:—                                                                                                                                  |             |          |        |
| Beutley                                                                                                                                                                                                                                                                                        | £4,792 0 0  |          |        |
| Chappell                                                                                                                                                                                                                                                                                       | 4,600 0 0   |          |        |
| Brass & Son                                                                                                                                                                                                                                                                                    | 4,443 0 0   |          |        |
| Nightingale                                                                                                                                                                                                                                                                                    | 4,334 0 0   |          |        |
| Moriet                                                                                                                                                                                                                                                                                         | 4,100 0 0   |          |        |
| Dove Bros.                                                                                                                                                                                                                                                                                     | 4,100 0 0   |          |        |
| Rider & Son                                                                                                                                                                                                                                                                                    | 4,088 0 0   |          |        |
| Mowlem & Co.                                                                                                                                                                                                                                                                                   | 3,973 0 0   |          |        |
| Perry & Co.                                                                                                                                                                                                                                                                                    | 3,947 0 0   |          |        |
| Mark Gentry                                                                                                                                                                                                                                                                                    | 3,890 0 0   |          |        |
| Asby & Horner                                                                                                                                                                                                                                                                                  | 3,847 0 0   |          |        |
| Little                                                                                                                                                                                                                                                                                         | 3,768 0 0   |          |        |
| Fritchard                                                                                                                                                                                                                                                                                      | 3,697 0 0   |          |        |
| B. Cook                                                                                                                                                                                                                                                                                        | 3,691 0 0   |          |        |
| <b>LONDON.</b> —For alterations to the "Cambrian Stores," Glasshouse-street, Regent-street, for Mr. E. H. Barnes Mr. H. J. Newton, architect:—                                                                                                                                                 |             |          |        |
| Dixon & Jones                                                                                                                                                                                                                                                                                  | £148 0 0    |          |        |
| B. Cook                                                                                                                                                                                                                                                                                        | 113 10 0    |          |        |
| Lee (accepted)                                                                                                                                                                                                                                                                                 | 113 0 0     |          |        |
| <b>LONDON.</b> —For building a new billiard-room and other additions and alterations at 13, Upper Wimpole-street, on the Duke of Portland's estate. Mr. Mark H. Judge, architect:—                                                                                                             |             |          |        |
| Contract                                                                                                                                                                                                                                                                                       |             | Contract |        |
| No. 1.                                                                                                                                                                                                                                                                                         |             | No. 2.   |        |
| J. Andrews                                                                                                                                                                                                                                                                                     | £1,835      |          | £2,450 |
| H. Toten & Sons                                                                                                                                                                                                                                                                                | 1,850*      |          | 2,300  |
| * Accepted.                                                                                                                                                                                                                                                                                    |             |          |        |
| <b>MAIDSTONE.</b> —For the erection of a Chapel for the "Strict Baptists," College-walk, Maidstone. Messrs. Euck, Son, & Smith, architects, County Surveyor's Office, Maidstone. Quantities supplied:—                                                                                         |             |          |        |
| T. Elmore, Maidstone                                                                                                                                                                                                                                                                           | £1,767 0 0  |          |        |
| E. Wilkins, Loose                                                                                                                                                                                                                                                                              | 1,743 0 0   |          |        |
| R. Avar, Maidstone                                                                                                                                                                                                                                                                             | 1,723 0 0   |          |        |
| F. Vaughan, Maidstone                                                                                                                                                                                                                                                                          | 1,717 0 0   |          |        |
| Wallis & Clements, Maidstone                                                                                                                                                                                                                                                                   | 1,687 0 0   |          |        |
| Cox Bros., Maidstone                                                                                                                                                                                                                                                                           | 1,648 0 0   |          |        |
| * Accepted, subject to reductions.                                                                                                                                                                                                                                                             |             |          |        |
| <b>MONMOUTH.</b> —For building smithy, &c., for Mr. Charles H. Crompton Roberts, Overmonnow, Monmouth Messrs. Muggerside & Powell, architects:—                                                                                                                                                |             |          |        |
| Simmonds (accepted)                                                                                                                                                                                                                                                                            | £270 0 0    |          |        |
| <b>PONTYPRIDD.</b> —For new children's block and additions to main building at Pontypridd Workhouse. Messrs. James Seward & Thomas, architects, Cardiff. Quantities supplied by architects:—                                                                                                   |             |          |        |
| D. C. Jones, Gloucester                                                                                                                                                                                                                                                                        | £7,088 0 0  |          |        |
| T. Vackins & Jenkins, Swansea                                                                                                                                                                                                                                                                  | 6,190 0 0   |          |        |
| D. J. Davies, Cardiff                                                                                                                                                                                                                                                                          | 6,100 0 0   |          |        |
| James & Rees, Pontypridd                                                                                                                                                                                                                                                                       | 5,999 0 0   |          |        |
| D. Davies, Cardiff                                                                                                                                                                                                                                                                             | 5,815 0 0   |          |        |
| W. Symonds, Cardiff                                                                                                                                                                                                                                                                            | 5,689 0 0   |          |        |
| W. Seaton, Pontypridd                                                                                                                                                                                                                                                                          | 5,438 0 0   |          |        |
| H. Brown, Cardiff                                                                                                                                                                                                                                                                              | 4,928 0 0   |          |        |
| * Accepted.                                                                                                                                                                                                                                                                                    |             |          |        |

PONTYPRIDD.—For houses at Ynywyl, near Pontypridd, for the Cardiff and Glamorganshire Valleys Land and Building Investment Company (Limited). Messrs. James Seward & Thomas, architects. Quantities by architects:—

|                                       |         |    |   |
|---------------------------------------|---------|----|---|
| D. C. Jones & Co., Gloucester         | £19,863 | 0  | 0 |
| S. Lewis, Cardiff                     | 19,391  | 0  | 0 |
| H. Parfitt, Newport                   | 19,237  | 2  | 0 |
| D. Davies, Cardiff                    | 18,580  | 0  | 0 |
| D. J. Davies, Cardiff                 | 18,346  | 0  | 0 |
| E. Tanner, Gloucester                 | 16,280  | 0  | 0 |
| R. Parfitt, Pontypridd                | 14,567  | 0  | 0 |
| W. Seaton, Pontypridd                 | 14,000  | 0  | 0 |
| Holland & Martin, Pontypridd          | 13,924  | 12 | 6 |
| Shepherd & Son, Cardiff               | 13,321  | 0  | 0 |
| C. Jenkins & Son, Forth               | 13,200  | 0  | 0 |
| C. Pring & Co., Pontypridd (informal) | 12,435  | 0  | 0 |

\* Accepted.

PORTSMOUTH.—For new public hall, club, and offices, to be erected in the Commercial-road, Landport, Portsmouth, for the Directors of the Gladstone Buildings Company (Limited). Mr. G. Rake, architect, Portsea. Quantities supplied by Mr. H. P. Foster, John-street, Adelphi, London:—

|                   |         |   |   |
|-------------------|---------|---|---|
| S. H. Kingler     | £14,172 | 0 | 0 |
| Stevens & Sons    | 13,589  | 0 | 0 |
| W. B. & C. Light  | 12,774  | 0 | 0 |
| Bull, Sons, & Co. | 11,988  | 0 | 0 |
| G. Burridge       | 11,886  | 0 | 0 |
| T. F. Hall        | 11,538  | 0 | 0 |
| J. H. Corks       | 11,729  | 0 | 0 |
| D. W. Lewis       | 11,418  | 0 | 0 |

RETFORD (Notts.).—For enlarging factory for The Northern Rubber Company, Retford, Notts. Messrs. Muggidge & Powell, architects:—

|                      |        |   |   |
|----------------------|--------|---|---|
| G. Ledger            | £1,917 | 0 | 0 |
| J. Fish              | 1,120  | 0 | 0 |
| R. & C. Swannock     | 1,069  | 0 | 0 |
| G. Fenton (accepted) | 1,075  | 0 | 0 |

SCARBOROUGH.—For alterations to Lendborough Theatre, Scarborough. Messrs. William Lewis & Son, architects, York. Quantities supplied by architects:—

|                |      |    |   |
|----------------|------|----|---|
| Jowsey         | £270 | 0  | 0 |
| Berry          | 257  | 6  | 0 |
| Eastman & Sons | 239  | 0  | 0 |
| Petch & Fox    | 238  | 19 | 0 |
| Manson         | 225  | 0  | 0 |

\* Accepted, extra contract £11 13s. 3d.

SOUTHWARK.—For alterations and additions to Nos. 79 and 81, Borough High-street, for Mr. Aubrey Hyman. Mr. J. Douglas Maclews, architect:—

|                   |      |    |   |
|-------------------|------|----|---|
| Gilbert & Gayford | £273 | 0  | 0 |
| Kardley & Son     | 219  | 0  | 0 |
| Ramer             | 200  | 0  | 0 |
| Mills & Son       | 195  | 0  | 0 |
| Saier (accepted)  | 178  | 10 | 0 |

TOTTENHAM.—For the extension of sewage works, for the Tottenham Local Board of Health. Mr. A. H. de Fape, engineer. Quantities by engineer:—

Contract No. 1.—Construction of Retaining Chambers, Tanks, Sewer Extensions, Penstock Chambers, &c.

|                     | A.*         | B.*         | C.*        |
|---------------------|-------------|-------------|------------|
|                     | £ s. d.     | £ s. d.     | £ s. d.    |
| J. W. & J. Neave    |             |             |            |
| Leytonstone         | 18,782 0 0  | 17,975 0 0  | 17,500 0 0 |
| B. Cooke & Co.      |             |             |            |
| Battersea           | 18,290 0 0  | 14,500 0 0  | 14,500 0 0 |
| C. Wall, Chelsea    | 16,496 0 0  | 14,906 0 0  | 14,906 0 0 |
| Putnam & Fother-    |             |             |            |
| ingham              | 16,300 0 0  | 16,150 0 0  | 15,000 0 0 |
| J. Bloomfield, Tot- |             |             |            |
| tenham              | 14,053 12 8 | 13,954 11 8 | 13,412 8 8 |
| W. Brass & Sons, §  |             |             |            |
| 47, Old-street      | 13,964 0 0  | 12,964 0 0  | 12,464 0 0 |

\* With special blue brick coping.

† With ordinary ball-nosed coping.

‡ With concrete ball-nosed coping.

§ Accepted for concrete block coping.

\* With special blue brick coping.  
\* With ordinary red-brick coping.  
\* With concrete block coping.  
§ Accepted for concrete block coping.

Contract No. 2.—Smith and Founders' Work.

|                                      |        |   |   |
|--------------------------------------|--------|---|---|
| J. W. & J. Neave, Leytonstone        | £1,881 | 0 | 0 |
| Waller & Co., Holland-street, South- | 1,699  | 0 | 0 |
| work (accepted)                      | 1,699  | 0 | 0 |
| Davis & Pearson (informal)           | 1,699  | 0 | 0 |

[Quantities by Engineer.]

Sludge Presses.

Johnson & Co., Stratford (accepted) £1,750 0 0

WESTMINSTER.—For alterations and additions, No. 2, Wood-street, Westminster, for Messrs. Nicholls & Co. Mr. Thos. Newell, architect. Quantities supplied by T. Marcus Houghton:—

|                    |        |   |   |
|--------------------|--------|---|---|
| J. Foster          | £1,698 | 0 | 0 |
| Pemberton          | 1,550  | 0 | 0 |
| Lucas & Son        | 1,440  | 0 | 0 |
| Stevens & Co.      | 1,300  | 0 | 0 |
| C. P. Smith        | 1,288  | 0 | 0 |
| W. & D. McGregor   | 1,300  | 0 | 0 |
| J. Crapper         | 1,181  | 0 | 0 |
| C. F. Kearley      | 1,145  | 0 | 0 |
| Goodman (accepted) | 1,129  | 0 | 0 |

YORK.—For erecting fourteen houses, first portion of an estate at Clarendon-terrace, York, for Mr. W. H. Waddington. Quantities supplied by architects. Messrs. W. Lewis & Son, architects, Stonegate, York:—

Whole Tenders less Ironmonger.

|                |        |    |   |
|----------------|--------|----|---|
| Galtry         | £1,632 | 0  | 0 |
| Clark and Ward | 1,379  | 15 | 0 |
| Kilington      | 1,304  | 0  | 0 |
| Lister         | 1,292  | 10 | 0 |

Rebuilding 65 and 66, Bernick-street, S.W.—In the list of tenders for this work, given on p. 210, the architect's names should have been given as Messrs. "Burden & Milnes," not "Barden & Milnes."

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our Office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

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# The Builder.

Vol. XLIX. No. 2550.

SATURDAY, AUGUST 22, 1885.

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### The New Docks and Quays at Antwerp.



THE vast increase in the shipping trade of Antwerp of late years had completely outgrown the accommodation provided by its old quays and docks, in spite of the fact that they had been repeatedly enlarged and added to. Within the past twenty years Antwerp has risen from a third or fourth rate centre of commerce to the very first and largest port on the European continent. It has distanced all its old rivals, and has not only left behind Rotterdam and Amsterdam, but all the largest ports of France and Germany. It is now in advance of places like Hamburg, Bremen, Havre, Trieste, Marseilles, Copenhagen, Constantinople, and St. Petersburg. In 1850 the tonnage entering the port of Antwerp was only 250,000 tons. In 1865 it had increased to 750,000 tons, and in 1884 had reached the enormous figure of 1,000,000 tons. Ten years ago the Belgian authorities decided upon giving Antwerp the vastly-increased dock and quay accommodation its ever-growing commerce required. The practical realisation of the scheme commenced in 1877, and its completion was signalled by the great fête on the 26th ult., when the whole of the new quays and docks were inaugurated by H.M. the King of the Belgians. The sight presented to the English passenger, as he steamed, in the Harwich boat, past the splendid sweep of the new quays, is one which it would be difficult to match in the whole world.

The old quay walls on the river, constructed bit by bit on very irregular lines, were ill adapted for any important trade. Except on the Quai du Rhin there were no means of working these river walls by railways, and they could not even be approached at low water, their footings being laid at low-water level: ships were either obliged to lie on the mud, or to keep at a distance from the walls. Eventually, the irregular form of the quays, a marked projection which occurred about the middle of their length, and the necessity of providing projecting jetties, produced a retardation in the river currents, and in consequence deposits of sand and many other inconveniences, whilst the ground available was insufficient for a complete and regular working of the traffic. It was, therefore, resolved to reconstruct the entire quays upon a regular curve, concave towards the river. This curve has a total length of 3,500 metres, or two miles and one-fifth. At the same time, the creeks which divided the then

existing quays were to be replaced by large floating basins for smaller vessels. The docks proving likewise insufficient, it was decided to lengthen one of them, and to add three new dry docks to the three already existing. The new quays have been executed by the State, but were furnished with the necessary appliances at the cost of the town; the other works on the docks were executed by the town alone. The portion to be provided by the State was contracted for in 1877 by Messrs. Couvreux & Hersent, of Paris, and comprised the following works.

Firstly, the construction of a quay-wall, two and one-fifth miles in length, resting on a sound foundation, laid without any timber footings, and giving a depth of not less than 8 metres, or 26 ft. 3 in. of water against the face at low tide. In this wall there are three recesses, rectangular in plan, which are intended to accommodate floating landing-stages, and give access to boats. The landing-stages do not project beyond the line of the quay, and are made of iron, having a movable platform joined to the wharf by a movable bridge. Two of these landing-stages are 66 ft. long by 33 ft. wide, and the other 330 ft. by 66 ft.

The second portion comprises the building at the south end of this quay wall of an embankment connecting it with the land. This embankment is 2,130 ft. long, and is properly protected against the action of the river.

Thirdly, a basin for small craft had to be constructed, having an area of about ten acres, and divided into three parts; a lock, 42 ft. wide, connecting this basin with the Scheldt, and an entrance channel 160 ft. in width.

The works were divided into four sections, and the whole was to be completed within six years and seven months from the commencement. They included the provision and fixing of 12,000 tons of wrought iron for the caissons in the foundations, landing-stages, swing bridges, &c.; 375,000 cubic metres, or 490,000 cubic yards of brickwork and concrete; 33,000 cubic yards of masonry in Soignies stone, and more than 3,300,000 cubic yards of earthwork in filling, dredging, &c. The cost was estimated at more than 38,000,000 francs, or 1,520,000*l.*, being augmented or diminished, according to an agreed schedule, with any augmentation or diminution in the depth of foundations which might become advisable. To this are added upwards of 60,000*l.* for any necessary additions to the work in the foundations. The first section of the works includes in the first place the new basins for small craft. These run parallel to the river, and are three in number. The central basin, from which branches the lock connecting them with the Scheldt, is 874 ft. by 213 ft., and the two others are respectively

807 ft. and 740 ft. in length, with a width of 164 ft. They are joined to the central basin by openings 33 ft. in width, each crossed by a swing-bridge carrying a roadway 17 ft. 3 in. wide and two footways each of 3 ft. 3 in. The bottom of the basins is 6 ft. 6 in. below the level of low water at Antwerp, and the coping of the walls 21 ft. above the same level. The total length of these walls is about 5,900 ft., or  $1\frac{1}{8}$  mile. They rest at the bottom level on a layer of concrete 3 ft. 3 in. in thickness, and 16 ft. 6 in. in width, being enclosed by two rows of sheet piling. The wall, which is constructed of Boom bricks, is 27 ft. 4½ in. in height, including the coping, 13 ft. 1½ in. in width at the base, and 8 ft. 2½ in. at the top. The wall has a batter of one in ten, and is faced with hammer-dressed stone from the coping to a height of 8 ft. 2 in. above low-water. The quay-space of these basins has a width of 98 ft. The walls are furnished with cast-iron mooring-posts, with cast-iron fenders, and wrought-iron ladders, whilst the basins are kept filled to a level of about 12 ft. above low-water. The lock between the central basin and the Scheldt is built partly in the river and partly upon dry ground. It is composed of three distinct and separate portions. In the first place, there is the upper lock, with a sill of masonry 1 ft. above the bottom of the basin, and resting on a foundation of concrete 8 ft. 2½ in. in thickness. In width it is 42 ft. 6 in. between the side walls, and is crossed by a swing-bridge, 28 ft. wide, which is intended not only for horse traffic, but likewise for the railway which serves the quays on the Scheldt. This lock was constructed between two rows of sheet piling, and behind an earthen cofferdam connected at each end with the original banks of the river. It has a pair of gates opening inwards, arranged for receiving, if at any time necessary, a similar pair opening outwards. In the second place, there is the lock-chamber, 246 ft. by 82 ft., whose walls are similar to those of the basins, only they are entirely faced with ashlar. The invert rests on a layer of concrete, a little over 3 ft. in thickness, with its surface 6 ft. 6 in. below low-water, and is surrounded by sheet-piling. Lastly, there is the lower lock, which contains two pairs of gates, and has its invert level the same as that of the chamber. The side walls, which are 42 ft. 6 in. distant from each other, are crossed by a swing-bridge of the same dimensions as that across the upper lock, and carry a roadway with two lines of railway.

The chamber and lower lock had to be constructed almost within the area of the Scheldt. The contractors purposed to make the lower lock form part of the coffer-dam which should shut in the lock chamber to be built behind it, instead of building a coffer-dam in the river,



so as to proceed with both at the same time. With this object they constructed the entire lower lock *in situ*, and in one piece, upon an immense caisson, sunk, by means of compressed air, to a depth of 21 ft. below low-water level. This caisson was 131 ft. by 75 ft. 6 in., having an area of 920 square metres, or 9,890 square feet, whilst its total height was 42 ft. 6 in., making the contents 11,960 cubic metres, or 421,000 cubic feet. It was divided longitudinally inside the roof into five working compartments, which were completely independent of one another, each having its own air-lock and tubes for concrete. The walls of the caisson were joined near the top and above the girders by cross-girders of iron. The caisson was erected upon the banks of the Scheldt, in a place protected from the tide by an earthen embankment. After being completed the embankment was cut through on the side nearest to the river, and the tide entering floated off the caisson, which was then towed, without fear of damage, to its proper position. In August, 1878, the sinking was commenced, and was completed by November of the same year. The masonry having been carried up a certain distance, it was then connected with the bank at each end by an earthen embankment. A vast base was consequently formed, which required only to be pumped dry in order to commence the foundations of the lock-chamber. Upon the completion of the chamber and locks, all that remained was to remove the iron barrier across the end of the lower lock nearest to the river, by cutting the rivets and unbolting the wrought-iron knees which supported it. The six gates belonging to the entire lock are all of wrought-iron, and made without rollers; the lowering of the water is effected by means of sluices in the side walls and valves in the gates themselves. Between the lower lock and the line of the new quay is an entrance-channel 164 ft. in length, and as many feet in width, which is intended to shelter boats from the river current as they enter or leave the lock. The bottom of this channel is 8 ft. below low-water, its walls being constructed upon caissons sunk by compressed air to depths varying from 34 ft. 6 in. to 41 ft. 6 in. below low-water.

The quay wall has been built within the bed of the river by a special system of movable coffer-dams. It is constructed of Boom bricks, and faced with Soignies stone; the coping level is 21 ft. above low-water, and the total height is 47 ft., whilst the width is a little more than 6 ft. 6 in. at the top, 20 ft. 6 in. at low-water level, and 23 ft. at the base. It has a batter of one in twenty from the coping to low-water level, and one in ten from thence to the foundations. The upper part of these foundations is at a level of 26 ft. 3 in. below low-water throughout, and has a breadth of 20 ft. 6 in.; the depth varies between 8 ft. 3 in. and 16 ft. 6 in., according to the depth of the river bed, so that the bottom of the foundation is from 34 ft. 6 in. to 42 ft. 9 in. below low-water. The difficulty of carrying out such works in the Scheldt was exceedingly great; the sandy nature of the bottom, the speed of the current, and the great rise of tide, are all adverse circumstances. It became necessary to build a continuous quay-wall with its foundations 34 ft. to 43 ft. below the low-water level of a rapid river, rising twice in the course of the day to more than 13 ft. on the average above this level, and frequently at high tides to 21 ft. The method adopted by the contractors was as follows:—They divided the total length of the quay into lengths of 82 ft., which have been built end to end, and directly upon firm ground, without any intervening foundations. This has been accomplished by means of a special coffer-dam used for the first time on this occasion, and with most complete success. It is composed of the following parts:—

1. An iron caisson for compressed air, varying in height according to the depth at which the foundations were to be laid, and intended for removing the soil and laying the base of the wall.

2. A movable iron cofferdam, 40 ft. high, having the same shape as the caisson which supported it, and with which it was connected

by bolts. Within this cofferdam the part of the quay wall was built 26 ft. 3 in. in height, which is comprised between the top of the foundations, properly so called, and the level of low water.

3. A floating framework, designed for the manipulation of the coffer-dam, and for the placing and sinking of the caisson. The caisson served for the removal of the earth, and was then filled with concrete, and became an integral part of the foundations. The masonry having been built on the top of this up to low-water level, under the shelter of the movable coffer-dam, it became possible to remove the coffer-dam by unbolting it from the caisson and raising it by chains fixed to the floating framework. It was then taken away to serve the same purpose for another length of wall, while the length so far constructed by its means was finished in the dry.

The caissons were built in yards on the bank of the river, and were launched at high water, when they were towed to their destination underneath the movable coffer-dam, being bolted to the latter, with a layer of india-rubber placed between the two. The weight of a caisson, 82 ft. by 29 ft. 6 in., varied from 65 tons to 100 tons, according as the height is 8 ft. 3 in. or 16 ft. 6 in. The movable coffer-dam was composed of a large wrought-iron rectangular box, 82 ft. by 29 ft. 6 in., and 40 ft. in height. To prevent any deformation of the walls of the coffer-dam under the pressure of the water whilst the building of the masonry was going on inside, they were connected with each other by strong movable stays, which were removed as the work proceeded, being replaced by shorter stays bearing against the face of the wall already constructed. The coffer-dam, complete, with all its apparatus, weighed about 200 tons.

The floating framework was composed of two iron barges, 85 ft. by 16 ft., upon which were built frames of iron braced diagonally, and connected at a height of 43 ft. above water level by cross-girders, being also connected by a similar framework at the two ends. The cofferdam was suspended by twelve chains in the space between the two barges, and could on this account be raised or lowered at will by means of hoisting gear, consisting of six winches in each barge, all twelve being worked by one steam engine. The power was transmitted from one barge to the other by means of two pitch-chains. Uniformity of lifting with the twelve lifting chains was secured by india-rubber springs, and each tackle had a lifting power of about 20 tons. In the hold of the barges were the steam engines for working the cofferdam and the air-compressors, with the pressure and exhausting pumps. On deck were mortar-mixing machines, and others for handling the materials. Four Jablochhoff electric lamps were placed on each framework for working by night. The method of working with this apparatus was as follows:—

The site for the caisson was first dredged to the proper level, and the caisson then brought up to the floating framework with its roof loaded to the top of the girders with concrete, which ultimately formed part of the foundation. The coffer dam was lifted until its bottom edge was about 3 ft. 3 in. above water-level, when the caisson was brought in under it and the coffer-dam lowered upon it, and the two bolted together. The masonry was then commenced on the top of the caisson, so as to load it with the necessary weight, whilst at the same time the air-tube and the four concrete tubes were attached to it. The bottom of the Scheldt is generally composed of sand, more or less argillaceous, and of loam earth. Under these circumstances the work of removing the earth excavated has been considerably facilitated by the use of ejectors, as employed for the first time by the same contractors at Selzette Bridge on the Terneuzen Canal. Each ejector can easily discharge 2·6 cubic yards of earth per hour.

The sheds cover an area of about 25 acres. The total width of the new quays is 328 ft. To obtain this width it has been necessary to pull down more than 600 houses, the purchase of which has cost upwards of 25,000,000 francs, or 1,000,000*l.* sterling. The total cost of the

quays, including machinery, earthworks, dredging, paving, works above ground, and property purchased, is no less than 80,000,000 francs; that is, 3,200,000*l.* sterling.

The operations at the new quays are carried out by hydraulic machinery. For this purpose steam pumping-engines of 400-h.p. have been placed in a building near the southern basin for small craft. From this building a line of pipes is laid, passing round the small craft basin, and along the first section of the quays. This first section is worked by twenty-two portable hydraulic cranes. The construction of the three new dry docks situated at the north end of the quay has required 28,700 c.m., or 37,540 cubic yards, of brickwork, and nearly 5,000 c.m., or 6,540 cubic yards, of heavy stone, while more than 100,000 c.m., or 130,800 cubic yards, have been excavated. The large dry dock previously existing is emptied by means of pumps, capable of drawing 200,000 litres, or 44,000 gallons, per minute. It was desired to make the same pumping-engine serve for the new dry docks, but there was great difficulty in so doing, from the fact that the conduit leading the water from the new docks to the engine was obliged to pass below the existing docks. For this purpose a tunnel, about 390 ft. in length, was driven, and lined with cast-iron tubing. A well was first sunk by means of compressed air, and the driving of the tunnel was carried on by the same means, the successive lengths of cast-iron tubing being bolted on to one another, and the water kept back by the pressure of the air. This operation succeeded perfectly, and the extremity of this tunnel has been united with the head of each of the dry docks.

The northern docks are also worked by hydraulic machinery. A special building contains a 150-h.p. steam-pumping engine and boilers, and two accumulators weighing together 240 tons. This engine supplies water-pressure to the movable and other cranes round the docks, the bridge and gate machinery, and capstans for hauling ships, &c., as well as to the hydraulic engines which drive the dynamo-electric machines for lighting the entrance of the old docks. Among the machines worked by this water-pressure may be mentioned a 40-ton crane altered to the hydraulic system, and sheer-legs capable of lifting 120 tons. These are on the eastern wall of the Kattendyke basin, the lock of which is crossed by a draw-bridge, having a length of 158 ft. carrying a roadway 90 ft. wide, and weighing 375,000 kilograms, or 370 tons. In order to open this bridge it is raised about 3 ft. 3 in. by means of two hydraulic cranes 2 ft. 7 in. in diameter and is then drawn back by chains which are worked by rams 2 ft. in diameter. It can be completely opened in three minutes twenty seconds, and closed in two minutes ten seconds.

## CLOCKS IN RELATION TO ARCHITECTURE.—I.

BY A PRACTICAL CLOCKMAKER.



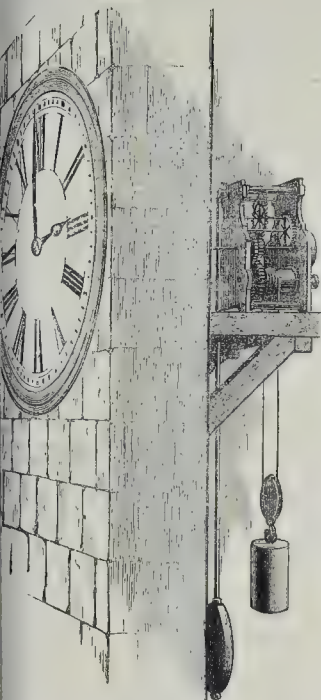
ALTHOUGH turret clocks cannot be said to belong to architecture, yet their association therewith is so intimate, that some jottings on the subject from a practical standpoint may not be out of place in a journal devoted to architectural interests.

No tower, whether of church, town hall, or other public building, can be considered complete without a suitable clock, for passers-by almost instinctively look up to see the time and are naturally disappointed if there is no clock to show it. Indeed, the *raison d'être* of a church tower is to contain the bells, and the clock follows as a matter of course.

This primary purpose of the existence of a tower we find in many modern buildings entirely ignored; no provision, or at best a most inadequate one, being made for a clock of due proportions, suited to the size and importance of the structure.

Take a few instances at random. The important parish church of Kensington has, indeed, a clock, but it is invisible, and time is





A Silent Turret Clock.

The drawing represents a "silent" turret clock of the most simple construction, having the following

Train of Wheels:—

|                                                              |                                                                                                                   |                                                                                         |                                                                                                                   |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| MAIN WHEEL,<br>turns once<br>in 4 hours,<br>and has<br>teeth | CENTRE WHEEL,<br>turns once<br>an hour,<br>carries the<br>minute hand,<br>and has<br>teeth<br>64 gears into ..... | THIRD WHEEL,<br>turns once<br>in 7½ minutes,<br>and has<br>teeth<br>60 gears into ..... | ESCAPE WHEEL,<br>which drives the pendulum,<br>turns once a minute,<br>and has teeth<br>30<br>Pinion of 8 leaves. |
|                                                              | 80 gears into .....                                                                                               | Pinion of 20 leaves.                                                                    |                                                                                                                   |
|                                                              |                                                                                                                   | Pinion of 8 leaves.                                                                     |                                                                                                                   |

most cursory inspection of the churches last mentioned.

Turret clocks, like other things, have not escaped the influence of the modern spirit, which demands a perfection hitherto unexpected. Formerly allowance was made for the difficult conditions under which the clock worked. The disturbance of the hands by wind or snow,\* the exposure of the movement (popularly known as "the works") to damp, dust, and grit, the effect of the weather on the oil and the metals, the action on the pendulum of extremes of temperature and other adverse influences were taken into consideration, and the clock was excused if its time-keeping were irregular, as was generally the case. The variation of a few minutes was, from the absence of true time in the neighbourhood, perhaps, never detected, or else condoned as the best to be expected, and of no practical consequence, as the mistake would be rectified at the next periodical winding. Indeed, allusion is made by old writers to the custom of allowing a quarter of an hour for the "difference of clocks."

There is no doubt that railways and the electric telegraph have indirectly done much to raise the standard of time-keeping; for the service of trains is regulated by Greenwich time, received daily by telegraph at the terminus, and thence transmitted to the various stations.

Exact time being now required, turret-clocks as the public standards are expected, no matter how exposed their situation or how large their dials, to keep an accurate rate, and not vary as many seconds per week as their predecessors varied minutes. This necessary condition ought to be stipulated for in all orders for new clocks, and makers of repute are prepared to comply with such a requirement.

Turret-clocks are not simply house clocks on an enlarged scale, differing from them merely in size and weight, but the extra strength of the mechanism involves greater weight of material and increased weight implies increase of friction. It is of the first necessity to provide ample space for the fall of the weights and the swing of the pendulum, in order to make the clock thoroughly efficient and a good timekeeper.

The movement which has to be placed at some distance from the dials must be more powerful than one in close proximity, and forethought on the part of the architect will save expense both in the original cost of the clock and its subsequent repair. Unless sufficient space be provided, it is, indeed, impossible to have a first-class clock that will give satisfaction to its owners and be a credit to its makers.

The popular idea is that a clock is too complicated a piece of mechanism to be understood by any but those engaged in its manufacture, whereas, in reality, its design is extremely simple, consisting of four wheels and three pinions, i.e., very small wheels, the teeth of which are called "leaves."

The action will be readily understood from the drawing and diagram of the "train of wheels" given above.

Each wheel, excepting the main-wheel, has a pinion (small wheel) on its arbor or axle. To the main wheel is attached a drum, which

\* This is not a fanciful supposition. The snowstorm which occurred early on Sunday morning, 22nd of March of the present year, stopped the great clock at Westminster and more than half the public clocks in London, the accumulation of snow on the hands overpowering the clock. Even in cases where the clock was not stopped, the hands would be retarded in their progress and thereby cause a loss of time.

carries a weight to supply the motive power. The pendulum, we will suppose, oscillates once a second, it will, therefore, take a double oscillation for each tooth to pass the pallet, consequently the escape-wheel, with thirty teeth, will revolve once a minute.

There is no arbitrary rule for the numbers for the teeth, which can be varied so long as the due proportions are retained. As the escape-wheel turns sixty times to one turn of the centre wheel, the method for determining the numbers will be as follows:—Multiply the teeth of the intervening wheels (viz., the centre and third) and divide the product by that of the leaves of the pinions similarly multiplied, and the result, if the train is true, must always be sixty. This we shall find to be the case in the present instance:—

$$\begin{array}{rcl} \text{Centre Wheel} & \times & \text{Third Wheel} \\ 64 & \times & 60 = 3,840 \text{ divided by } 64 = 60 \\ \text{Third Wheel Pinion} & \times & \text{Escape Wheel Pinion} \\ 8 & \times & 8 = 64 \end{array}$$

In like manner, the rate of motion of the arbor or axle which carries the minute-hand has to be reduced for the hour-hand, which is set on a pipe through which the centre arbor passes. This is done by two pinions and two wheels, the pinions in this case driving the wheels, and not *vice versa* as in the movement. The leaves of the pinions when multiplied must be one-twelfth of the product of the teeth of the wheels, because the minute-hand turns twelve times to one turn of the hour-hand.

The best clocks are usually made with wheels of gun metal or hardened brass, the teeth being divided, cut, and polished by steam machinery, and finished without the aid of the file, emery paper, or other polishing materials, so that the most minute difference is prevented and accuracy insured to the one-thousandth part of an inch. The pinions should be of hardened steel, cut from the solid, and made in the same manner as the wheels.

In cheap clocks, constructed chiefly for public companies who give their contracts to the lowest tender irrespective of quality, iron is frequently used instead of steel, both for the pinions and arbors (axles), and cast-iron takes the place of gun metal or brass in the wheels and bushes. These clocks are generally the production of firms who combine engineering with clock-making, and are naturally anxious to make one plant serve two purposes, notwithstanding the dissimilarity of the two pieces of mechanism under manufacture.

The result is that clocks thus made are faulty time-keepers, and that, owing to friction, rust, and brittleness—for iron wheels, however well made, are very liable to chip or break, or to oxidise and decay,—such clocks have, in a comparatively short space of time, become worn out and useless.

This opinion as to the unsuitability of cast-iron has been, I am aware, controverted, although no amount of argument can alter the facts, which are as stated.

It has, however, been said that "as soon as you cut off the friction of the train from affecting the escapement, it is obvious that cast-iron wheels are just as good as brass or gun-metal." But it is not so. You never can prevent the friction of the train from affecting the escapement,—i.e., that part of the clock which regulates the discharge of the power imparted by the main wheel. [This will be more fully explained in the succeeding article.] The celebrated Ferdinand Berthoud has proved in the case of watches, that "no escapement can have any influence over the main-spring, and consequently that it cannot correct the inequalities of the motive power

iven by sound only, the architect having allotted no space for dials. In a busy thoroughfare like this, a clock with face and hands could be of the greatest public convenience, specially as it is by one of the first makers, an exact time-keeper, and cost 1,000*l*. The better half of the usefulness of the clock lies barren and idle, and its value is to a large extent sacrificed.

At St. John's, Hammersmith, there has recently been erected a new tower of fair proportions, and a bell-chamber and an opening for a clock are provided, but the circular space is far too small. The elevation being 60 ft. the minimum size of dial should be 6 ft. in diameter. The space actually allotted does not exceed 3 ft., which will make the clock out of proportion with the building, and too small to be of much service.

Lower down on the same road, the conspicuous church on Turnham-green presents the ludicrous spectacle of a dial stuck half-way down, and in front of an unglazed window-space at the base of the spire,—as if to form a sort of shutter,—the bell-chamber being below, the cart before the horse. In this case, the architect had never contemplated the necessity for a clock, and the present awkward, ineffective arrangement,—the dials being far too small for their elevation,—is evidently a make-shift and an afterthought.

Wren's treatment of church towers was very different to that adopted in the cases noted, for we find that in his plans adequate provision is made for the clock, which is part of the design, blending with it, and forming with the building one harmonious whole. Surely it does not require the genius of Wren to do this in modern structures. Examples may be seen in St. Paul's Cathedral (south-west tower), Bow Church, Cheapside (two dials, 9 ft. in diameter, at an elevation of 30 ft., one of the most effective clocks in London); St. Bride's, Fleet-street; and many others.

In these cases the clock and bell-chamber, so far from detracting from the symmetry of the architecture—an excuse sometimes made when the former have been neglected or forgotten,—rather improve it, as will be evident on the



from being transmitted to the balance, whose velocity is retarded or accelerated in conformity with the irregularities of the main-spring. And the same is true as regards clocks, any variation in the uniformity of the motion of the train, communicates itself to the escapement and thence to the pendulum.

Moreover, the action of the escapement is (as we shall see in a later paper) to regulate the time, and not to correct defects in the mechanism, and to require from the former results it was not designed to give, can only end in disappointment.

A further argument is that cast-iron wheels, with smaller teeth than any used in turret-clocks, are successfully employed in spinning machinery; but it is evident that the cases are altogether different, for the motive power in the latter instance is steam, the great force of which will drive the machinery even when the wheels are somewhat defective; besides, the evenness of the rate of motion is unimportant, provided the machine does the work assigned to it.

But in clock-work, none of these conditions obtain; the motive power, derived from the descent of a weight, is, compared with steam, very weak and consequently altogether inadequate to resist the inertia of defective wheels, whilst an even rate of motion is of the highest importance and its absence would render the whole machine useless.

The most inexperienced person will see that wheels cut from the solid metal, hard and close in texture as gun metal or brass, must be more efficient and reliable than cast-iron, the roughness and other defects of which are well known.

So far from brass corroding, as is sometimes asserted, in town atmospheres, old clocks may be seen with brass wheels that have been in action for more than 100 years and are still perfectly sound and good.

It must be borne in mind that the efficiency of a clock depends no less upon the materials and workmanship than upon the plan of construction; for if the metals used are liable to wear away by friction, or corrode by damp, the most perfect design in theory will fail in practice.

The same is true as regards workmanship; unless the various parts are made with the greatest accuracy, all roughness removed from the edges of the teeth, and the surface of the acting parts made smooth and clean, friction is inevitable, and the clock soon cuts itself to pieces.

Too much care, therefore, cannot be given to details of manufacture, as an apparently slight defect in execution will be sufficient to spoil the uniformity of the rate of time, and thus detract from the efficiency and value of the clock.

The introduction of steam machinery has added to the accuracy of clock-work, and at the same time considerably diminished its cost. A turret clock can now be produced for the sum of 150*l.*, which will excel in superior construction and accurate time-keeping one that half a century ago would have cost 800*l.*, and the practical result is seen in the largely-increased number of public timepieces.

As the purchaser of a clock is not usually in a position to judge of its merits, he must rely upon the reputation of the maker, who, if he is an actual and *bona fide* manufacturer (their number is very limited), and not a mere clock-seller, will be able to refer to public clocks erected by him in different parts of the country, so that independent inquiry can be made as to the efficiency of his instruments.

The winding of the clock seems a simple affair, and yet special precautions have to be taken not to derange the working of the machine.

If the drum which carries the weight were part and parcel of the great wheel, the winding would reverse the action, put back the hands, and utterly disorder the instrument. To prevent this, the drum has a ratchet or saw-toothed edge, into which fits a stop falling from the inner edge of the great wheel, and kept in its place by a spring; so that, turning in one direction the drum will drive the wheel; turning in the other it is free, the stop slipping over the teeth in a somewhat similar manner as the pall in a windlass or capstan. By this

means the revolution of the great wheel during winding is left undisturbed.

A second point to provide for is the *continuation* of the motion. As the act of winding takes the motive power off the great wheel, it is obvious the clock would stop, and the action of the pallets (for the swing of the pendulum would go on for some time after the stoppage of the train) upon the finely-cut teeth of the motionless escape wheel, would probably injure them,—unless some means were found to continue the action until the motive power is restored. This substitute, technically known as the “maintaining power,” is of the greatest importance in large clocks, the winding of which takes some minutes.

The mechanism employed by the best makers is of a simple character, yet thoroughly effective and reliable. Its action is as follows:—To gain access to the winding square on which the key fits, the attendant must first raise a lever, one end of which, being wedge-shaped, gears, on being thus raised, into the teeth of the great wheel, and the other, being sufficiently weighted, supplies the motion. The winding completed, the lever gradually drops, with the revolution of the wheel, into its old position.

The important question of “escapements,” the different kinds now in use, and their respective merits, will be fully discussed in the next article.

#### NOTES.

THE memorandum which forms the instruction for the Royal Commission on the Depression of Trade covers a field so immense that the labours of the Commission on the Housing of the Working Classes shrink almost to nothing in comparison. At the same time, while concentration or orderly grouping of the subjects of inquiry is loudly called for, there are many matters of extreme interest to the working people, of every class, for investigation which there seems to be no direct provision. Such, for example, is the effect on the building trade of the importation of ready-made doors, sashes, hand-rails, and other wrought woodwork required for houses. That this importation has disorganised and thrown out of work a large number of persons formerly in constant employ, there is no doubt whatever. What are the countervailing advantages to the trade, to the house occupier, and to the country, it is important to ascertain. In cases of this kind trade statesmanship requires to know the balance of profit and loss to the country. It is just this which the advocates of foreign labour have failed to show. This is only one case out of many; but it will be seen that the real gist of the work of the Commission, in order to be of use, is thus indicated. A certain gain may be effected by having recourse to foreign instead of to home labour. But the true point to ascertain is what, in each individual instance, is the net balance of gain or loss to the country, taking all things into account.

THE model of the design for the proposed New War and Admiralty Offices is on view at No. 18, Spring-gardens. In addition to the shifting of the tower, so as not to overpower the Horse Guards so much, the principal visible alteration is that the columns of the order on the Park front are pushed back on the wall so as to be quarter engaged, and, therefore, they and their stylobates project less, and do somewhat less useless work, and obstruct less light, than they would otherwise have done. The order is still out of proportion to its base and attic; the balustrades still display three different scales in different portions of the elevation; the building is still all over pots and pepper-casters. In short, the design, in model as in drawing, appears as what it is,—a piece of mere commonplace from base to cornice, without a spark of genius in it. That is what the judgment of Parliamentary professors of architectural taste has done for us. The narrowness and vertical depth of the central court, which, as a sanitary

matter, has been commented upon both in our columns and elsewhere, is forcibly brought out in the model. We presume the work will be carried out in this form, as we are told it has received the final sanction of the authorities; but it will interest none who have any perception of the higher possibilities of architecture, and will remain, if carried out, a monument to a great architectural opportunity thrown away.

THE Great Western half-yearly meeting on the 13th current had the special interest of being the hundredth meeting that company has held. At the first of these, the capital of the company represented 2,500,000*l.*, which had provided for 114 miles of railways at a cost of a little under 20,000*l.* a mile. It now represents 90,000,000*l.*, covering the construction of 2,300 miles of line, which have therefore cost a little over 39,000*l.* per mile the length of the undertaking having been multiplied by twenty, and the cost of each mile nearly doubled. It would be difficult to bring more succinctly before the public an illustration of that double growth in our railway capital to which foreign statisticians look with alarm. To increase the length, ought to be to increase the value, of the property. But it may be another thing to increase cost per mile. This is the more worthy of note when we find that over this great system 1,065,232 fewer passengers were carried in the last than in the preceding twelve months, with a loss of gross revenue of 32,182*l.* This gives an average fare of about 7*d.* per passenger, but no light is thrown on the question of cost of carriage. The percentage of working expenses over the whole line stood at the unusually low figure of 50.79, which is considerably less than that of the competing Northern lines. The good gradients of the Great Western Railway are a source of economy in working. But the percentage of cost really tells us nothing unless we are also informed of the average rate of fares and freight. And fares are certainly higher on the Great Western than on the Northern railways. If the Great Western Railway Company were to turn their attention to the proper development of the traffic on the 280 miles of canal, we should have less chance of reduction of dividends in the future.

THE seventy-eighth half-yearly report of the Great Northern Railway very forcibly illustrates the inconvenience, to say the least of it, of the present loose mode of keeping railway accounts. During the half-year there has been an increase of no less than 186,533 passengers, accompanying a decrease in passenger receipts of 9,682*l.* on this line. In an ordinary business an explanation of such an anomaly would be the first care of the proprietor. But so far are the directors of this line from being able to explain the falling off in their income, that the chairman stated that “it would be impossible to know what would be the financial results” of a partial abolition of the second-class traffic. If, as on most railways out of England, the company had taken steps for ascertaining, first, the average distance for which a passenger of each class was carried; and secondly, the cost of the passenger traffic, as distinct from that in merchandise and minerals, this undesirable condition of ignorance would have been removed. In the first place, to say that there is an increase of 186,000 passengers, tells the proprietors nothing, unless it be added at what increase or diminution in passenger mileage this is attained. In the next place, unless it be shown at what working cost the passenger revenue has been earned, it remains obscure whether the decrease of 9,682*l.* in gross revenue is a decrease also in net earnings or otherwise. It is possible that the removal of 9,456 passengers from the second to the third class, while diminishing the gross, has improved the net income. At all events, it is highly unsatisfactory that no information should have been collected to show whether or no this was the case. While the happy-go-lucky mode of making experiments on traffic continues, dividends are likely to decline.



BY degrees we appear to be arriving at some rather more definite understanding of how to purify water from the various organisms that tend to pollute it. According to Messrs. Austen & Wilber, alum has an excellent effect, both in clarifying and removing disease germs. Sixty litres (about thirteen gallons) of turbid drinking-water were treated by two grains of alum, the result being the formation of a precipitate and a perfectly clear water after forty-eight hours, with the merest trace in it of aluminium. Dr. Frankland finds that of the various filtering materials, the best were green sand, coke, animal charcoal, and spongy iron, every one of these completely removing micro-organisms from the water, the only drawback being the limitation of the time during which the filtering power remained intact. After a month or so the materials lost their vigour, and had to be renewed, although coke has the advantage of rather stronger action when agitated in the water, the organisms disappearing entirely, without the chemical composition of the liquid being in any way altered. Dr. Frankland also found that the greatest number of organisms were always to be met with in the upper layers of stagnant water, instead of, as might be expected, their subsiding to the bottom. Another bad habit of water has been successfully coped with, although in this case it was not for drinking, but for manufacturing purposes. Incrustation of pipes is a familiar difficulty to engineers, and one that often causes untold trouble. A case occurred at Leipsic in which the interior of the force main from the pumping-station to the reservoir was nearly filled up with an incrustation about 8 in. thick. The intruder was treated with dilute muriatic acid on eight different occasions, followed by soda solution three times, and chloride of lime solution once, after which the pipe was washed out thoroughly with water. The result was that the incrustation was completely removed, and the pressure gauge showed a decrease of nearly two atmospheres at the pumps.

It is not very often that we see amongst the shoals of prospectuses of new companies anything of a really utilitarian kind, although pseudo-philanthropic schemes are not uncommon, in which the philanthropic element, at all events, intended to serve at least one person, — the promoter. A *rara avis*, however, has recently appeared in the shape of a proposal to establish a training college or colleges, solely for the instruction of young men intended to follow out a colonial life. Considering the enormous numbers of the youth of England that annually leave the country to gain their livelihood in British colonies or the United States, it is marvellous that no systematic effort has been made until now to educate the colonial aspirant in some specific manner. Almost every professional branch has its own establishment, here the distinctive features of that profession may be grafted upon the more general education acquired beforehand; but lads are itched to go to the colonies with little or no preparation, save a few courses of agriculture a month or two of engineering study. While it should not deny the advantage of an ordinary general education as a basis for all others, the profession of colonisation demands an extraordinary amount of practical knowledge, the acquirement of which can scarcely begin too early; and the reason why so many young emigrants are returned upon their friends' hands as so many bad shillings, is not that the colony has no room for them, so much as the lack, on the part of the new rivals, of knowledge as to what they can turn their attention to with the greatest prospect of success. Agriculture, with all its various subdivisions of details, veterinary surgery, forestry, geology, and mining, are subjects with which every would-be prospector of new country should be fairly well acquainted, while a knowledge of the more practical trades, such as building, carpentering, coopering, wheelwrighting, engineering, tailoring, cooking, are all equally indispensable; and every young man who goes out with a tolerably good idea of being able, at a pinch, to do most

of these things, may be said to carry his fortune in his hand, far more than one who has only the recommendation of a few hundred pounds and no knowledge.

WITH the increase of town populations and of railway facilities, land on the sea coast becomes yearly more valuable. A somewhat curious example of this fact is shown in the recent litigation in the case of the Attorney-General v. Reeve, which was a proceeding by the Crown to establish its right to a tract of land, 1,200 ft. in width, at Lowestoft, which had been formed by accretions from the sea in the course of the last forty years. This land was required for the purposes of a dock; but there must be similar pieces on the east coast of England which in process of time will be required for promenades for watering-places, and for similar purposes. The principle of law which solves the question of the ownership of such ground as this is very old, and is to be found in the most ancient writers on the English common law. An accretion of land by the action of the sea is the property of the Crown, as, being once beneath the sea, it at one time belonged to the Crown. But if the accretion be very imperceptible and undiscernible by limits and marks, then the accretion belongs to the owner of the adjoining land. In the present case numerous witnesses were produced by the Crown, who testified to the marked increase of the land, and the diminution of water in a perfectly perceptible manner. Consequently, applying the old principle, the Court pronounced for the claim of the Crown against that of the freeholder. No one who regards this new supply of land as a kind of bonus at the hands of nature can consider that the freeholder has any more right to such land than any other member of the English nation. On the other hand, land which thus comes into the possession of the Crown should be used so far as possible for the benefit of the localities. Land such as this, which is to be used for a dock, should be sold or let at a low price, and the results employed for the benefit of the locality. The subject is one likely to come more into public notice for the reasons which we have already pointed out.

NOTWITHSTANDING the assertions of eminent sanitary engineers that the whole of the Thames Valley is destined to be sooner or later drained by one gigantic combined scheme, many of the Local Boards along the valley are still making praiseworthy efforts to make their separate schemes as perfect as possible. As we mentioned recently, Chiswick has spent a considerable sum in introducing into its works sludge presses, forming the sludge into dry cakes, and so obviating objectionable accumulations of that material; and that parish is now, for the purpose of flushing the sewers, erecting in each of the manholes an automatic syphon which it has tested carefully by experiment. The Brentford Local Board, following in the footsteps of that of Chiswick, are about to add to their sewage system the sludge-presses and the automatic flushers. Acton, as we also pointed out some time ago, has just concluded a seven years' contract with the "A B C" Company for the clarification of the sewage of that parish at the works about to be constructed. Acton is regarded as an excellent suburban station, where the "A B C" system can be seen at work by those interested in the drainage of towns; and the fact that the shares of the company have risen very perceptibly since the signing of the Acton contract would seem to show that this circumstance has been duly appreciated in financial quarters. Acton is spending between 60,000l. and 70,000l. on its scheme; Hounslow, since it gained its freedom from connexion with the Lower Thames Valley Sewerage Board, has been busily occupied with a separate scheme, which cannot fail to cost a very large sum, considering the large area to be drained. So that within a year or two a pretty considerable sum will have been sunk in separate district drainage schemes, and if it be impracticable to utilise the sewers, or a material portion, at any rate, of this vast

drainage machinery in the forthcoming combined scheme,—which some persons anticipate will be in operation within the next eight or ten years,—this expenditure must ever remain without its full return. Still, the superior advantages of a well-considered combined scheme may outweigh this consideration.

THE last instalment of the Transactions of the Royal Institute of British Architects is a very attractive and well-illustrated one. It contains Mr. A. Graham's paper on Roman Remains in North Africa, accompanied by lithographs, by the Sprague process, of some of the finest remains of triumphal arches, and proposed restorations of them, as well as drawings of mosaics, &c., from the same part of the world. Mr. Bagge's paper on the flint-work of the Suffolk churches is both of practical and artistic value, and is also very fully illustrated.

MR. WILBERT BEALE has sent round a circular with reference to the position and prospects of the Crystal Palace, proposing a means of resuscitation for that, we fear, by no means flourishing institution. Frankly admitting that the mere current expenses require an average of receipts too formidable to be covered, in years to come, "by occasional fêtes and uncertain monster gatherings," and that the original purposes of the Palace have been overlooked in the engagement of tight-rope dancers and athletes (which form of entertainment has also, it would seem, been unremunerative), Mr. Beale suggests the effort "to court Dame Fortune's golden smile" by reverting to the Prince Consort's original idea of the educational objects of the Palace, and making it a Fine Art College. There is something in the way it is put, as the following sentences from the circular will show:—

"A charter should be obtained authorising the College to confer Degrees in Painting, Sculpture, Architecture, Engineering, Music, Literature, Languages, and the Drama. Houses should be built in the Crystal Palace grounds, suitable to the requirements of each of the branches of study referred to, as well as for residences of professors and pupils. The Crystal Palace should be closed to the general public during Term time, when season-ticket holders, professors, and students only should have access to it. During the holidays the public should be admitted as at present."

The Fine Art College would take rank with Oxford and Cambridge, and would, in fact, afford facilities to the art-student such as, with all our modern institutions, do not yet exist elsewhere. The curriculum of study would be pursued in a healthy climate and locality, under the guidance of professors who would jointly conduct the course of education necessary to qualify an artist.

Hardly any change in the arrangements of the Palace is involved in the plan. The Band would remain, and its members might become professors of their respective instruments, at the Fine Art College.

The Art and Architectural models, brought together at such vast expense, would be made to serve their most legitimate purpose."

We fear the atmosphere of gymnastics and fireworks which has of late years pervaded the Palace has created a sort of prejudice in the minds of many against any such serious use of the place; but we should be very glad to see any such scheme for continuing the career of the Crystal Palace under happier auspices carried out, and we do not see that there is any insuperable objection to the idea.

THE Railway Congress at Brussels last week seems to have touched upon some very important subjects without promoting progress in regard to them in any way. Thus the question of automatic brakes was shelved with the conclusion that they prevent certain classes of accidents, but are very costly, and that these classes of accidents are "rare": in other words, we suppose, the compensation to injured persons costs less than the brakes. That is a true and typical "railway view" of the question. In regard to communication between passengers and guards, the Congress only arrived at a recommendation that "it was desirable to establish an efficient system of communication between passengers and guards." Plenty of people could have told them that without going to Brussels to make the discovery.



IN the current number of the Journal of Proceedings of the Institute of Architects is printed a memorial to the Council of the Institute from the "Stone-carvers' Trade Association," stating that in the opinion of the memorialists the inferiority in the quality of carved work at the present time "is directly traceable to the prevailing system of including the carving in the builder's estimate." The builder sub-contracts as cheaply as possible, and secures to himself, for inferior carving, a large percentage of the money set apart for carving. The memorialists therefore pray the architects to keep contracts for carving in their own hands, and deal directly with practical carvers. We are entirely in sympathy with the memorial. We do not go so far as to say that the bad quality of modern carving is directly and entirely due to the "middleman" system; but we are quite certain that it is not the system to foster art or secure the best results.

#### THE ANNUAL EXCURSION OF THE ARCHITECTURAL ASSOCIATION.\*

ON the way back from Canons Ashby, a short stay was made at Moreton Pinkney, a pleasant village with many substantial houses built in alternate bands of light and dark stone, and having mullioned windows, bold copings with good simple kneelers, and the invariable Northamptonshire chimney. Thence by way of Thorpe Mandeville (of which the church tower was illustrated in last week's *Builder*) the party went to Middleton Cheney to see the fine church. It is chiefly of the Decorated period, but the tower, with its beautiful west door, and the spire, are Perpendicular. The south porch is somewhat remarkable, having a very steep stone roof, to the support of which an arched stone rib or principal in the middle of the porch helps. The space between the rib and the roof is filled with Flamboyant tracery, and presents one of those characteristic features of Mediaeval work which may either be considered as evidences of the thoroughness with which the work was done,—for the position of the tracery prevents its being properly seen,—or of a wicked and wasteful tendency to put carefully-designed and executed work in places where it could never hope to be fitly viewed. At the door of Middleton Cheney Church, but the door of an earlier structure than the present, one John de Curci lawfully received to wife Alfrice, daughter of Godred, king of the Isle of Man, and there endowed her with much land, of which "all he had in Middleton" was a very small part. The gift was as complete as words could make it. She was to "hold and possess all the said lands in frank dower freely and quietly, honourably, wholly, and fully, in monasteries, chapels, and tithes, in wood and plain, in meadows and pastures, in waters and mills, in ponds and rivers, in ways and paths, in salt and fresh waters, and in mosses and moors, in fisheries and fishes, and in all liberties, with soc and sac and thol and them" (what could a man do more than that?), "and 'infangtheof in furcis and fossis and ferro and duello,' or the privilege of trying felons taken within her fee, and of having gallows for the purpose of hanging male, and pits for drowning female, criminals; and the power of subjecting the accused to the fiery ordeals of burning irons or heated ploughshares, and to the ordeal of duel or single combat." And a very pretty endowment for a blushing bride, too. The bridegroom still further distinguished himself in after years, and the paragraphs of Baker's Northamptonshire, whence this information comes, read like a condensed edition of "Ivanhoe." The respective titles of King John of England and Philip Augustus of France to the Duchy of Normandy were to be tried by the duellum or single combat. The French king was provided with a champion, but the miserable John had none. At length it was suggested that John de Curci would be the fittest man, notwithstanding that he was then in disgrace with the king, as most good men were. He was accordingly summoned, but refused compliance till an appeal was made to his patriotism, when he replied that for the honour of his country, though not for the king, he would hazard his life. "At the day appointed," says Baker, "the two combatants appeared in the presence of the kings of England, France, and

Scotland, but the French champion, alarmed at the formidable aspect of his opponent and the size of his sword, set spurs to his horse and fled when the trumpet sounded the last charge; and victory was consequently adjudged to the earl. The French king being desirous of a proof of the prodigious strength which was ascribed to him, the earl directed a helmet full faced with mail to be set upon a coat of mail and placed on a block of wood, which, with one blow, he smote asunder, and struck his sword so deep into the wood that none present could extricate it with both hands, though at the first effort he instantly disengaged it with one hand" (perhaps the others had loosened it). "King John, in the warmth of his gratitude to the earl, not only restored him to his titles and estates, but offering to confer on him any other marks of distinction in his power, the earl desired that he and the heirs male of his family might have the privilege, after their first obeisance, to be covered in the royal presence of him and his successors, kings of England, which privilege was granted and has been lineally transmitted to his descendants, barons of Kinsale, to the present time." So much for John de Curci, the mightiest man of whom Middleton can boast, though it numbers among its worthies one not less celebrated in other ways,—William de Edyngdon, who was priest here from 1327 to 1345, and afterwards Bishop of Winchester. This William was a great builder, as witness the beautiful church at his birthplace, Edington, in Wiltshire, and, no doubt, much of Middleton Church is his work, unless he employed his more famous assistant and successor, William of Wykeham,—which is hardly likely. William of Edington is the originator of the saying, afterwards used by Bishop Fox, that Canterbury might have the higher rack, but Winchester had the deeper manger.

Since leaving Cropredy the route had lain entirely in Northamptonshire, and it was still in that county that the next day's excursion began, by a visit to King's Sutton. The three steeples of King's Sutton, Adderbury, and Bloxham are locally celebrated for embodying the three qualities of length, strength, and beauty, the last quality being assigned to King's Sutton. Tastes notoriously differ, and are not the proper subject for dispute, but surely it must be an untravelled native who holds up King's Sutton spire as a type of beauty. It is true that the two pinnacles at each corner of the tower where the spire springs are somewhat unusual features, and the flying buttresses which connect them with the main structure are striking, but the outer pinnacles which receive the thrust of the buttresses look as though they would willingly have done with the job and fall into the quiet churchyard, and the brilliant appearance resulting from so many pinnacles close together is not altogether pleasing. The interior of the church is no more interesting than that of most village churches (they are all of interest, especially to the Gothic enthusiast); the spire was too complicated a subject to sketch in the showery weather, so the excursionists settled like bees on the picturesque manor-house close by. Some score attacked the outside from various points of view, the others might be found obstructing the staircase (under the pretext of measuring it), or taking dimensions of a bay, or mounting to the attics to look at a terrible picture of St. Sebastian pierced with arrows in very vital parts of his frame,—all to the amusement of the excellent inmates, who were quite pleased at this tremendous invasion of their quiet home.

Adderbury was the next place on the list, and here was found a very fine church indeed, but "in the throes of restoration," as one of the party remarked. Mr. Sedding introduced the church to the notice of his companions in a piquant paper from which the following are extracts:—

"Such bold, strong, vigorous art as we get here must have its value for all time: and one may say that this fine church would of itself go far to justify the study of Gothic architecture in the present day. Prominence is assured to any building which represents William of Wykeham, as this does in its chance. Apart from this fact, however, you will agree with me that you could not make a list of the typical churches of England, and not include this one of Adderbury."

The church has a chancel 40 ft. by 20 ft.; transepts, 71 ft. across; nave, 60 ft. wide, including the aisles, and 71 ft. long. It has also a western tower and spire, and north and south porches.

From this description you might infer that Adder-

bury Church was quite ordinary and commonplace; but it is not so, either in regard to plan or detail. Nature abhors symmetry, and so did the Goths who laid out these walls all askew, and ceased not to play pranks with their parts for a couple of hundred years afterwards. And Adderbury Church is as puzzling to the know-all archaeologist as the archæus is to the monkey! The chancel does not 'run' with the nave, and is wider at one end than the other. The tower is several feet 'out of centre' with the nave. The westernmost bay of each of the nave arcades—for no apparent reason,—very much smaller than the three eastern bays. If you walked across the church from one porch to the other you would bump against two piers. Then the aisles are wider than the nave; the easternmost bays of the arcade are as wide as the transepts, and there are coupled arches where the aisles intersect with the transepts. There are two tiers of clerestory windows, and the two easternmost bays look into the transepts.

Why were the transept clerestories added? For the reason that, as power of design developed, there grew a passion for lofty walls and fine interior effects. Oddly enough, the Norman builders and the Perpendicular builders are of one mind in this respect. The thirteenth and fourteenth century builders think much of the high pitch of their roofs. They do not aim at the high walls, but rather at the glamour of light and shade obtained by sticking timbers of curious and interesting shapes across void spaces. The twelfth and fifteenth century builders, on the contrary, do not care a dump for high-pitched roofs (as flat panelled ceilings pleased them), but they concentrate their skill upon the wall spaces; that is, upon the architecture proper of the structure, and aim at nobility there. Alas! that the noble architectural proportions of some thousands of our parish churches should have been ruthlessly destroyed in order to gratify the insatiable nineteenth century craze for deep roofs and high walls. The cry of a return to the original pitch has served good people with a justification for working untold mischief in buildings whose qualities of design they had neither the eyes to see, the sense to comprehend, nor the taste to admire. . . .

Even the most skilful sketch I have given of this church will be seen that its architecture covers a wide and varied range of design. Where the work is everywhere so good, one does not like to praise or set of workmen at the expense of another, for the dead have feelings; yet I must say that for massiveness, vigour and refined, unaffected power, the fourteenth century design at this and at the sister church at Bloxham, is beyond all praise. We are reminded of Bloxham by much that we see here: there is the same treatment of coupled arches in the transepts, the same aisle parapets of two stages, with a deep corbe below containing rich carvings; only that I cannot help thinking that Bloxham's 'gentle work compared with Adderbury, beautiful though it be. The drawback to our full enjoyment of Adderbury lies in the fact that the tracery of the nave and chancel windows is only conjectural. . . . I print some about 1800, which I have seen, shows the church as it then existed, and the windows referred to are void of tracery. But we can spare the window tracery while we have the sculpture to the eaves-course and the transept capitals; for I doubt whether through all the range of English carving there is anything better in its way than this. The capital to the north transept is busts of women with grave, beautiful faces. . . . From the south transept to the south transept is re-chiselled and spoiled; it has men in armour, with their arms linked. Fancy what people would say if we introduced the figures of our modern soldiers in the decoration of a mediaeval church! The north aisle eaves course is a perfect sample of the kind of sculpture that all generations of Adderbury folk can enjoy so long as they continue to be produced upon old English lines. How the work escaped the Puritan's holy hammer passes understanding, except it be that the pious man never lifted his yellow eyes high enough to see it. Such carving as this shows us that the old carver could both jest and pray; he knew how to mix things human and divine as they ought to be mixed upon the walls of that building which is the trysting-place of God and man; he could express his faith and tell of man's relation to the court and company of heaven; and yet give his art local flavour and a spice of humour, by inserting current village jests and local contemporary portraits. Thus we get the coronation of the Virgin, with attendant angels and saints, and busts of King David and other musically-minded people playing on harps, dulcimers, and all kinds of instruments. A little farther on is delineated a sporting event that probably happened at the time the work was progressing, when the king's comic side Here is the Medieval Brigs as an archer making bad shot, for his arrow has wounded his bound (no making moon), has scored a gash in the hide of harmless cow, and has, finally, lodged in the leg of rustic. Then come the portraits of the village bann with bagpipes and other instruments, a mermaid, and several authentic likenesses of village worthies. . . .

\* All which is simply saying that the building was more carelessly and stupidly set out. A modern builder would be called an ignorant bungler who did his work so; why it is to be admired in a mediaeval building?

† Has Mr. Sedding satisfied himself on this head by personal investigation?

\* Continued from p. 233.



In the opening remarks of this prolix dissertation I said that this church would go far to justify the modern study of Gothic architecture. I conclude by calling attention to the magnificent array of seventeenth-century and eighteenth-century tombstones now lining one of the churchyard walls. Their bold carving shows that the fine traditions of the Mediaeval school of sculpture, which existed in those parts, had not up to that time entirely died out, as they are all of the 'Queen Anne' period by anticipation or realisation. The Architectural Association will do them justice; and I am persuaded that, if studied in a proper attitude, the forms of these memorials of the dead will open out new prospects to contemporary design."

Besides the features thus alluded to, there is in the vestry a wooden tablet, on which is depicted, as it says, "the representation of Thomas More, gen., who deceased the 2 of Jan. 1535, and of Marie his wife." Both of them are drawn kneeling on either side of a tomb, on which is inscribed,

"So far is tumb from lasting aye,  
That tombes shall have their dying day."

a very true remark in this case, as the tablet is the only record remaining of the Morens. The execution is extremely good,—not at all in the usual style of the village signboard artist; and, in addition to the foregoing legends are various sentences in Latin and English, such as, "Quasi moriturus vive," "Vive pius, moriere pius."

Deddington was next reached, where there is another good church, and several interesting houses, notably one near the church, once the parsonage-house. The most remarkable feature of the church is the roof of the north porch, which is in shape a flat dome, of Gothic tracery, with traceried pendentives. The tower fell in the year 1635, and carried portions of the church with it. For some years nothing could be done towards the rebuilding; so, in 1643, Charles I. bethought him of the bells, which were lying "unserviceable." When cannon was wanted it was a pity that so much good metal should be wasted; accordingly he addressed an order, dated at Oxford, January 21st, 1643, to the parson, churchwardens, and others, requiring them to send the bells "to our magazine here in New College," and guardedly promising to "restore the same in materials or moneys to your church when you shall have occasion to use the same." The occasion arose some time before 1649, the date of one of the new bells; but how far the king helped is not on record. The old materials were largely re-used, but the mouldings are, many of them, new and thoroughly Classic in profile. The rectorial house, already mentioned, which stands to the north of the church, is a picturesque building of the seventeenth century, with a balustrade round the summit of a kind of central tower. Inside are several well-proportioned rooms, and a very good staircase, with much unusual detail. A very acceptable cup of tea at the vicarage brought the visit to a pleasant close, and the party returned to head-quarters by way of the small and rather puzzling church of Barford St. Michael.

Thursday began with a visit to another fine house,—Wroxton Abbey,—once a priory of Augustinian monks, of whose buildings some fragments are built into the new house, which was erected in 1618. The property passed, about the year 1538, into the hands of Sir Thomas Pope, the founder of Trinity College, Oxford, and on it were certain remains of the old buildings, duly named in an inventory taken at the time, together with the "condyte," "with all the lode thereto belonging," certain "brasse potts in the kichyn, to sythe mete in," and many leaden vessels. The most noticeable feature inside is a magnificent collection of family portraits, by all the best masters since Holbein. Some of them are, indeed, exquisite. The colour, the composition, the execution are alike perfect. They are, first of all, portraits, but have enough accessories to be of interest as pictures, without suffering the individual depicted to become a mere incident in a landscape. There is also a great deal of carved woodwork, too, but it was imported mostly from Flanders, and is, therefore, interesting in detail, and not as a specimen of Jacobean panelling. The front entrance is a fine example of Renaissance work, with quite as much ornament as is good for one time; unfortunately, a window has been introduced over the front door, and mutilated the upper part of the design. The grounds, with their enormous lawns, tree-clad undulations, lakes, and formal gardens, are alone worth a long journey to see.

The church is chiefly noteworthy for a very beautiful Jacobean monument to Sir Wm. Pope, first Earl of Downe, and his wife. The details are refined, and the whole monument the work of an excellent artist as he who designed the Cordell monument at Long Melford, visited on last year's excursion.

From Wroxton a drive of a few miles led to Alkerton, where the pretty little church looks across the deep valley, to its sister of Shennington. Most of the structure is quite early, and the chancel arch is a fine specimen of the deeply-recessed mouldings of early work, but much work was done here, as in all the churches round, in the Decorated period. The plan is rather peculiar, the tower being over the chancel, or rather between the chancel and the nave. There is a south aisle, but no north aisle, and as there is a clearstory the north side presents externally a two-storied building of much interest. The parapet of the west end is adorned with excellently-carved quatrefoil panels, which formerly returned along the side parapets, but which have now almost wholly disappeared. Here for some years Thomas Lydiat was parson. He was a native of the village, died here in 1646, and was buried here too. He was a mathematician and chronologer of the same mark, and is mentioned by Johnson in his "Vanity of Human Wishes."

By way of Edge Hill, where, with the help of a small diagram and the clear description of the President, the battle between Charles and Essex was well realised, the party went to Warrington, obtaining on the journey vast glimpses over the plain to Warwick and far beyond. At Warrington they found a charming little church, perched up on a high bank, and approached by a perfectly straight flight of nearly forty steps. The church is mainly of the Decorated period, but the nave arcade goes back to the first hundred years after the Conquest, and has curious high bases and short piers. But excellent as is the church, the most interesting portion is the two-story building attached to it on the north side, which was formerly a priest's residence. The ground-floor has a fire place and two windows, the sill of the eastern of which is corbelled out inside to form an altar, while in the same wall is a small piscina; the room, therefore, must have been both tiring-room and chapel. The upper room, approached by a steep winding staircase, which forms an agreeable feature outside, has also a fire-place, and in one corner a latrine formed in the thickness of the wall at the north-west corner behind the angle buttress. The ventilation is by means of two small slits in the wall, not more than 20 in. in area, and wholly contrary to the regulations which guide the modern surveyor. It is to be remarked that the angle buttress referred to finishes at the top with a pinnacle, in the faces of which are pierced trifolds, indicating that there is a shaft within. This shaft may either have ventilated the latrine or served as a chimney, probably the latter, as the present chimney is modern, and an account of the church by the late Mr. Parker speaks of the smoke then (1840) escaping through "a sort of eyelet-hole."

The last place visited on this day was Hanwell, where are a church and the remains of the castle. The church has one or two unusual features; a good Decorated reredos at the end of the north aisle, consisting of a series of small canopied niches; and a fireplace at the south-west corner of the south aisle, with its chimney complete. The caps to the nave arcade contain carved figures playing on musical instruments, a device of considerable ethical interest, but surely a failure so far as regards grace of outline. Of the castle, there is not much left,—only a brick tower, with octagonal turrets having stone quoins. This seems to have been originally the end of one wing of what Leland calls "the pleasant and gallant house of Hanwell," built by Anthony Cope, confessor to Henry VII. There is no detail of any consequence, and if there had been, permission was refused by the inmate to inspect it. The colour and general outline are pleasant, and the red mass, seen in conjunction with two large, lichen-covered stone gate piers, once the chief entrance to the lordly precincts, forms a pleasing feature.

On the last day of the out-of-town excursions Broughton Castle and Bloxham Church were the main points of interest, for Wigginton and South Newington churches were not held worthy of more than a quarter of an hour's visit. Bloxham Church is well known as a

fine example of ecclesiastical architecture: it is of great size, and possesses many beautiful features, but a very complete restoration has somewhat impaired its interest. Much of the structure is said to have been built by Cardinal Wolsey, and its style no doubt would tend to justify the supposition. The beautiful tower and spire are certainly better as a mass than as an example of detail, for the manner in which the angles of the octagon come down on to the belfry windows is far from happy, and distinctly below the customary high level of Mediaeval work. The label of the western door is ornamented with sculptures representing the Last Judgment, but of these it may be said, as of the numerous carvings in the hollow of the cornices of many of the churches hereabouts, that they would be more pleasing if bound more strictly with architectural bands. These are but minor matters, however, and Bloxham steeple must always remain one of those works which seem to lift man out of himself, and speak to him in noble and purer accents than those which usually fall on his ear in this workaday world.

Broughton Castle, which formed the *pièce de résistance* of the day, is one of the text-book examples of domestic architecture. Its chapel, its well-wrought corridors, its staircases, and its chambers have pointed many an architectural moral and adorned many an historical tale. The De Broughtons built the oldest parts in the fourteenth century; to them must be ascribed the interesting domestic chapel, the vaulted corridors with their carved capitals and bosses, the hall, and a certain circular staircase, for a long time the only means of access from one floor to another. After the De Broughtons follow the Wykehams, blood relations to the great William, from whom, indeed, they inherited the place. To their time belong the gatehouse, the stables, and the battlemented wall, now a ruin, ivy-clad, and the protector of captive fowl. To the Wykehams succeeded the Fieneses, Lords Saye and Sele, who still reside there. Their mark is the most conspicuous; for not only did they enlarge the house they found, but by throwing out large bays to the hall they gave the whole place an Elizabethan character which false time has stamped over much of the earlier work too. From every side the mansion looks well. The moat still surrounds it, washing its eastern wall, and on all other sides leaving a fair level expanse of garden and grass; ancient trees dip their sturdy arms and fingers into its placid waters and themselves bear witness to the centuries which must have passed since the waters in which they are peacefully mirrored flashed back the glitter of arms and the blaze of banners. The gateway remains, robbed of all its terrors, but still the only means of access to the island, and when its sturdy proportions are grouped with the long, dark, gabled, and battlemented mass of the house and the pointed spire of the church with the broad quiet moat spreading right across the foreground, it forms a picture from which the sketchers found it hard to tear themselves. Inside, the house abounds in relics of the Roundheads, for the Lord Saye and Sele of that time was a "root-and-branch" man, and one of the chief props of the Parliamentary party. It was here and at Fawsley that, at the beginning of the troubles, the earnest meetings took place between Hampden, Pym, Eliot, and Nathaniel Fiennes. The room in which they met is still pointed out, and the adjacent leads upon which they took the air after a heated discussion. On Friday, the venerable Lord Saye and Sele himself pointed out to a few of the party the advantages of the quarters chosen by the councillors, and from the historic platform where the opponents of Charles's tyranny paced, he called out to an astonished sketcher below, "No taxation without Parliament." The commodious attics in the roof are still called the "barracks" from having been for some time the quarters of Parliamentary troops, and the upper part of the ancient circular staircase, already mentioned, has been dubbed "Mount Rascal," from having been used by the soldiers. Not a complimentary piece of humor, it is true, but then Lord Saye and Sele subsequently changed his opinions, and became Lord Privy Seal in the first cabinet of Charles II. His recantation is said to have been marked by an architectural feature in the dining-room, an ornamental wooden porch projecting into the room at one corner, and bearing the regretful motto, "Quod olim fuit meminisse minime juvat." Every one says the porch was



placed there after the Restoration, but if so it must have been brought from somewhere else, for it is distinctly Elizabethan in character and accords completely with the date of that wing of the house, which is 1599. The inscription stating that "the memory of what used to be gives little pleasure," might equally well apply to some architectural feature which the porch replaced, as to the change in its owner's opinions. However that point may be, there can be no doubt that the porch itself is a very excellent piece of work, as is also the ceiling (dated 1599) of the room above, which breaks down into innumerable pendants. Another interesting feature is the bay window of the gallery, thrown out in 1554, as the date on the chimney above states. It has many lights in width, and two in height; the lower mullions are treated outside like half Ionic columns, the upper as Corinthian; the angles being in the form of pilasters.

Just outside the gate-house is the church, a pretty Decorated building, with two of the best windows seen during the expedition,—indeed, there can be few of its size so fine as the east window of the south aisle, with its delicately-cusped inner arch. The nave arcade, too, is good, but the stone chancel-screen, though interesting, from its rarity, is dull. There are several fine monuments to the various owners of the castle, one of which, in the chancel, must have been a magnificent affair before it was mutilated. Shakespeare says,—

"By Time's fell hand defaced,  
The rich proud cost of out-worn buried age."

But the destruction here was that of "mortal rage," and it is an interesting question whether if Shakespeare had gone to Broughton, he would have seen the tomb whole or not, for much of the mischief attributed to the unfortunate Cromwell was perpetrated a century before his time.

Few places have been left with so much regret as Broughton. It suits all tastes,—the early man, the "late and fast" man, the worker in water-colours, those of the pencil and him of the pen; and it suits the lounge, who prefers to drink in with all his senses the atmosphere of the place, to committing small portions of it to paper; and all must agree in rejoicing that such a building is in the hands of one so loving to itself and so courteous to its visitors, as its present owner.

Of Banbury itself not much need be said. Of all the "original" cake-shops the most picturesque is in the main street, and its projecting gables, parge-plated walls, and bold circular bays make a most effective appearance. In the Reindeer Inn is a particularly fine room, with an excellent plaster ceiling, and dark oak panelling extending to the floor. The shape and arrangement of the room are pleasant, and the whole effect is heightened by coming as a surprise. The church is a comparatively modern structure, having replaced the old one in 1793. Its circular tower "in the Italian style" is far from displeasing, and the decoration of the interior is reported by competent authorities to be above the average. Much admiration is lavished on the departed building, and from such views as remain, it seems to have been a fine church, as good certainly as Adderbury, but local enthusiasm exceeds its due limits when it compares it for magnificence with a cathedral. Other antiquities, beyond several old houses, there are none; the celebrated cross is new, which may account for the absence of any fine lady on a white horse,—or coloured either, for the matter of that. But the town certainly no longer deserves the epithet of "dirty" conferred on it by another rhyme, and the excursionists have never had pleasanter head-quarters from which to make their delightful rounds.

"The Cabinet-Makers' Exchange."—Under this title, Mr. J. Williams Benn has opened, at No. 42, City-road, near Finsbury-square, what is intended to be a permanent exhibition of furnishing and decorative novelties and materials. The ground-floor is mainly occupied by a light, spacious, and cheerful reading and writing room, the wall-coverings here being by Messrs. William Woollams & Co. The basement floor and the three stories above the ground-floor are devoted to exhibition purposes, and the space has already been for the most part taken up. The Exchange is free to any London or provincial furnisher or shipper, also to architects, builders, and decorators.

#### THE BRIGHTON CONGRESS OF THE BRITISH ARCHEOLOGICAL ASSOCIATION.

THE forty-second Congress of the British Archaeological Association commenced on Monday last at Brighton.

The annual meetings having been held at rather a long distance from the metropolis in recent years, it was determined to try the experiment of a meeting nearer home, so to speak, and an invitation from the Mayor and Corporation having been received, the meeting at Brighton has been the result, his Grace the Duke of Norfolk, E.M., having kindly accepted the office of President,—this being the second time of his rendering service in this manner to the Association.

At two o'clock punctually, a large number of ladies and gentlemen assembled at the Pavilion, when the Mayor of Brighton, on behalf of himself and his colleagues, bade the Association welcome, and called upon the Town Clerk to read the illuminated address prepared for the occasion. The members were reminded that this was the first occasion on which any antiquarian society had made Brighton its headquarters for a Congress.

In the absence of the Duke of Norfolk, who was unavoidably prevented from being present, Sir James A. Picton, F.R.S., of Liverpool, was called upon to deliver the inaugural address, from which we make the following extracts:—

The common subject which binds us together as an association is the study of archaeology. On a recent occasion, when a number of our members were gathered in a delightful tour of inspection of some of the antiquities of France, one of the visitors, hearing so often the phrase used, inquired very pertinently,—“What is archaeology?” The reply to this question brings under review the whole scope of our inquiries and discussions. In brief, archaeology may be defined as that study which connects the past with the present by its visible monuments. It is distinguished from written history, which is the record of human actions and motives. Ancient architecture has been defined as history in brick and stone, but this is only one department of archaeology, which embraces in addition works of art of every description on which the human mind and hands have been employed. To understand the present, and to give a probable insight into the future, it is necessary to study the past, where the germs have been formed which may lie dormant in the present, to be developed as time rolls on. The human mind is the same under all circumstances, but presents itself in its results in an endless variety of aspects. The province of archaeology is to discover, arrange, and classify these phenomena, and connect them with the written records of ages gone by. Beyond these records, where they fail us entirely, the Cimmerian darkness in which we are left is illuminated by the researches of the archaeologist, who takes up the relics of the long-buried past, and by the inductive process of arrangement, classification, and comparison, presents us with inferences as to the condition and progress of humanity in the prehistoric times, not less certain and in many respects more trustworthy, than the written records of history. We have in our country a rich mine of antiquarian wealth to explore. We cannot pretend to vie with the splendours of ancient Egyptian architecture, nor the colossal grandeur of the remains of Babylon, Nineveh, and Persepolis, nor the perfection of Grecian art in the time of Pericles and Pheidias; but as regards the elucidation of history, and the transition from the old to the new, the series of visible objects within our reach possess an interest for us which far transcends any which can be derived from foreign sources. They are our own; they have descended to us by inheritance; we can trace them backward step by step into the night of ages, and connect them by an unbroken chain with what is passing before our eyes. Notwithstanding the attention which has been paid to the subject, the untold number of volumes which have been written, and the ever-increasing illustrations which have been scattered broadcast, there is still much virgin soil to turn over. In respect of those remains which have been illustrated and recorded, the interest of the archaeologist is enhanced by the information thus afforded, and the assistance given to his inquiries. This information is increasing year by year, and imparts additional zest and throws additional light on the connexion of topography,

not only with local records, but with our national history in general. Valuable service has been rendered by the various local archaeological societies of late years in illustration of their respective localities. It is the province of the two associations\* which have a more general character to combine and compare the information thus obtained, and to supplement it by actual inspection. Each county of England has its own peculiarities and its own history, and Sussex yields to none for the stirring events which have taken place within its borders, and the existing monuments by which their memory is perpetuated. The prehistoric remains are not so numerous as those in Wiltshire, nor as those in Pembrokeshire, which we visited last year. There are, however, a number of earthworks well worth notice, such as Cissbury, the Devil's Dyke, Caburn, Hollingbury, and others. Tumuli or barrows are met with, scattered over the Downs. Of the original inhabitants we know nothing. Whoever they were, they were dispossessed by the invading Cymri, who have left traces behind them in the names of the rivers Rother, Arden, Ouse, Adur, Arun, and others. The numerous Roman remains scattered over the country, in at least sixteen different localities, present strong evidence of the flourishing and prosperous condition of the county under the Roman dominion. The splendid villa at Bignor, unearthed in 1811, could only have come into existence under circumstances of peace and refinement. Having narrated the principal events connected with the descent on Sussex in the year 477, by the Saxons under Ælle, the son of Hengist, and referred to the nomenclature of the county, which he described as intensely Anglo-Saxon, Sir James Picton went on to refer to the Norman Conquest, which took place within the county of Sussex. Bosham was the residence of Harold, from which he took his voyage to Normandy, which was attended with such direful results. William the Norman landed at Pevensey. Sir James continued,—“The course of his march to Hastings, and thence along the ridge to the fatal field of Senlac, can be traced with the utmost minuteness. Standing on the low hill which overlooks the downs, we can realise in the mind's eye the events of the memorable 15th of October, 1066, the most momentous battle ever fought on English ground. We can see the trench and stockade thrown up by English Harold, behind which, in the centre, clustered the body-guard of the king, men in full armour, wielding huge battle-axes, grouped round the Golden Dragon of Wessex and the standard of the king. Duke William's Norman knightly host was arrayed on the opposite side. From this point English history takes a fresh departure,—

“Th' old order changeth, giving place to new.”

Out of apparent disaster springs new life. The Saxon element absorbed the Norman, but drew from it an energy, a vigour, a power, which has been the dominant influence in its progress and success. The feudal system was now established in all its rigour, and England became for a time a vast camp. The county of Sussex was divided into sixteen fiefs, held in demesne by tenants *in capite*, containing in different proportions 387 manors. These were distributed amongst the Norman adventurers, the Saxon thanes being ousted or reduced to servitude. Four castles of the first class,—Arundel, Lewes, Pevensey, and Hastings,—were erected by the Norman barons to overawe the country, and to protect their acquisitions. Some of these we shall have the opportunity of inspecting. Several fortified manor-houses were erected during the Middle Ages by the sub-feudatories; several by royal licence, as that of Camber, in the reign of Henry VIII., Bodiam, in 1386, and Hurstmonceux, during the reign of Henry VI. Whilst on the subject of castles, I may mention that there are a number of interesting earthwork encampments at Hollingbury, Woolstonbury, Burlough, and the Devil's Dyke, which have probably been occupied successively by the Britons, the Romans, and the Saxons.—Having related the circumstances which led to the battle of Lewes, between Henry III. and the barons, which had a most momentous influence on the history of England, inasmuch as it led to the calling of a Parliament in which representatives from the boroughs appeared for the

\* The Royal Archaeological Institute (of whose Derby meeting detailed accounts have been published in the three last numbers of the *Builder*) and the British Archaeological Association.



first time, Sir James Picton turned to the churches of the county, of which he spoke in the following terms:—Much cannot be said in praise of the church architecture of Sussex. The buildings are for the most part small and plain in their architecture. The reason for this is not far to seek. With one exception, to which I shall shortly refer, the country has been destitute of manufactures. It was the early manufacturing industry of the eastern counties which supplied the funds for the erection of the magnificent structures which the Middle Ages have bequeathed to us. The population of Sussex has always been mainly agricultural and pastoral. The church was, therefore, destitute of that material support which the richer counties were able to afford. The first place must, of course, be given to Chichester Cathedral. This, though not on the largest scale of its sister structures, and rather unfavourably situated, is very interesting, and contains a variety of styles from the twelfth to the fifteenth centuries. Battle Abbey, from its connexion with our national history, is well worthy of a visit; its remains will come under our review. The church at Arundel, with its associated buildings, will afford ample scope for a pleasant day's excursion. There existed abbeys, priories, or collegiate churches, at Lewes, Hastings, Bayham, Robertsbridge, and Durdul, fragments of which still remain. The churches of Steyning and Sompting are well known from their specimens of early architecture.

New and Old Shoreham, Lewes, Bosham, Bishopstone, Alfriston, Broadwater, offer interesting examples, some of which we shall doubtless visit. The modern restorer does not appear to have been quite so energetic here as in some of the other counties, which to us, as archaeologists, is cause for congratulation. Besides the churches and castles there are many interesting reminiscences of antiquity scattered about the country. The ancient town of Lewes, with its noble castle and its quaint street architecture, will come under our notice. Steyning has its Roman and Medieval associations and its fine old Norman church. Old and New Shoreham present features of antiquity worthy of inspection in addition to the churches. In fact, a ramble amongst the quaint old villages of Sussex would give a vivid idea of England in the olden time. The tide of commerce and manufactures has for so many ages set in a northerly direction, that we are apt to forget the distinguished part played by the southern counties in our early history. International commerce in its feeble development was here cherished and protected, and manufactures in one important direction here had their seat. I allude more particularly to the iron smelting and casting for which Sussex was long renowned. Ironstone of excellent quality is found in various parts of the county, and was very early made use of. Even before the advent of the Romans, the forest of Dean in the west, and the forest of Anderida, in Sussex, in the east, were the two principal sources from which the metal was derived, and all through the Medieval ages the manufacture was continued. After the discovery of the art of smelting and casting iron in the sixteenth century, the manufacture in Sussex received a great impulse from the abundance of wood for fuel, and from that time down to the middle of the last century it continued to flourish. One of the largest furnaces was at Lamberhurst, on the borders of Kent, where the noble balustrade surrounding St. Paul's Cathedral was cast, at a cost of about 11,000. It is stated by the historian Holinshed that the first cast-iron ordnance was manufactured at Buxted, in this county. Two specialties in the iron trade belonged to Sussex, the manufacture of chimney backs and cast-iron plates for gravestones. At the time when wood constituted the fuel, the backs of fireplaces were frequently ornamented with neat designs. Specimens, both of the chimney-backs and of the monuments, are occasionally met with. These articles were exported from Rye. The iron manufacture, of course, met with considerable discouragement on the discovery of smelting with pit coal, and the rapid progress of iron works in Staffordshire and the north, but it lingered on until the great forest was cut down and the fuel exhausted. The last furnace was at Brede, near Beckley, a few miles from Rye, which was discontinued in 1825.

Sir James was briefly thanked for his address by Lord Mount-Temple, seconded by the Ven. Archdeacon Hannah, and he expressed his

thanks for the gratification he had given his audience.

A paper was then read by Mr. F. E. Sawyer, F.S.A., on "Old Brighton." In the course of his address, attention was called to the fact that the building operations carried on in the town had been so rapid that no change of the old local divisions had been attempted. The map of the modern town, therefore, showed many of the old boundaries, &c., in the wide streets of to-day. The town dates from early times, and pleasant reference was made to the contrast afforded by the ancient hill-forts around Brighton, the places of shelter of the earliest inhabitants of the district, the fishing village of very recent times, and the town as it now exists. Several points of local history were referred to, viz., the escape of Charles II. from England from the George Hotel, now pulled down, and the existence of a "Permissive Bill" in the early part of the seventeenth century.

After Mr. Roach Smith, F.S.A., had proposed a vote of thanks to Mr. Sawyer, the party proceeded to the old Church of St. Nicholas, Brighton, where the Ven. Archdeacon Hannah described at length what is known of its history, and afterwards proceeded to point out the portions of the church which are original, namely, the western tower, a plain solid fourteenth century work, and the chancel arch. The aisles and the nave piers have been rebuilt in recent years. The interest of the church centres in the good roof-screen of fifteenth century date, and the very remarkable font. This is covered with carved figures in bold relief. On one side is a representation of the Last Supper; on another apparently a portion of the history of St. Nicholas. The intermediate spaces contain the Baptism of Our Lord and a fourth subject not well made out. The date is about the middle of the twelfth century.

Proceeding to the Brighton Museum, the party inspected the large and well-known collection of English pottery formed by Mr. Henry Willett, F.G.S., and now lent on loan. Mr. Willett proceeded to describe the articles, which are displayed in cases arranged in an unusual way, but which admirably brings out the curious points of the collection. In case A, for instance, Royalty and Loyalty being the title, articles of pottery representing our kings and queens are grouped. Case B is devoted to hero worship. Case C to politics, Napoleon, statesmen, and the like. The collection is remarkable in every way, and of large extent, filling a large gallery with about 20 cases. Good examples of the earliest of our old English pottery form part of the collection, together with many curious pieces, including some Elizabethan green glazed terra-cotta panels for decorative purposes in buildings. After Mr. Willett had been cordially thanked, the Sussex antiquities were inspected, including the beautiful amber cup found in Palmeira Square in 1865.

A special loan collection of paintings and drawings of ancient Sussex buildings was also inspected in the museum, arranged by Mr. G. de Paris, containing works by Nibbs, Scott, de Paris, Earp, and other local artists.

Tuesday was devoted to a visit to Chichester and Boxgrove, and the party, leaving Brighton by a special train at an early hour, arrived at the former ancient city in good time to spend a long day in useful investigations. Proceeding to the Museum, under the guidance of Messrs. Henry Griffith, the hon. local secretary, and G. R. Wright, F.S.A., the hon. Congress secretary, the interesting collection of local antiquities was described by Mr. C. Roach Smith, F.S.A., who pointed out the peculiar Roman pottery found in the district, as well as the lapidary inscriptions of the same age. The most important of these found in the district is now at Goodwood, but for convenience of reference in relation to the others, it was described at the Museum. Dr. Birch, F.S.A., deprecated the hypothesis which has connected the name PUDENS of this inscription with the early convert to Christianity, and agreed with Mr. Smith as to the importance of the inscription. It commemorates the erection of a temple to Minerva and Neptune by a college of smiths, probably the precursors of the trade guilds of later times, with the authority of a local king, Pudens having given the ground. After a vote of thanks to Mr. Smith had been proposed by Sir J. Picton, and cordially rendered, the party proceeded to inspect some excavations which

had been made by the Association at the base of one of the projecting bastions of the old city wall on the south side. The contours of these walls have long suggested that they occupied the site of the walls of the ancient Roman city, but nothing of this early date is to be noticed above ground, except a few Roman bricks sparsely used as old material. The existence at one time of walls to the Roman city might be considered as certain, from its importance in these early times, and the analogy of other large Roman cities.

It had been resolved upon by the Association to ascertain if the ground covered any work of older date than what was visible, and the excavations were made at a bastion selected by Mr. Roach Smith, the Archdeacon of Chichester having granted leave. A discovery of the highest antiquarian interest has resulted. The Medieval bastion is found to rest upon the base of a larger semicircular tower, having a bold chamfered plinth, the whole solidly founded upon a square base of massive blocks of squared sandstone, there being a set-off to the latter for additional strength. Mr. Gordon Hills and Mr. Roach Smith commented in turns upon this remarkable discovery; and Mr. Loftus Brock, F.S.A., who descended into the excavations, pointed out that the whole of the solid mass was built with red Roman mortar of pointed brick. It may be taken, therefore, as a determined problem that the city had a wall in Roman times, and that the present Medieval ones are founded upon it.

Escorted by the Bishop of Chichester, the dean, the archdeacon, and several of the cathedral dignitaries, the grounds of the palace were perambulated and the ancient building inspected, the bishop pointing out in passing the colossal head of a Roman statue of white marble, probably Nero. Arriving at the cathedral, the party listened to an interesting lecture upon its origin and architecture by Mr. Gordon Hills, the cathedral architect, and an old member of the Association. Taking his stand at various spots the different peculiarities of the interesting building were pointed out. Chichester Cathedral strikes a spectator at once by the irregularity of its setting out. The lines are not straight, the angles are not right angles. The Norman work is of the highest interest, not only on account of its varying dates being well made out, but as well from the excellency of the design of each several part, and the ease with which many curious additions and alterations can be followed. The double aisles to the narrow nave give an appearance of width and size which the building does not actually possess, while some pretty effects of colour are produced by the introduction of alternations of red stone. The fine collection of paintings of the early bishops is now carefully placed against the north wall of the north transept. Mr. Hills pointed out the so-called tomb of Bishop Richard, St. Richard, as he is so frequently called,—where the fine effigy is in reality that of Bishop Robert Straford, the record being very precise that the shrine of St. Richard was demolished at the Reformation.

After proceeding through the cloisters, past the site of the Chapel of St. Faith, a portion of which is still visible, luncheon was partaken of at the Dolphin Hotel, and a start was made for Boxgrove, past the beautiful and well-known Market-cross in the centre of the city. At Boxgrove Mr. C. Lynam read a paper upon the remains of this beautiful monastic church. Two churches, one parochial and the other monastic, have existed under one roof, so to speak, the parish having the nave and the religious the transepts and choir, an arrangement reversed probably at the Reformation, the parish now assembling in the eastern portion, while the western has gone to decay. The work is very beautiful, and the vaulting of the whole of the nave, choir, and aisles very effective. After inspecting the few remaining ruins of the monastic buildings the party proceeded to Goodwood Park and mansion, by the invitation of the noble owner, the Duke of Richmond and Gordon. After inspecting the fine collection of portraits of the middle of the seventeenth century by Lely, Kneller, and others, the famous Pudens stone, now in a summer-house in the grounds, was inspected, and commented upon by Dr. Birch and the Bishop of Chichester.

Returning to Brighton, a paper was read at the evening meeting on the results of excavations at Cissbury by Mr. E. Willett, F.S.A., and another by Mr. E. P. Loftus Brock, F.S.A., on the peculiarities of the Sussex churches.



On Wednesday, the 19th, the party, leaving Brighton again at rather an early hour, proceeded to the well-known church at Sompting, a building which possesses a Saxon tower at the west end of a cruciform Norman church. The tower has the peculiarity of having a gable on each face, above which is a pyramidal roof, the hips springing from the apices of the gables, a design similar to many of the early churches of the Rhenish provinces. The party having proceeded to the north-west angle, whence a good view of the fabric can be obtained, a short lecture was given by Mr. Loftus Brock, F.S.A., who pointed out that some portion of the church had been erected with the materials of some more ancient Roman building, many of the flat bricks of Roman date being worked in over the heads of the windows on the north side. The peculiarity of the curious projecting pilasters at the angles was pointed out, the central shaft, extending to the apex of each gable, being semicircular. These are worked in Caen stone bonded into the walls with a stone of great hardness resembling tufa. Entering the building, which was restored several years ago by Mr. Carpenter, Mr. Brock exhibited a plan of the building placed at his disposal by Mr. Herbert Carpenter. The transepts have eastern chequer chapels opening from them, those on the north side being vaulted in a very effective manner. At the east end are several ambries, having delicately worked Saxon interlaced work fitted and out to form their heads or lintels, these portions having been used as old material and removed probably from the old Saxon building on its being superseded by the present Norman work. At the north-west side of the nave is a separate chapel now in ruins. Mr. Gordon Hills gave some interesting notes on the parochial history, and expressed his belief that the two churches spoken of in the records were in fact included in the present structure, adducing some reasons from the arrangement of the building prior to its restoration, the nave having been a complete church, and the whole of the building east of it the other. The party lingered over this curious building and left it with regret.

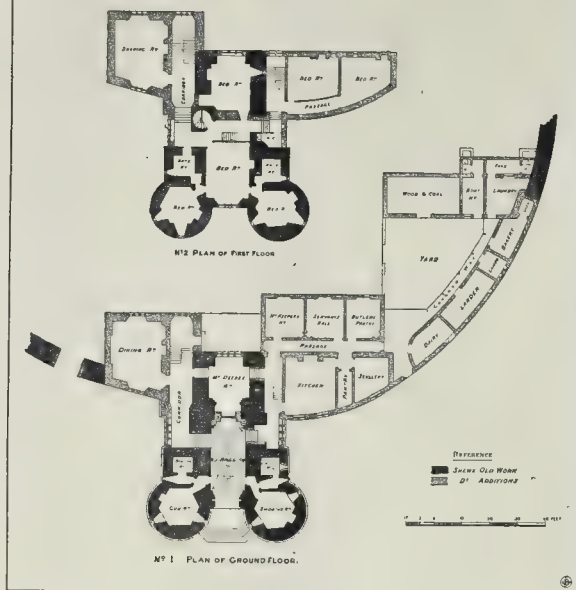
Proceeding to Broadwater, the large cruciform church was inspected, as were also some views laid out in the vestry by Mr. Tribe, showing the appearance of the chancel prior to a recent destructive restoration. Decorated traceried windows having been removed for the insertion of modern lancets, for the sake of uniformity. There is a central tower supported on arches of Late Norman work, which are insertions in an older Norman wall, there having been no transepts originally.\* Sir Jas. Picton pointed out that the western arch, now pointed, had been made up from the ornamental arch stones of a semicircular arch.

Proceeding to the famed ancient British earthwork, Cissbury Camp, some in carriages and some walking up the ascent, the party at length assembled within the bold earthen banks of this remarkable work. The day was somewhat cloudy, but the fine view over the distant town of Worthing and the sea beyond was still very visible. Here a lecture was delivered by Mr. Walter Myers, F.S.A., who, after giving a rapid résumé of what had been stated by various writers, proceeded to render a description of the work as it actually existed. The whole surface of the ground enclosed by the earthworks is honeycombed by pits and depressions, which, on being recently excavated by General Pitt Rivers and others, have been found to be the commencement of chambers and galleries, sunk apparently for the purpose of extracting flint from the chalk, of a kind capable of being worked into implements. The whole surface is covered with fragments of flint-flakes, evidently the refuse of primitive workings, and Mr. Myers, after his lecture, led the audience to a heap of flints, all of which had been cast aside as unfit for use after having been split and examined. Mr. Ernest Willett, F.S.A., pointed out the similarity of the work to those known as Grimm's graves, and also the position of some of the galleries, which, going beneath the ditch of the camp a very short distance below it, appeared to show that its formation was older than the ditch itself, which appeared to have been made unconscious of the existence of the gallery beneath.

\* It may be mentioned here that the tomb of Thomas, Lord de la Warr, in the chancel of this church, formed the subject of one of the illustrations in our last number.

Plans showing alterations and additions in 1884.

PLATE 5\*



Saltwood Castle.

Proceeding to the carriages on the opposite side of the hill, the pretty wooded village of Findon was next visited, and the quaint church was described by Sir Jas. Picton. Another halt was made at Clapton Church, where the Rev. — Burnett read some notes prepared by Sir Gilbert Scott on the history of the church and its recent restoration. It is a simple church, consisting of nave, chancel, side aisle to the nave, and a western tower to the aisle, the work being of the plainest kind, though the effect is admirable. Passing the curious half-timbered house at Salvington, where Selden was born, the last halt was that made at West Tarring Church, which was described by Mr. Loftus Brock. The church is of large size, of very plain and good Early English work, the nave having an original clearstory; the chancel is Perpendicular, the western tower flowing Decorated. The latter has a fine tapering spire of timber work covered with oak shingles.

The party then returned to Brighton from Worthing Station, and a meeting was held in the Pavilion, Mr. Thos. Morgan, F.S.A., being in the chair. A paper was read by the Venerable Archdeacon Hannah, vicar of Brighton, on "The Font of St. Nicholas Church, Brighton, in relation to other Early Norman Fonts." A rubbing of another fine font at Grimsthorpe was exhibited by the Rev. G. F. Browne, of Cambridge. Another paper, by Dr. S. Birch, F.S.A., of the British Museum, was then read upon the "Coins of the Ancient British Period, illustrative of Southern England," some fine examples being exhibited by Mr. E. Willett.

We shall continue our notes of the Congress next week.

## Illustrations.

### SALTWOOD CASTLE.

WE give this week views and plans showing restorations and additions recently carried out to the gate-house of this castle for the owner, Mr. William Deedes, under the direction of Mr. F. Beeston, F.R.I.B.A.

The ruins of Saltwood Castle, situated near Hythe, in Kent, have for years been an attraction to tourists, many of whom must have noticed how unsafe portions of them had become. In 1882, the gate-house portion being closed as unsafe, it was suggested to Mr. Deedes by his architect:—

1. That it might be repaired and left a picturesque ruin.

2. That it might be reinstated in its late form,—that of a farm-house; or

3. That it might be restored, and with suitable additions turned into a mansion fit for the residence of a country gentleman.

The last suggestion was adopted, the work was carried out, and this portion of the castle is now occupied by Mr. Deedes and his family. A small part of the ground-floor story dates back to A.D. 1154, when the castle was rebuilt by Henry de Essex,—Baron Raleigh in Essex the remainder was the work of Archbishop Courtenay, who, in 1382, again practically rebuilt the castle, his work being probably the earliest specimen on a large scale of Perpendicular work in this country.

Many of the fireplaces and doorways now in use are those placed in the building by Courtenay in 1382; the present lead roofings are at the same levels as the originals, traces of which remained embedded in the old masonry.

The ribbed and arched ceiling of Mr. Deedes' room on the ground-floor, and the circular staircase from the first-floor upwards, date back to A.D. 1154, and the ribbed and vaulted ceiling of the ground-floor tower rooms are as they were left by Courtenay.

In carrying out the works many workmen's tokens bearing German inscriptions were found showing from their date that in repairing the gate-house after the earthquake of 1580 German hands had been employed.

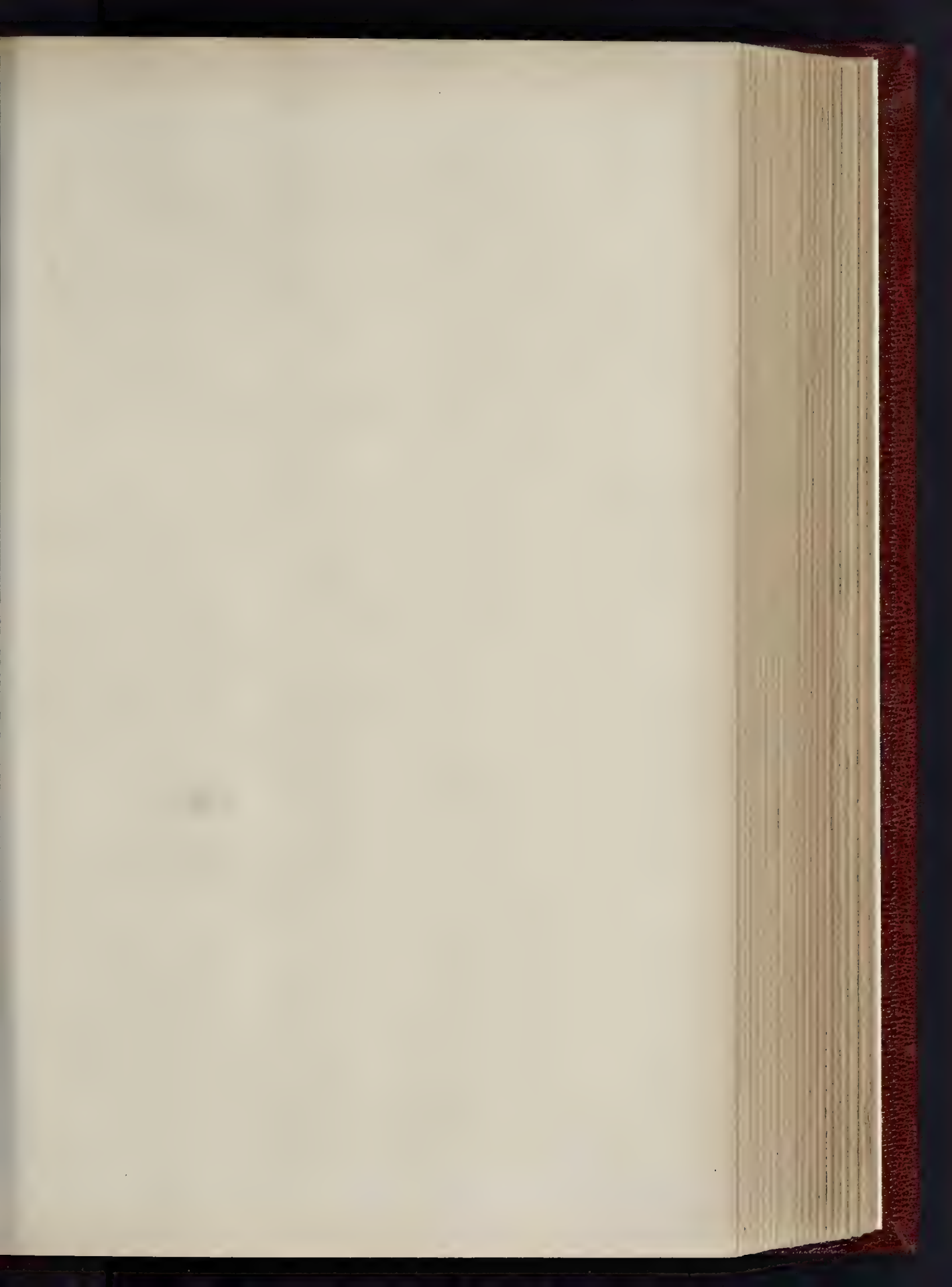
In the process of clearing for the purpose of the restorations various disputed questions relating to the architecture of the castle have been set at rest, and many fragments of beauty and interest which had been hidden away for centuries were brought to light.

The restoration was one requiring great care as the last 20 ft. or 25 ft. of the main building now upwards of 80 ft. high, was added upon works erected part 500 and part 750 years back and all more or less injured by the earthquake of 1692 and 1755. All, however, was safely and satisfactorily completed by the contractor, Mr. T. L. Green, of London; Mr. Edward Addison being the clerk of the works.

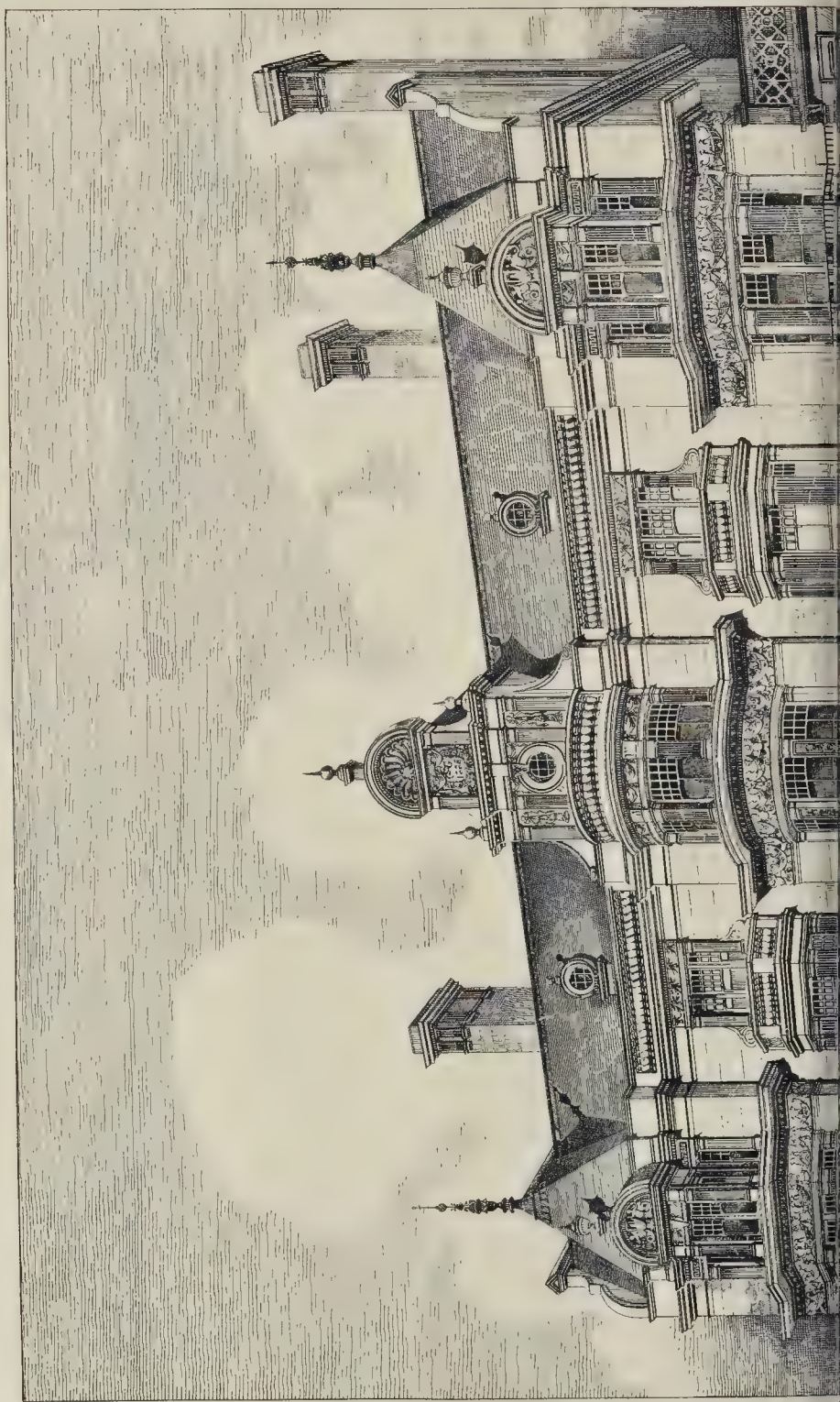
### CARVING FROM WEST DOOR, ELY CATHEDRAL.

THIS fine and free bit of Early English decorative work is reproduced from a pencil drawing by Mr. R. W. Paul, whose measurements and drawings of the sculptry at Bristol Cathedral we published two or three weeks since.

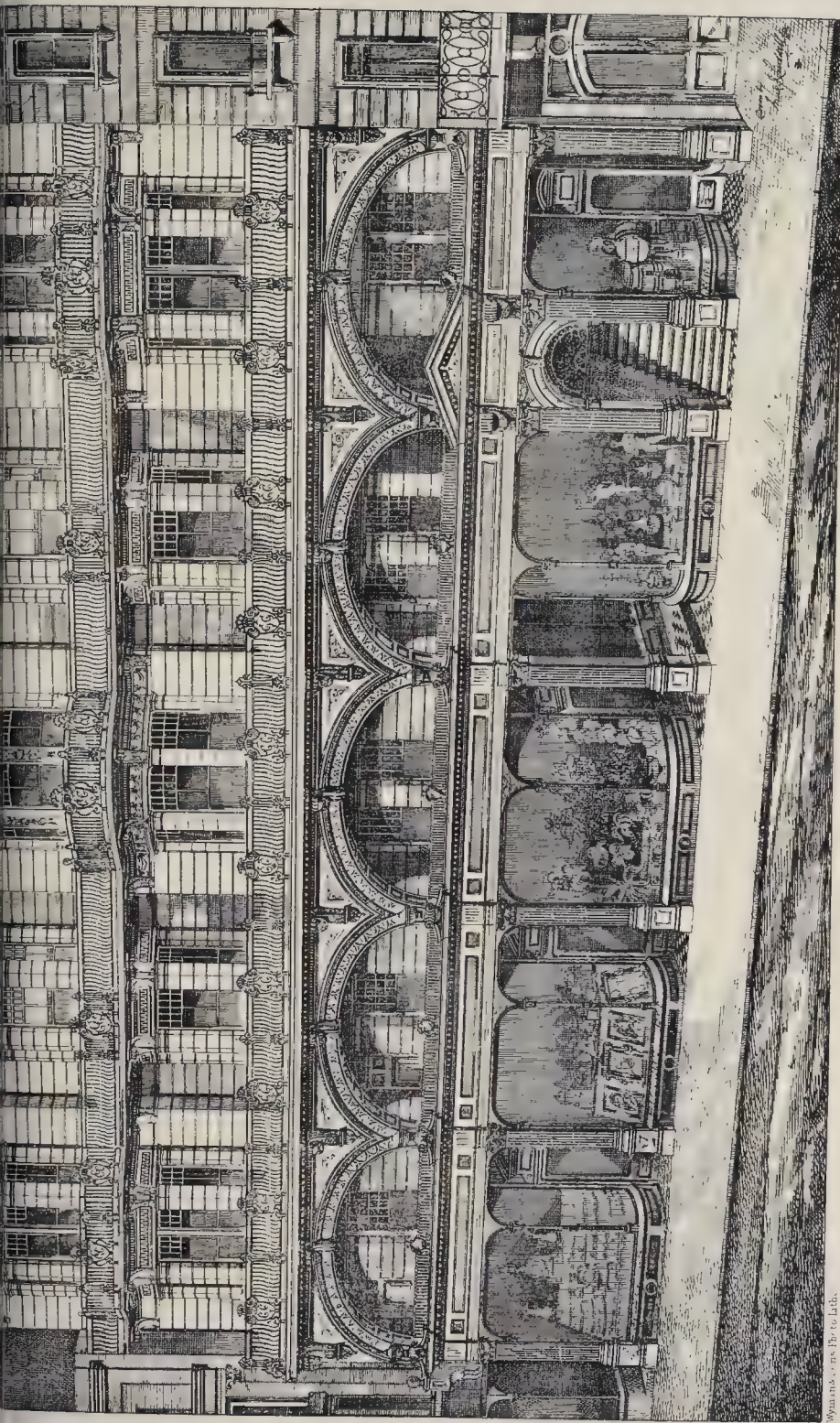




THE BUILDER, AUGUST 22, 1885.





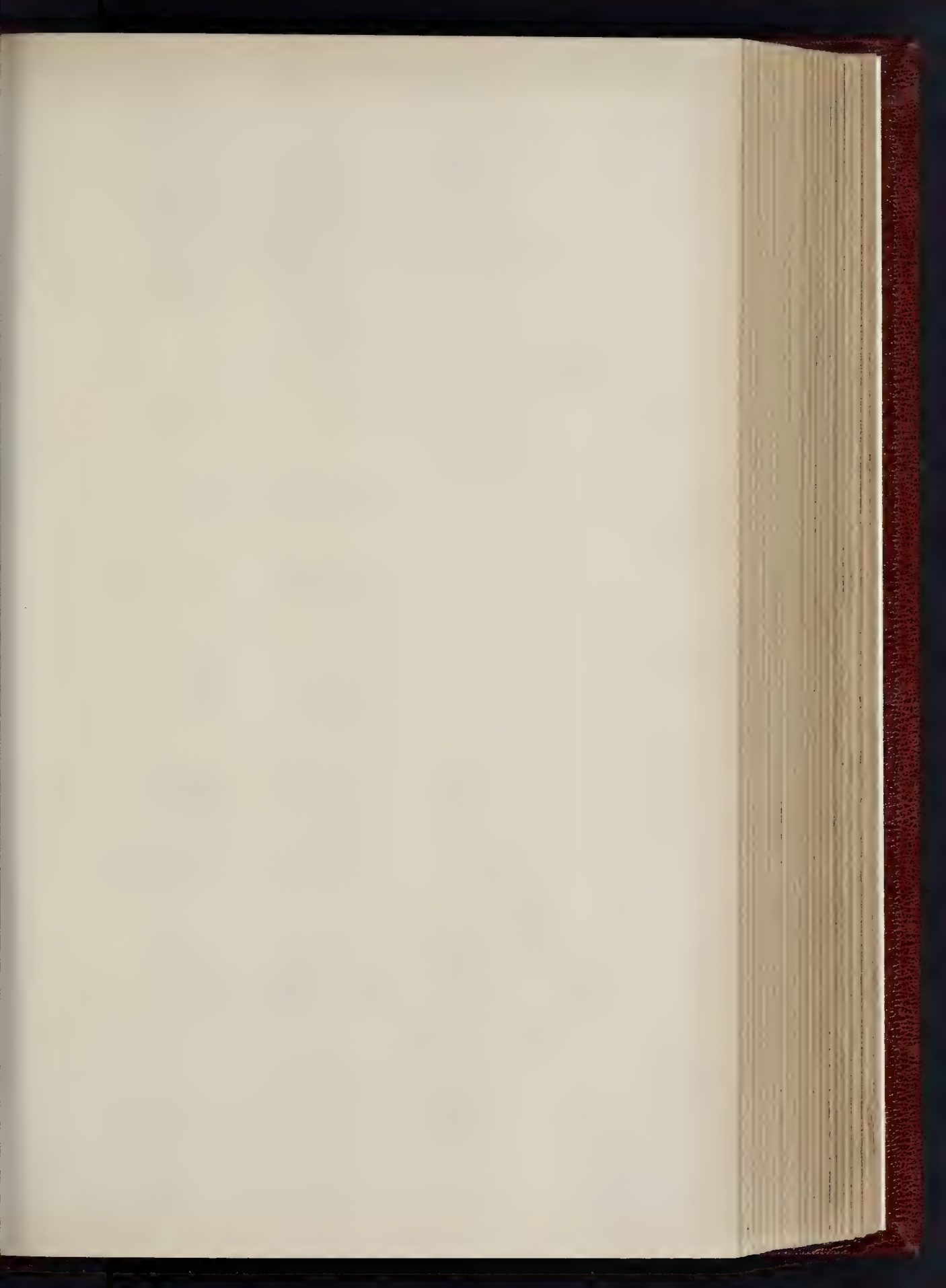


PREMISES IN COURSE OF ERECTION AT HASTINGS, FOR MR. G. G. GRAY.

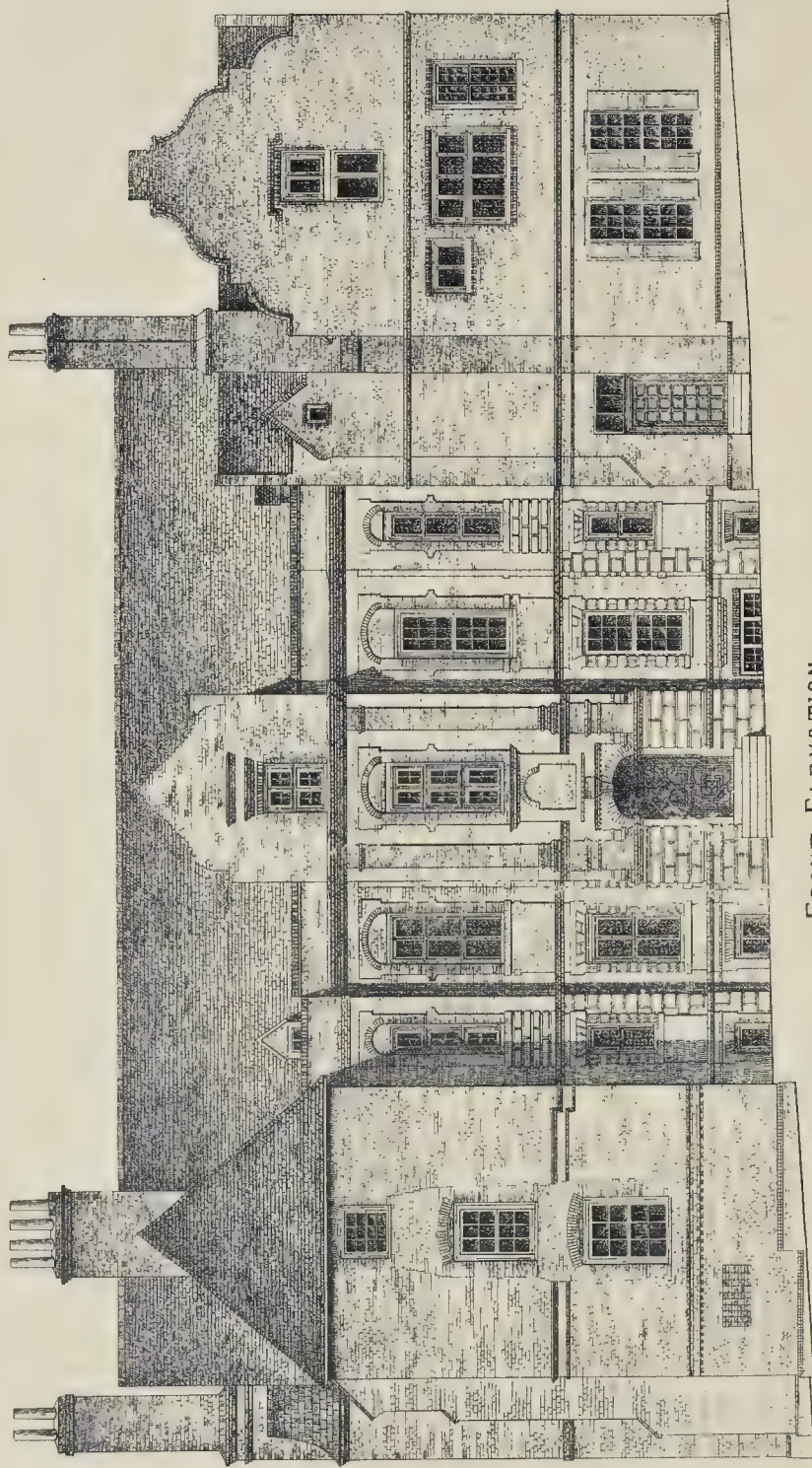
MR. ARTHUR WELLS AND MR. MARK J. LANSDALE, ARCHITECTS.







THE BUILDER AUGUST 22, 1895

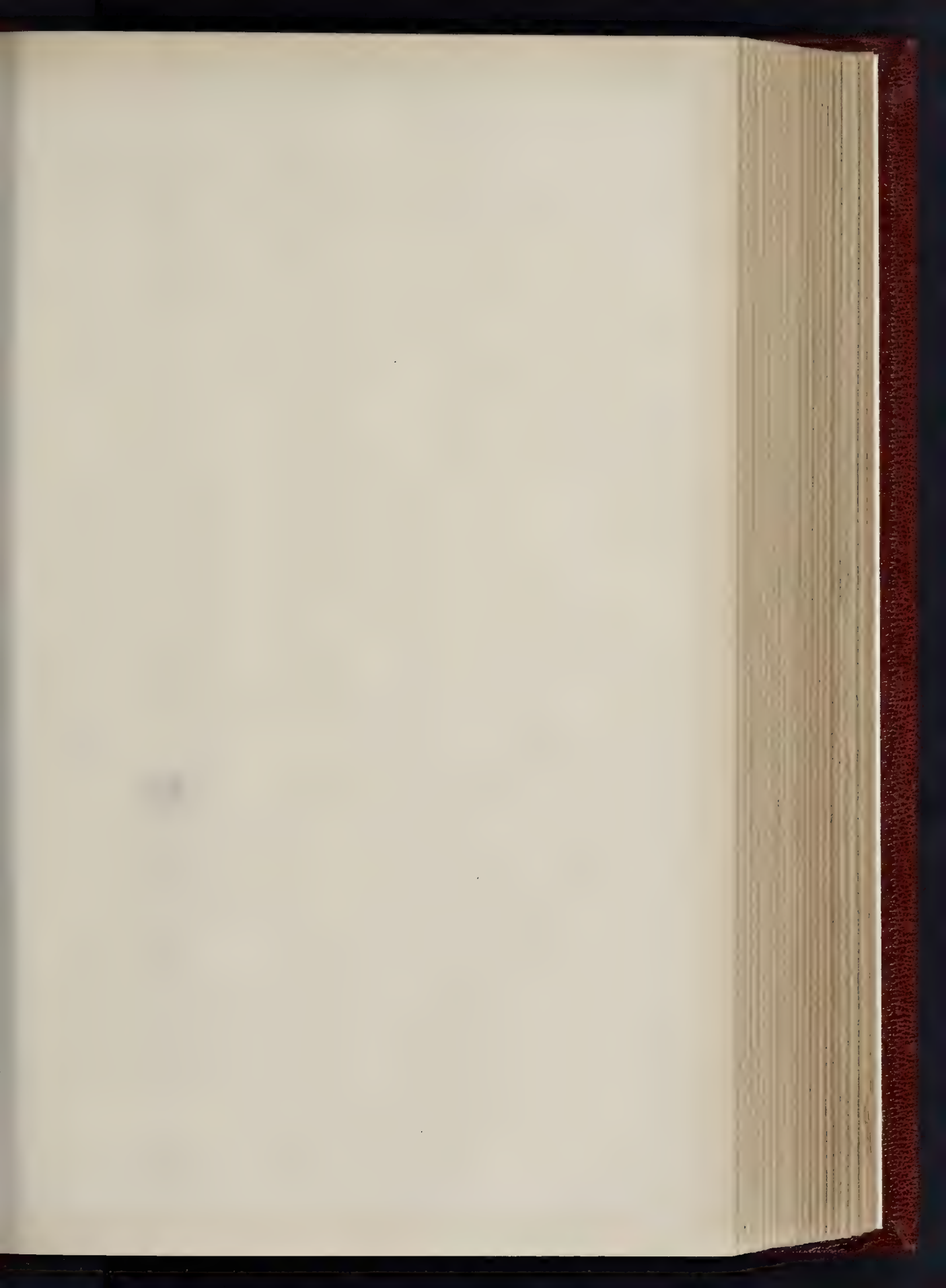


FRONT ELEVATION.

SCALE 1" = 20' 0" 10' 0" 30' 40' Feet

RESTORATION HOUSE, ROCHESTER. MEASURED AND DRAWN BY MR. H. BAKER.





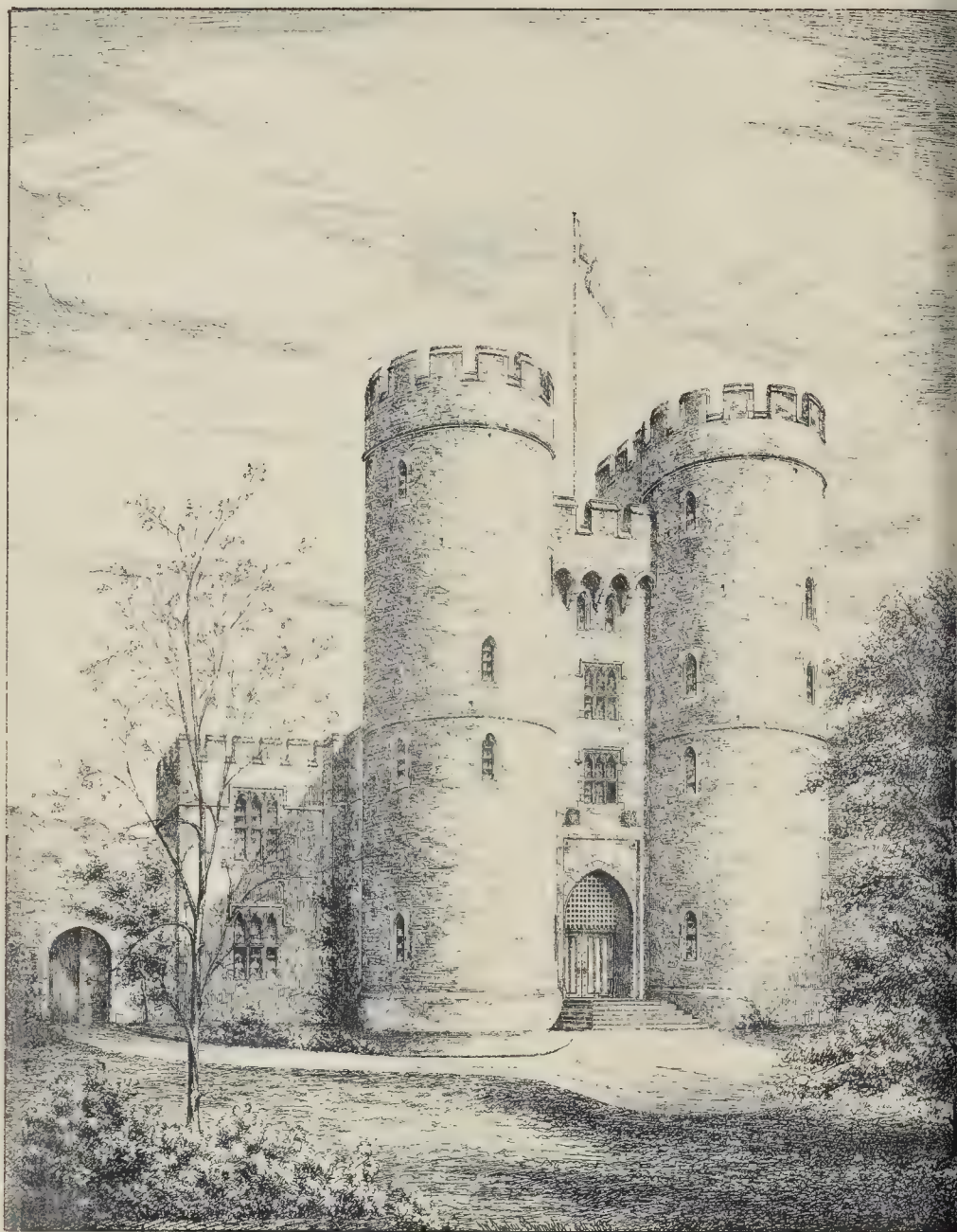


PHOTO. THE SPEARHEAD & CO. LONDON.

SALTWOOD CASTLE, KENT:  
AS RESTORED BY MR. F. BEESTON, F.R.I.B.A.  
ENTRANCE AND GATE-TOWERS.



Carved from the stone  
of the old  
church of St. John.

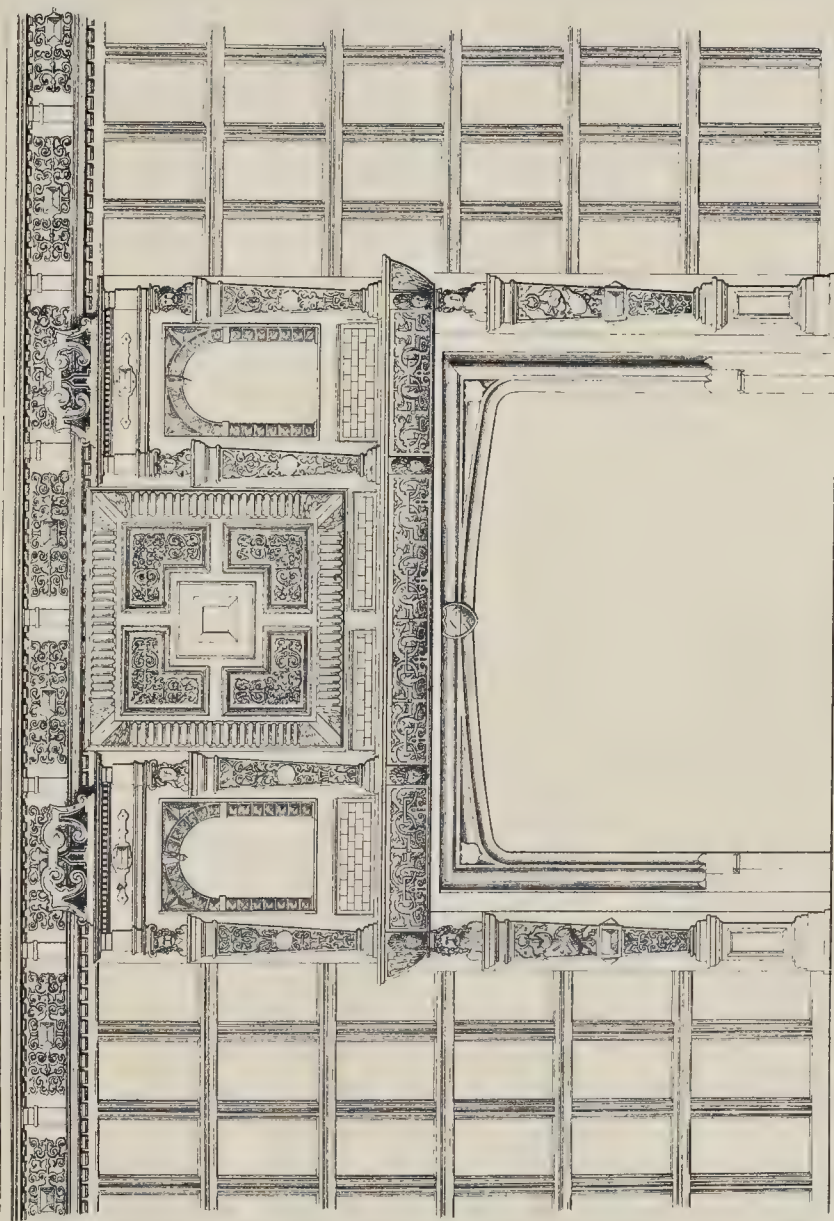


*W. Paul*

INK PHOTO. SPRAGUE & CO. LONDON







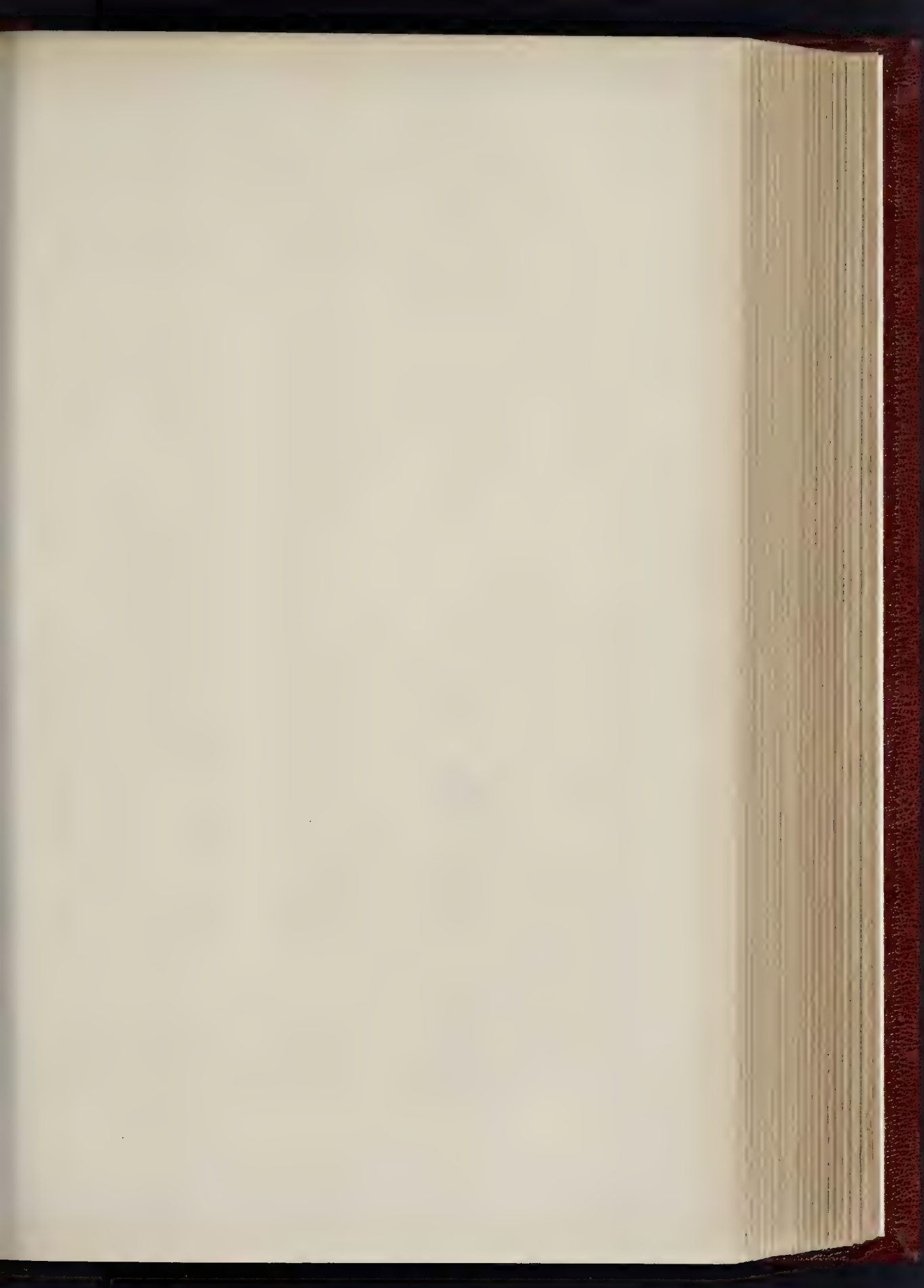
Scale 1/4" = 1 foot  
C. F. Hill, Photographer & Printer, 8, Castle St., Brighton

CHIMNEY PIECE, RESTORATION HOUSE, ROCHESTER. MEASURED AND DRAWN BY MR. H. BAKER.

HB  
1882









SALT  
AS RESTORED





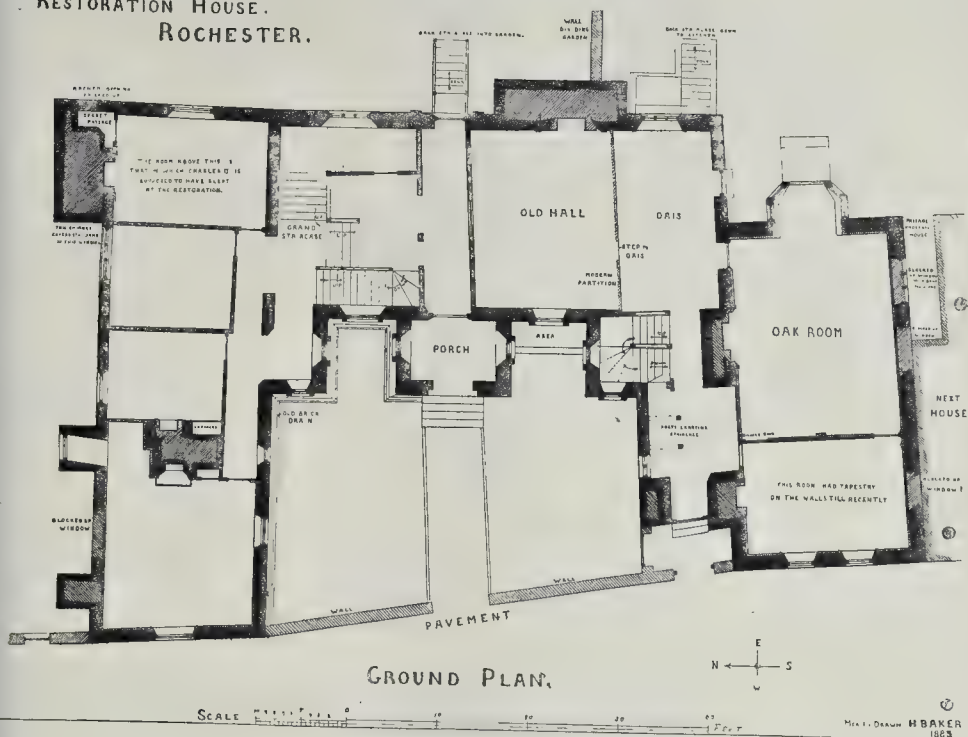
INK PHOTO SPRAGUE & CO. LONDON

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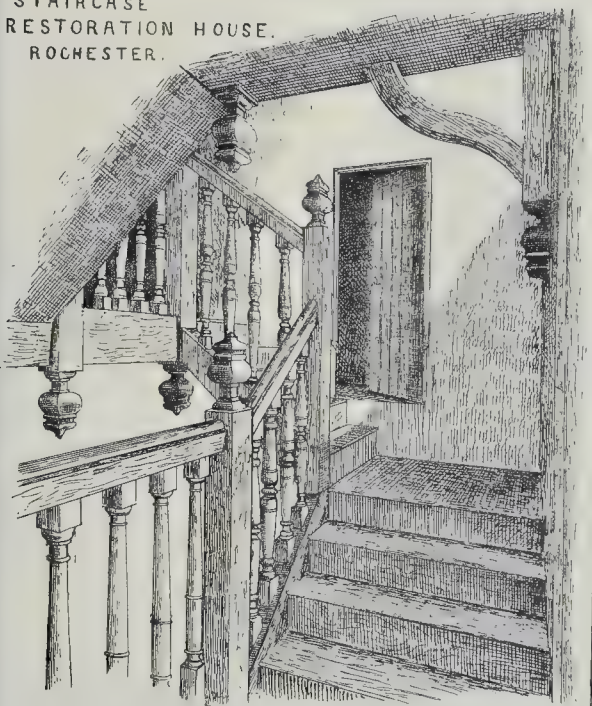




RESTORATION HOUSE.  
ROCHESTER.



STAIRCASE  
RESTORATION HOUSE.  
ROCHESTER.



RESTORATION HOUSE, ROCHESTER, AND  
CHIMNEY-PIECE THEREAT.

This picturesque old house,—which is to be visited by the Architectural Association to-day (Saturday),\*—takes its name from the fact that Charles II. slept there on the eve of the Restoration.

It is believed to have been built between the years 1580 and 1600, but it is uncertain by whom. The plan, as will be seen, is in the form of a letter E. The building is of red brick. The centre portion of the front between the two wings is supposed to have been recessed and decorated with pilasters and rustic work by Sir Francis Clerke in the middle of the seventeenth century. All the windows of the oldest portion may originally have had brick mullions, one such window having been found blocked up on the south side, but all the rest have oak frames. In the centre of the house is the hall, with a raised dais, and beyond in the south wing is a fine panelled room with a magnificent chimney-piece, Elizabethan in character.

Considerable alterations were made in the interior at the end of the seventeenth century, a new and wide staircase being added, a view of a portion of which is subjoined.

The room in which Charles slept, called the King's Room, is richly decorated in black and gold, and is where Mr. Aveling, the present owner of the house, has discovered a secret passage running from the top to the bottom of the house. He has also found in the basement an underground passage leading in the direction of Eastgate House. A curious feature is the two huge buttresses (?) on the north side, which are large enough to contain a secret passage, but in which nothing has yet been discovered.

"MENTONE MANSIONS," HASTINGS.

The illustration of the above represents a large block of buildings in course of erection on the site of an old brewery,—more recently used as wine-vaults,—and adjoining premises, at White Rock-place, Hastings, facing the sea. The

\* We are asked to mention that members of the Association may obtain return tickets for the excursion, at single fares, from Mr. A. L. Forrest, 7a, Lawrence's Pountney-hill, E.C.







This custom has been kept up by Prof. Lewis with regard to the very numerous and excellent diagrams which he prepared, as well as those of Prof. Donaldson's, which were in his charge, and it is still continued. A year or two back, Prof. Donaldson presented to the College a large mass of valuable drawings and engravings illustrative of architecture, for the purposes of this class, and, as was pointed out by you, a Donaldson Medal was founded as a prize in each of the courses of Architecture and Construction.



Donaldson would spare no pains in answering our questions and clearing up our difficulties, and was always accessible to any of the students who wanted guidance; and this, with his evident devotedness to our benefit served to attach his students closely to him. I remember that, in the class of which I was a member, we set on foot a subscription to purchase some token of respect that should be presented to him at the close of the session, but he somehow found it out, and told us that he should not consider it right to accept such a gift, so the project fell through; but I am glad, at this long distance of time, to remember that we had sufficient sense of his arduous and unremitting exertions for our good, and of his great generosity and liberality, to have set it on foot.

T. ROGER SMITH.

University College, London.

#### INVENTIONS EXHIBITION AWARDS.

SIR,—As the "Inventions" Exhibition awards are now being made public, and many persons are forming their opinions of the merits of the exhibits from the decision of the jury, I think it should be known that the jury commission hold that two persons can constitute a jury.

Having ascertained from the secretary that such was the case with regard to my exhibit, I withdrew from competition on the ground that two persons could be judges, but not a jury. As the jury commission invited exhibitors to nominate members, some might have been judged by two of their nominees, while others may have suffered from the lack of collective wisdom implied in the word "jury."

A DISSATISFIED EXHIBITOR.

#### HOUSING OF THE WORKING CLASSES.

SIR,—Inasmuch as you think I am in error about one cause of the wretched dwellings of the London poor, and that in suggesting some regulation of street trading I am proposing an impracticable and absurd method of reforming the habits of the occupiers of these houses, may I request the favour of the insertion of the subjoined extract from my report, in order that your readers may judge for themselves?

I may add my opinion that the Holborn Board of Works has, for its size, applied the Artisans' Dwellings Acts to more houses than any other Sanitary Authority in the metropolis. Torrens's Act has been applied to 401 houses, and there have been four "representations of unhealthy areas" under Sir Richard Cross's Administration.

SEPTIMUS GIBSON, M.D.,

Medical Officer of Health.

Sanitary Department, Holborn Town-hall,  
Gray's Inn-road, W.C.,  
Aug. 18, 1885.

Extract from my Annual Report.

"The worst of the tenemental houses in our district are certainly occupied by such traders as costermongers, flower-sellers, newspaper girls and boys, match and fuse sellers, street singers and musicians, thieves, beggars, and prostitutes. It may be necessary and expedient to have perishable articles of food, such as fish and vegetables, hawked about the public thoroughfares for sale, but I think the hawkers should be duly licensed by some authority; at present, none of them ever take out a hawker's licence. If this trade was subjected to regulation, it would be greatly to the advantage alike of the traders themselves and of the general public. Besides the vocations of thieves, beggars, and prostitutes, there is much of this street-trading that is very demoralising to the persons engaged in it. This is proved by the fact that it is well-nigh impossible for the landlords to prevent the houses in which they dwell from being stripped of all their available metal, woodwork, taps, and other sanitary fittings. As I stated last year, it is of little permanent advantage to cleanse the 'rookeries' unless effectual and practical measures are taken to reform the 'rooks'; and this, in my judgment, can only be done by legislation."

"It is much to be regretted that the Royal Commission on 'The Housing of the Working Classes' did not inquire into this and other real causes of the indecent, demoralising, and unhealthy homes of the poor. I am inclined, therefore, to dispute the main outcome of the Commissioners' suggestions, which may be briefly comprehended in this saying of their own:—'There has been failure of administration rather than in legislation. What at the present time is specially required is some motive power.'"

\* \* The Royal Commission was instituted to inquire into the housing of the poor. The question suggested by Dr. Gibson is obviously out of their purview.

**Memorial.**—Mr. W. C. May has executed a life-size marble bust of the late Canon Pearson, which is shortly to be placed in the Chapter Library at Windsor Castle.

#### THE HOUSING OF THE WINDSOR POOR.

SIR,—The report of the special commission of the *Lancet* on the homes of the Windsor poor appears in that journal of the 15th inst. It is, altogether, a most formidable indictment of things as they are in the slums of Windsor; and, moreover, entirely corroborates the report of the special commissioner of the *Builder* made some fourteen years ago. Thus the *Builder* and the *Lancet* are in complete and undesigned accord in condemning the state of many of the dwellings of the Windsor poor. Can nothing be done to compel the authorities to deliver our poor? In South-place in this town there are forty-two houses, with a population varying from 170 to 210. To these forty-two houses there are fourteen closets, all without water. Ten of these so-called houses have no "backs," no sink, no closet, no privy. There are in these ten houses just fifty people without the common decencies of life. They have thus to cross the street for all sanitary or insatiable purposes,—to beg, or "crib," or slish, accommodation from their neighbours' closets. The medical officer of health admits that this appalling and demoralising state of things exists, but adds, "I do not feel justified in condemning these houses as unfit for habitation." What, sir, outside Windsor, would be held to constitute "unfitness," if fifty people, by day and night, perpetually casting about for a closet, in not an outrage on morals and decency? Is there no way by which we can, at all events, purge ourselves of any seeming complicity with the official mind that "does not feel justified" in condemning such horrible "homes" as these.

ARTHUR ROBINS, M.A.,

Rector of Holy Trinity, Windsor.

August 17th, 1885.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

4,997. Ventilating Buildings, &c. T. Clayton. A vane made of a number of spiral plates forming compartments so as to resemble a double or treble pitched screw rotates in suitable bearings, and is fixed into a casing in the box of the ventilator. The end of the casing runs in a groove, formed in a circular rim. By means of a screw, lock nut, and collar the casing may be adjusted so as to easily run in the groove. The box is about half filled with water. The foul air enters through an opening communicating with the space to be ventilated, and being caught by the compartments of the vane which are out of the water is kept trapped until those compartments leave the water on the opposite side, when it is allowed to escape through an outlet. The vane may be made to work horizontally or vertically, and the water may be dispensed with, in which latter case the casing runs in a groove on the drawing-in side, and is made adjustable on that side.

5,277. Warming, Ventilating, and Disinfecting Hospitals. V. H. Dale.

Foul air is drawn off to main pipes in the ceiling by means of branch pipes opening to the ward or room, and passes by a flue to the extractor. Here the noxious germs in the air are destroyed by contact of the latter with metal tubes, through which hot air from the gas or from any gas-heater passes. A gas regulator maintains the temperature at a uniform point. The heated and purified air from the extractor is conducted by a pipe below the floor to the end of the ward and back again to an outlet shaft. Fresh air admitted by suitable inlets to an air-chamber or passage surrounding the heated pipe becomes warm and escapes to the room through branch pipes and gratings.

6,818. Picture-rod and other Hooks. E. Tonks.

The larger end of a double hook is bent over a picture, and the cord suspending the picture is passed over the lower hook. In order to prevent the upper hook from coming off the rod, a double-headed pin falls, or is pressed by a spring, across its mouth. Instead of at the extremity of the upper hook, the pin may go through the middle of the hook, or it may be dispensed with entirely, a bowed spring riveted to the middle of the hook serving the same purpose.

7,008. Earth-plate for Fencing Standards. T. Mailer.

The earth-plate has its opposite ends bent at right angles. Bands or strips are punched or stamped out; and between them and the middle strip lying at the back of the plate, the standard is placed and held by a pin.

7,395, and 7,397. Concrete. J. A. Jones.

These two patents both refer to the use of blast-furnace, or annealed slag and whinstone, which are ground, incorporated with Portland or other cement preferably in a mortar or pug mill, and moulded for use in paving or the like. The second specification has water added.

8,042. Picture-nail. R. Collard.

A removable head is built up of three pieces, viz., the ornamental front, the dish-shaped piece, which is attached to the front by sliding over the edge, and has a ledge to support the third piece, which is in the form of a disc. The first piece has opening cut in it to receive the stem of the nail, and the disc has a depression to bear against the head. The elasticity of these pieces securely holds the nail to the complex head.

10,144. Mosaics and Stained Glass. H. J. Belcher.

Pieces of glass or other mineral substances arranged on a table in the form of the desired design with spaces between all the pieces. A sheet of gummed asbestos is applied to the pieces, which are then removed adhering to the sheet, and a second sheet is caused to adhere to the other side. The sheets are then placed in frames, and molten metal poured in, which, when the metal is cool, unites the pieces together in the glass, and the asbestos may be heated before the metal is poured in. The sheets may be pressed into contact with the glass or other pieces, and grooves may be formed in the sheets to produce strengthening bars across the frame.

4,799. Folding Ladder Fire Escape. J. Imrie. The rungs are of wood, and fitted into eye-bolts, strips of girth-webbing, which, with the joint links, constitute the sides. The ladder is lowered from a window by a rope, and suspended from hooks permanently fixed to the wall of the chamber. It is kept clear of obstructions by a frame which folds outward.

5,881. Paving Blocks, Parquetry, &c. J. Rolfe. Glasgow.

Tiles or blocks of wood are grooved in their edges, and long slip fasteners are inserted in the grooves to connect the blocks together. The grooves run in one direction are in a different plane from the crossing them, so that the fasteners may pass over the blocks. The separate blocks are connected together to form slabs, the ends of some of the fasteners being left projecting to attach the slabs to one another.

6,359. Metallic Roofing Tiles. J. Mott, N. York.

The tiles or shingles are square, and are laid with one diagonal running in a vertical direction. They have a central hollow rib along the vertical diagonal, in which is a small slot near the point, and have two ribs near the corners parallel to the first, the lower portion of the latter ribs being cut away so that when the tiles overlap, a space is left through which to put a fastener. Hollow ribs are stamped in a body parallel to the sides, the two lower ones being larger than the others, in order to fit over the corresponding upper ones of the next lower course. The nail-holes are placed so that they are all covered by the overlap of the tiles in the course above. At the lower points of the tiles, a fastener extends under the two tiles beneath, and has projecting through the slot in the central rib a piece of metal which bent over to fasten down the point.

6,817. Fireplaces. H. Westman.

A shield is placed above the fire to regulate the draught. Its bottom corners rest upon the top of the forming the fuelia about which it swings. It is pulled forward and held in any position by a toothed quadrant, allowing the fire which would otherwise pass through the shield to escape through a narrow aperture left between the shield and the main jamb.

8,116. Imitation Wood. F. Thieme.

Sawdust, wood shavings, straw, or other lignaceous substances, are moistened with zinc chloride and then impregnated with basic magnesium chloride. The substance is afterwards pressed into moulds and dried. The resulting material may be worked like hard wood, takes a good polish, is not so burned, is impervious to water, and resists the action of weak alkalis and acids.

#### APPLICATIONS FOR LETTERS PATENT.

July 31.—9,171, W. Walker and others, Fluid-tight Joints for Pipes.—9,209, C. Rowlands, Improved Sawing Machine.—9,210, W. Frost, Window Sashes and Frames.—9,211, H. Gibbs, Improvement in Flushing Water-closets.—9,215, H. Doulton and J. Slater, Embossing and Decorating Window Grates &c.—9,221, W. Scott-Moncreiff, Rain-water Flushing Apparatus.—9,222, A. Fullicks, Moulding of Blocks and Slabs for Structural and Ornamental Purposes.

Aug. 1.—9,239, R. Stockman, Improvements in Water-meters.—9,244, A. Boulton, Machine Tool Working Slits.—9,251, R. B. Stove, Fire-grates &c.—9,252, R. Boyle, Ventilating Rooms.

Aug. 4.—9,276, R. Munn, Ventilator.—9,278, Stephenson, Coupling and Uncoupling Pipes.—9,297, B. Mills, Improved Joint for Pipes.

Aug. 5.—J. Denny, Soft Lock Tiles for Celling, &c.—9,353, J. Denny, Improved Disinfectant.

Aug. 6.—9,370, J. Wallis, Apparatus for Cutting or Excavating Drains, Trenches, and Ditches.—9,379, S. Furnival, Composite Moulds for Moulding Plastic Articles.—9,389, J. Day and T. Wright, Locks, Bolts, &c., for Doors, Shutters, &c.

Aug. 7.—9,403, W. Thompson, Improvements



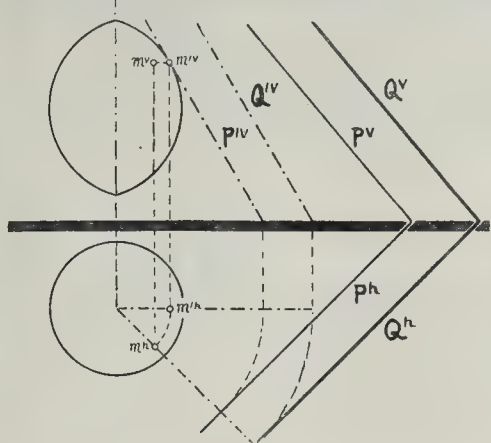


Fig. 144.

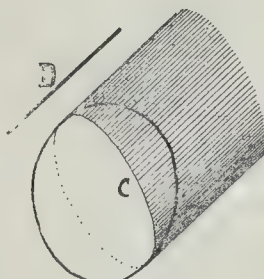


Fig. 146.

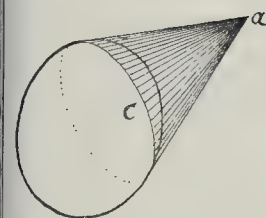


Fig. 145.

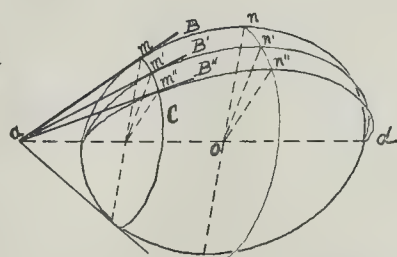


Fig. 147.

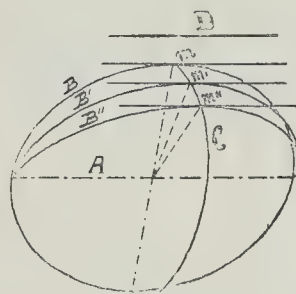


Fig. 148.

Shaping-machines.—9,410, G. Lowdon, Improvements in Locks.—9,413, W. Macrone, Improved Varnish or Size.—9,414, W. Macrone, Manufacture of Dry Colours.—9,417, J. Betts, Ventilation.—9,435, T. Jenkins and R. Perress, Improvements in Ventilators.

Aug. 8.—9,443, W. Fryer, New Spring Arrangement for Closing Doors, &c.—9,469, W. Macfarlane, Closets and Urinals.

Aug. 10.—9,494, J. Kent and E. Chahrel, Ascertaining Levels and Angles, &c., at a Glance.—9,519, C. Winn, Improvements in Water-closet Apparatus.—9,528, A. Gates, Improved Construction of Bakers' Ovens.

Aug. 11.—9,561, A. Wilkinson, Improved Construction of Ventilating Bricks.—9,577, W. Wise, Improved Lock.

PROVISIONAL SPECIFICATIONS ACCEPTED.

5,281, R. Wany, Fastenings for Window-sashes.—8,460, C. Watson, Fastenings for Window-sashes.—8,513, S. Rossett, Weather-bar for Doors and Windows.—8,533, R. Harrison, Attaching Door-knobs to Spindles and Doors.—6,783, R. Bateman, Ventilation of Public Offices, Rooms, &c.—7,250, J. Broadhurst, Improved Pottery Kiln or Oven.—8,309, A. Rockwell and F. Davis, Sash-fasteners.—8,375, W. Lane, Chimney-pot or Smoke Ventilator.—8,385, E. Roberts, Blower for Domestic Fire-grates.—8,737, W. Lake, Improved Paint or Pigments.—8,873, J. Kellott, Drawing-board and Set-square.—7,252, J. Anderson, General Cabinet-makers' and Automatic Dovetailing Machines.—7,434, W. Brewer, Window Fasteners.—7,780, H. Campbell, Bench Vices.—8,026, J. Coulter, Machinery for Dressing or Planing Stone, Marble, &c.—8,753, A. Cooner and T. Harbord, Improvements in Cooking Ranges or Stoves.—6,814, F. Bussard, Metallic Paints.—7,066, E. and G. Warburton, Panel Planing and Thicknessing Machines.—7,124, E. Marland, Securing the Tops of Houses or other Chimneys.—7,965, H. Wakefield and A. Thomas, Locks or Latches.—8,029, A. Harshorn, Sanitary Closet Pans, &c.—8,106, D. Miller, Cisterns for Flushing Water-closets.—8,269, J. Shanks, Improvements in Baths.—8,578, J. Banks, Door Checks.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

11,496, W. Russell, Improvements in Cooking and Kitchen Ranges, Stoves, or Grates.—12,614, R. Adams, Springs for Doors, and Checks for the Prevention of Slamming.—13,601, G. Noble, Appliances for Supplying Disinfecting Fluid to Water-closets and Urinals.—13,817, F. Turner, Improvements in Flushing Tanks or Cisterns.—15,335, T. Ellis, Im-

proved Domestic Ventilator.—7,699, H. Haddan, Improvements in Windows.—13,036, T. Lumley, Combination Street Lamp-post, Letter-box, and Fire Alarm.—13,523, W. Paulson, Ventilating Rooms and Preventing Smoke.—13,845, D. Cowan, Cooking Ranges.—13,867, A. Boulton, Manufacture of Paint.—15,266, A. Milne, Casement Stay for Securing French Casements and other Hinged Sashes.—12,019, W. Potts, Ventilating Apparatus.—12,761, C. Douglas, Locks and Latches and Adjusting and Securing Knobs and Handles to the Spindles of same.—13,472, H. Thompson, Construction of Stoves and Grates.—4,154, R. Best, Improvements in Chandeliers.—6,212, W. Mitford and G. Pottigrew, Joint for Water, Steam, Gas, Drain, or other Pipes.—7,125, R. Nisbet, Cooking Ranges.—13,350, J. Webb, Improvements in Kilns and Stoves.—13,477, J. Jex-Love, Apparatus for Dividing Timber.—14,010, H. Cooper, Manufacture of Portland Cement.—15,489, J. Fagan, Water-closet Cisterns.—7,938, A. Cram, Elbows for Stove Pipes.—8,088, J. Banks, Gully or Trap Grates.—8,365, C. Cowney, Closets, Urinals, &c.

The Student's Column.

DESCRIPTIVE GEOMETRY.—PART II.

XIII.

Find a plane, P, tangent to a surface of revolution, and parallel to a plane, Q, given, and mark the point where the plane P is tangent.

**M**E rotate the plane Q round the axis of the surface of revolution until the plane be perpendicular to the elevation; then we draw P<sup>h</sup> parallel to Q<sup>h</sup>, mark the point of tangency, m<sup>h</sup>, and rotate back so as to get m<sup>a</sup> and m<sup>v</sup>. (See fig. 144.)

Find a plane, P, tangent to a curved surface, either through a point a outside, or parallel to a line D, and mark the point, m, where the plane P is tangent.

We have already seen that to cylinders and cones there are always two planes, P, tangent, either through a point outside their surface or in a direction parallel to a given line, such as a ray of the sun's light; but with curved surfaces, such as spheres, surfaces of revolution in general, ellipsoids, &c., there are an infinite number of planes, P, tangent to their surface, as can be seen by our perspective sketches. (See

figures 145 and 146.) In fig. 145, we see that through a point, a, exterior to the surface we can draw an infinite number of tangents to the surface, which, taken together, form a cone, of which the point a is the apex. Through every generator of that cone we can take a plane P, which will be at once both tangent to the cone and to the surface which the cone circumscribes. In fig. 146, where the planes P are required to be parallel to a given line, D, they would be tangent to a cylinder parallel to D, which circumscribes the surface; and again there are an infinite number of planes P tangent to a cylinder. In fact, both problems are identical, for the cylinder is, as we have said before, but a cone, the apex of which is infinitely distant.

There is a general method applicable to all surfaces for producing a plane, P, tangent to their surface and passing through a point a or parallel to a line D. Through the point a we take a number of planes which cut the surface and find the intersections B of these planes with the surface; then from a we draw tangents such as a m to the curves B; the series of points of contact m will form a line of contact C, along which the cone touches the surface; any plane containing a tangent to the curve C, and a generator of the cone will, of course, be one of the planes P required (see fig. 147). The same system applies when the planes P are required to be parallel to a line D. It suffices to take through the surface a line A parallel to D, and there all the planes passing through the line A will be parallel to D; to the section curves B we shall take parallels to A, and the curve of contact C will be that of a circumscribed cylinder. (See fig. 148.)

These curves of contact C are of great importance to us, for they form the limit between light and shade,—in the one case, when objects are lighted by a candle; in the other case, when lighted by the sun's rays.

There is another important property of the curve of contact C, to which we beg to call the attention of the reader. The curve C is the outline of the surface seen in perspective when the eye of the spectator is placed in the point a, as in fig. 145.

### RECENT SALES OF PROPERTY. ESTATE EXCHANGE REPORT.

| AUG. 10.                                                                                                           |        |  |
|--------------------------------------------------------------------------------------------------------------------|--------|--|
| By T. CRANTHIPS.                                                                                                   |        |  |
| Chadwell, Essex—"Whalebone House," and 15 a., freehold                                                             | £4,950 |  |
| By WATTEBALL & GREEN.                                                                                              |        |  |
| East Tilbury—The rent charges of £388 a year ...                                                                   | 5,700  |  |
| "The Rectory House," and 3 a. 2r. 2p., freehold                                                                    | 1,900  |  |
| "The Gravel Pit Farm," containing 42a. 2r. 23p.                                                                    | 1,050  |  |
| "Tilbury House," 17a. 3r. 19p. freehold                                                                            | 1,250  |  |
| Numerous enclosures of land, 129a. 0r. 37p., in seventeen lots                                                     | 4,627  |  |
| By OFFIN & CO.                                                                                                     |        |  |
| Westminster Bridge-road—21, Tower-street, 49 years, no ground-rent                                                 | 200    |  |
| By J. LEWIS & CO.                                                                                                  |        |  |
| Mid-End—24, Edward-street, 79 years, ground-rent 4s. 10s.                                                          | 380    |  |
| Woodwich—4 and 6, Clarendon-cottages, 48 years, ground-rent 6s. 6s.                                                | 300    |  |
| West Ham—78 to 84 even, Clarkson-street, 75 years, ground-rent 11s. 6s.                                            | 430    |  |
| Mid-End—19, Paterson-street, 12 years, ground-rent 4s.                                                             | 110    |  |
| Buckhurst-hill—1 to 4, Durham-villas, 80 years, ground-rent 2s.                                                    | 800    |  |
| By W. DROGOW.                                                                                                      |        |  |
| Lingfield, near—Four enclosures of land, 15a. 3r. 23p. freehold                                                    | 1,080  |  |
| Three freehold cottages                                                                                            | 200    |  |
| AUG. 11.                                                                                                           |        |  |
| By RALE & SONS.                                                                                                    |        |  |
| Berley-heath—Four freehold cottages, and 2a. 0r. 25p.                                                              | 1,775  |  |
| By DENEHAM, TAYLOR, & CO.                                                                                          |        |  |
| St. James's—42, King-street, freehold, area 2,566 ft. St. John's Wood—90, Carlton-hill, 60 years, ground-rent 35s. | 9,350  |  |
| Warham, Sussex—"Cider Mill Farm," 29a. 1r. 39p., freehold                                                          | 4,100  |  |
| Kentish Town—57, Bartholomew-road, 73 years, no ground-rent                                                        | 810    |  |
| By ROGERS, CHAPMAN, & THOMAS.                                                                                      |        |  |
| Old Kent-road—39, Commercial-road, 23 years, ground-rent 4s.                                                       | 285    |  |
| By BRAM, BURNETT, & EDWARDS.                                                                                       |        |  |
| Shortlands, Kent—"The freehold residence, 'Comingly'"                                                              | 1,430  |  |
| By PHILLIPS, LEE, & DAVIES.                                                                                        |        |  |
| Forest-gate—73, Odessa-road, 68 years, ground-rent 2s. 10s.                                                        | 145    |  |
| AUG. 13.                                                                                                           |        |  |
| By INMAN, SALER, & HARRINGTON.                                                                                     |        |  |
| Rotherhithe—161 and 163, Abbeyfield-road, 69 years, ground-rent 1s.                                                | 790    |  |
| By NEWSON & HARDING.                                                                                               |        |  |
| St. Giles's—23, Denmark-street, freehold                                                                           | 1,740  |  |
| Upper Holloway—207, Junction-road, 70 years, ground-rent 6s.                                                       | 570    |  |
| Islington—16 to 22 even, Barnsbury-street, freehold                                                                | 2,610  |  |
| By BRADSHAW BROWN.                                                                                                 |        |  |
| Loughton—Copyhold residence in Victoria-place                                                                      | 400    |  |
| Bow—1 to 8, Denbigh-terrace, freehold                                                                              | 2,000  |  |
| Upper Holloway—100 to 112 even, Bruce-road, 76 years, ground-rent 24s. 9s.                                         | 700    |  |
| No. 1 to 5, Railway-cottages, 76 years, ground-rent 17s. 15s.                                                      | 630    |  |
| Old Ford-road—43, 45s. and 47, and 1, Autumn-street, freehold                                                      | 740    |  |
| Poplar—1, Pennyfields, freehold                                                                                    | 280    |  |
| Millwall—51, West Ferry-road, 68 years, ground-rent 6s. 10s.                                                       | 380    |  |
| No. 209, West Ferry-road, 26 years, ground-rent 2s. 10s.                                                           | 280    |  |
| By VENTRO, BULL, & COOPER.                                                                                         |        |  |
| Clapham—91 and 93, High-street, freehold                                                                           | 12,900 |  |
| Borough—147, High-street, freehold                                                                                 | 4,000  |  |
| By E. STRIMON.                                                                                                     |        |  |
| Brixton—30 to 39, Ralston-road, 81 years, ground-rent 20s.                                                         | 1,006  |  |
| Wandsworth, Point Pleasant—Two houses, 63 years, ground-rent 20s.                                                  | 200    |  |
| Battersea—Ground-rents of 151. 12s., reversion in 42 years                                                         | 350    |  |
| Lambeth—1 and 3, Little Paris-street, and ground-rents of 162. 10s., 14 years, ground-rent 30s.                    | 255    |  |
| Canterbury—30, Leipsic-road, 19 years, ground-rent 4s.                                                             | 275    |  |
| By C. C. & T. MOORE.                                                                                               |        |  |
| Limehouse—47, Salmon's-lane, freehold                                                                              | 310    |  |
| Old Ford—106, St. Stephen's-road, freehold                                                                         | 910    |  |
| Bromley-by-Bow—68 and 69, Tilly-street, 67 years, ground-rent 4s. 6s.                                              | 570    |  |
| South Hornsey—8 and 10, Cowper-road, freehold                                                                      | 385    |  |
| By WILKINSON & SON.                                                                                                |        |  |
| Brighton—18 and 19, Clifton-road, freehold                                                                         | 1,450  |  |
| AUG. 14.                                                                                                           |        |  |
| By NORTON, TRIST, WATNEY, & CO.                                                                                    |        |  |
| Maids-head—7, Warwick-road, 63 years, ground-rent 12s.                                                             | 1,000  |  |
| By BAKER & SONS.                                                                                                   |        |  |
| High Barnet—The Corn Exchange, freehold                                                                            | 2,210  |  |

### Miscellaneous.

**Public Baths at Bootle, near Liverpool.** The Bootle Town Council on the 12th inst., adopted the recommendation of the Health Committee to award the first premium of 50l. for designs for their new baths to Mr. George Heaton, of Wigan,—motto, "Greater Bootle"; the second prize of 25l. to Mr. Samuel Jackson, of Bradford,—motto, "Choice A"; and the third prize of 10l. to Messrs. Smith, Woodhouse, & Chadwick, of Manchester,—motto, "Within the Limits." The estimated cost is 9,000l.

**Incrustations on Bronze Statues.**—Certain bronze monuments in Germany have not only failed to develop a patina, but have been much disfigured by the appearance of stains. With a view to elucidate the sources of this disease of bronze, Professor Kaemmerer lately made a series of experiments upon statues which had marred the effect of the statues of Albert Dürer and Hans Sachs, at Nuremberg, of which the composition is as follows:—

|         | Dürer. | Sachs. |
|---------|--------|--------|
| Copper  | 88.43  | 88.93  |
| Lead    | 4.72   | 4.79   |
| Arsenic | .86    | .76    |
| Iron    | .80    | .69    |
| Tin     | 5.31   | 2.39   |
| Zinc    | .11    | 2.62   |

The results obtained disprove the assertion that zinc has an important part in the formation of such black incrustations, the statue of Dürer presenting more stains than the other. The normal components of bronze form but a slight proportion in these stains, which principally consist of foreign substances deposited on the surface of the bronze by wind, rain, smoke, and by birds. Amongst these substances are quartz, sand, clay, charcoal, sulphur, carbonic acid, water, ammonia, calcium, magnesium, iron, &c. After many trials cyanide of potassium was found the best dissolver, the limited duration of its application and the subsequent washing preventing the corrosion of the metal underneath. It is incidentally remarked by the *Chemiker Zeitung* that the formation of patina is more dependent upon regularity and fineness of grain than upon the exact composition of the metal itself. Hence the mode of casting and the preparation of the moulds are points calling for particular attention in the creation of bronze statues.

**The First Railway in America.**—In a paper recently read before the Franklin Institute, on "Transportation Facilities of the Past and Present," Mr. Barnet Le Van corrects the commonly-received statement that the Granite Railroad, built at Quincy, Massachusetts, in 1827, by Gridley Bryant, for transporting stone for the Bunker-hill monument from the granite quarries of Quincy, was the first railway built in the United States. He presents evidence which proves that, far from being the first, the Granite Railroad was really only the fourth in order of precedence in the United States. The author, in dealing with this subject, states:—"Railroads were also first introduced in Pennsylvania. In September, 1809, the first experimental track in the United States was laid out by John Thomson (the father of John Edgar Thomson, who was afterwards the president of the Pennsylvania Railroad Company), civil engineer, of Delaware County, Pennsylvania, and constructed under his direction, by Somerville, a Scotch Millwright, for Thomas Leiper, of Philadelphia. It was 60 yards (180 ft.) in length, and graded 14 in. to the yard. The gauge was 4 ft., and the sleepers were 8 ft. apart. The experiment with a loaded car was so successful that Leiper in the same year caused the first practical railroad in the United States to be constructed for the transportation of stone from his quarries on Crum Creek to his landing on Ridley Creek, in Delaware County, Pennsylvania, a distance of about one mile. It continued in use for nineteen years. Some of the original foundations, consisting of rock in which holes were drilled and afterwards plugged with wood to receive the spikes for holding the sleepers in place, may be seen to this day.—*Iron.*

**Newport (Mon.).**—New Board schools at Crumlin have been opened for the use of 330 children, arranged in two departments, with master's house attached. Great difficulty was experienced in getting solid foundations to the schools and to the walls to the playgrounds, owing to the site being the bed of a former river, a large quantity of bog and slurry having to be excavated and carted away, to allow the foundations being taken to a solid stratum. The whole of the works have been carried out by Mr. Henry Parfitt, builder, of Pontnewydd, for the sum of 2,800l., under the supervision of Mr. E. A. Lansdowne, of Newport, Mr. Ellis Williams, of Newbridge, acting as clerk of works.

**Diocesan Surveyorship, York.**—Mr. John W. Alexander, architect, Middlesbrough, was on the 13th inst. elected a surveyor under the Ecclesiastical Dilapidations Act, 1871, for the diocese of York, in place of Mr. Armfield, resigned.

**Cae-Gurwen, Carmarthenshire.**—The foundation stone of a Mission Church at the above place, to accommodate 200 worshippers, was laid on the 12th inst. by the Rt. Hon. Lady Dynevor. The building consists of nave, chancel, north vestry, and south porch. The walls will be of local stone, plastered inside. The seats will be placed upon wooden platforms, and the nave, passages, porch, and chancel, floored with Webb's Worcester encaustic tiles. The building will be heated by one of Porritt's underground stoves. The builder is Mr. O. Edwards, of Locomotive, and the architect, Mr. E. H. Lingner-Barker, of Hereford.

**Royal Exchange Assurance Building.**—Messrs. Chubb & Sons ask us to mention that the safes indicated in the plan of this building, published last week, were made by them especially for the building.

**Fire-bricks, &c.**—Messrs. Goodman & Co., of Cumberland Wharf, E., have opened City offices at 72, Bishopsgate, E.C., where samples may be seen of fire-bricks, glazed bricks, blue bricks, drain-pipes, &c.

### PRICES CURRENT OF MATERIALS.

| TIMBER.                                    |          | £. s. d. | £. s. d. |
|--------------------------------------------|----------|----------|----------|
| Greenheart, B.G.                           | ton      | 6 10 0   | 7 10 0   |
| Teak, E.I.                                 | load     | 12 10 0  | 15 10 0  |
| Sesuvium, U.S.                             | cube     | 3 0 0    | 3 0 0    |
| Ash, Canada                                | load     | 3 0 0    | 5 0 0    |
| Birch                                      | "        | 3 0 0    | 4 10 0   |
| Pin                                        | "        | 3 10 0   | 5 0 0    |
| Fir, Dantsic                               | "        | 10 0 0   | 10 0 0   |
| Oak                                        | "        | 3 0 0    | 5 0 0    |
| Canada                                     | "        | 6 0 0    | 7 0 0    |
| Pine                                       | "        | 7 0 0    | 17 0 0   |
| " Yellow                                   | "        | 3 15 0   | 5 5 0    |
| Lath, Dantsic                              | fathom   | 5 0 0    | 6 0 0    |
| St. Petersburg                             | "        | 5 0 0    | 7 0 0    |
| Wainscot                                   | "        | 7 0 0    | 10 0 0   |
| Deal, Finland, 2nd and 3rd                 | std. 100 | 8 0 0    | 9 0 0    |
| Riga                                       | "        | 6 10 0   | 7 10 0   |
| St. Petersburg                             | "        | 10 0 0   | 17 0 0   |
| " 2nd                                      | "        | 8 0 0    | 9 15 0   |
| " white                                    | "        | 6 10 0   | 11 0 0   |
| Sweden                                     | "        | 7 0 0    | 17 0 0   |
| White Sea                                  | "        | 8 10 0   | 19 0 0   |
| Canada, Pine lat                           | "        | 18 0 0   | 32 10 0  |
| " 2nd                                      | "        | 12 0 0   | 18 10 0  |
| " 3rd & 4th                                | "        | 7 0 0    | 10 0 0   |
| " Spruce lat                               | "        | 9 0 0    | 12 0 0   |
| " 3rd and 2nd                              | "        | 6 10 0   | 8 0 0    |
| New Brunswick, &c.                         | "        | 5 0 0    | 7 10 0   |
| Battens, all kinds                         | "        | 6 0 0    | 13 0 0   |
| Flooring Boards, sq. 1 in.—Prepared, first | "        | 0 9 0    | 0 13 0   |
| Second                                     | "        | 0 8 0    | 0 12 0   |
| Other qualities                            | "        | 0 5 0    | 0 7 0    |
| Cedar, Cuba                                | foot     | 0 0 3    | 0 0 4    |
| Honduras, &c.                              | "        | 0 0 3    | 0 0 4    |
| Australia                                  | "        | 0 0 3    | 0 0 4    |
| Mahogany, Cuba                             | "        | 0 0 5    | 0 0 7    |
| St. Domingo cargo av.                      | "        | 0 0 5    | 0 0 7    |
| Mexican                                    | "        | 0 0 5    | 0 0 7    |
| Tobacco                                    | "        | 0 0 4    | 0 0 6    |
| Honduras                                   | "        | 0 0 4    | 0 0 6    |
| Rosa, Rio                                  | ton      | 7 0 0    | 17 0 0   |
| St. Domingo                                | "        | 26 0 0   | 40 0 0   |
| Satin, St. Domingo                         | "        | 0 0 8    | 0 1 0    |
| Porto Rico                                 | "        | 0 0 8    | 0 1 3    |
| Walnut, Italian                            | "        | 0 0 4    | 0 0 5    |

### METALS.

|                            |     |         |         |
|----------------------------|-----|---------|---------|
| Iron—Pig in Scotland       | ton | 2 1 6   | 0 0 0   |
| Bar, Welsh, in London      | "   | 4 15 0  | 5 2 6   |
| " 4 15 sale                | "   | 4 15 0  | 5 2 6   |
| " Staffordshire, in London | "   | 6 0 0   | 7 0 0   |
| Sheets, single, in London  | "   | 7 10 0  | 9 0 0   |
| Hoops                      | "   | 6 10 0  | 7 10 0  |
| Rail-roads                 | "   | 6 0 0   | 7 0 0   |
| COPPER.                    |     |         |         |
| British, cke. and ingot    | ton | 47 0 0  | 48 0 0  |
| Best selected              | "   | 48 0 0  | 49 0 0  |
| Sheets, strong             | "   | 63 10 0 | 63 0 0  |
| Australian, fine cash      | "   | 54 10 0 | 56 0 0  |
| Chili, bare                | "   | 43 10 0 | 44 0 0  |
| Australia                  | "   | 0 0 4   | 0 0 4   |
| YELLOW METALS.             |     |         |         |
| LEAD—Pig, Spanish          | "   | 11 15 0 | 0 0 0   |
| English, com. brands       | "   | 12 5 0  | 0 0 0   |
| SILVER.                    |     |         |         |
| Silican, special           | ton | 14 0 0  | 14 0 0  |
| Ordinary brands            | "   | 14 0 0  | 0 0 0   |
| TIN.                       |     |         |         |
| Straits                    | "   | 90 2 6  | 90 12 6 |
| Australian                 | "   | 90 2 6  | 90 12 6 |
| English Ingots             | "   | 93 0 0  | 0 0 0   |
| TINPLATES.                 |     |         |         |
| IC coke                    | box | 14 6 0  | 16 6 0  |
| IX ditto                   | "   | 21 0 0  | 25 0 0  |
| IC charcoal                | "   | 26 10 0 | 26 0 0  |
| IX ditto                   | "   | 26 0 0  | 27 0 0  |

### OILS.

|                     |      |         |         |
|---------------------|------|---------|---------|
| Linseed             | ton  | 23 10 0 | 23 17 6 |
| Cocoonut, Cochiti   | "    | 32 0 0  | 0 0 0   |
| Ceylon              | "    | 27 0 0  | 0 0 0   |
| Copra               | "    | 26 0 0  | 26 10 0 |
| Palm, Lagos         | "    | 29 10 0 | 30 0 0  |
| Palm-ut Kernel      | "    | 28 10 0 | 0 0 0   |
| Rapeseed, English   | "    | 26 10 0 | 26 0 0  |
| " brown             | "    | 24 0 0  | 0 0 0   |
| Cottonseed, refined | "    | 22 10 0 | 24 0 0  |
| Tallow and Oleum    | "    | 25 0 0  | 45 0 0  |
| Lubricating, U.S.   | "    | 7 0 0   | 10 0 0  |
| " Refined           | "    | 8 0 0   | 15 0 0  |
| TURPENTINE.         |      |         |         |
| American, in cks.   | cwt. | 1 6 6   | 1 6 6   |
| Swedish             | "    | 1 2 0   | 1 2 0   |
| Archangel           | "    | 0 13 0  | 0 13 6  |



# COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITIONS.

| Nature of Work.                                           | By whom required.        | Premium. | Designs to be delivered. | Page. |
|-----------------------------------------------------------|--------------------------|----------|--------------------------|-------|
| Designing of "Harold Tower" Grounds, Douglas, Isle of Man | Owners of "Harold Tower" | 25l      | August 31st              | i.    |

## CONTRACTS.

| Nature of Work, or Materials.                | By whom required.      | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page.  |
|----------------------------------------------|------------------------|-----------------------------------|--------------------------|--------|
| Painting, Tarring, &c., Bedford              | War Department         | Official                          | August 28th              | ii.    |
| Military Improvements                        | Windsor Ryl. Infantry  | do                                | do                       | xviii. |
| Police Station, Wexford                      | Metro. Police District | Official                          | August 29th              | ii.    |
| Whaler Tank                                  | Oxford Gas & Coke Co.  | T. & C. Hawkey                    | do                       | ii.    |
| Market Hall, Shops, and Dwelling-houses, &c. | Hull Corporation       | W. A. Gelder                      | August 31st              | ii.    |
| Wagon, Granite                               | Graveland U. S. A.     | Official                          | do                       | ii.    |
| Emigrated-Iron Sorting Office                | Com. of H.M. Works     | do                                | do                       | ii.    |
| Block of Buildings. (3.) Making-up           | Wandsworth Bd. of Wks  | do                                | Sept. 1st                | ii.    |
| And Roads                                    | Admiralty              | do                                | Sept. 4th                | ii.    |
| And Battery, Drill Shed, &c.                 | Covey Corporation      | J. C. Mellis                      | Sept. 6th                | xviii. |
| Largement, &c., of Sewage-Purification Works | E. Moseon, Jun.        | do                                | Sept. 8th                | ii.    |
| House and Shop, Kilburn                      |                        |                                   |                          |        |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised.   | Salary.       | Applications to be in. | Page. |
|------------------------|-----------------------|---------------|------------------------|-------|
| Inspector of Nuisances | Wandsworth Bd. of Wks | 100l. 4s. &c. | Sept. 6th              | xvi.  |

## TENDERS.

**ASHBY-DE-LA-ZOUCH.**—For restoring, re-seating, and ventilating Holy Trinity Church, Ashby-de-Zouch, including hot-water apparatus and fittings. Mr. T. Hampton, architect, Loughborough. Quantities by Mr. Robey E. Carpenter, Burton-on-Trent:—  
 Messenger, Loughborough ..... £1,500 0 0  
 Stevenson, Burton ..... 1,350 0 0  
 Noon & Son, Hilton ..... 1,325 0 0  
 Lowe & Sons, Burton ..... 1,258 6 0  
 Fish, Ashby ..... 1,189 11 0  
 Harvey, Newhall ..... 1,104 3 0  
 Black, Barrow ..... 1,074 0 0  
 Needham, Loughborough ..... 1,031 13 6  
 \* Accepted, subject to reductions.

**BROCKLEY.**—For the erection of a residence for Capt. Harvey, Mr. Richard Peters, architect, Wool Exchange, Coleman-street.  
 Richardson Bros. .... £1,688 0 0  
 Savers ..... 1,675 0 0  
 Watson ..... 1,350 0 0  
 Kemp ..... 1,350 0 0

**BROMLEY-BY-BOW.**—For painting and decorative repairs to the Vestry-hall, Bow-road, for the Churchwardens and Overseers. Messrs. A. & C. Harston, architects, 15, Leadenhall-street. Quantities not supplied:—  
 Brown, Kruse, & Co. .... 2,650 0 0  
 Cocks & Co., Fredrick's-place, Mile End (accepted) ..... 625 0 0

**BROMLEY-BY-BOW.**—For erecting new mineral water manufactory, stabling, and offices, to be called "The Priory team Works." Priory-street, Bromley, for Mr. T. R. Watts. Mr. G. T. Tribe, architect. Quantities by Mr. James F. Wesley:—  
 Gentry ..... £2,980 0 0  
 Curtis & Sons ..... 2,895 0 0  
 Taylor ..... 2,750 0 0  
 Sharnum (too late) ..... 2,754 0 0  
 Everard ..... 2,722 0 0  
 Hughes ..... 2,701 0 0  
 Walker ..... 2,700 0 0  
 Athert & Latta ..... 2,699 0 0  
 Holland ..... 2,693 0 0  
 Harris & Wardrop ..... 2,690 0 0  
 J. H. Johnson ..... 2,631 0 0  
 Perry & Co. .... 2,698 0 0  
 Palmer & Co. .... 2,663 0 0  
 Barnes ..... 2,492 0 0

**COLCHESTER.**—For offices in Crouch-street, Colchester, for Mr. E. J. Sanders. Mr. F. E. Morris, architect:—  
 G. Dobson ..... £283 0 0  
 C. H. Oldridge ..... 273 0 0  
 H. Everett & Son ..... 269 0 0  
 F. Dupont (accepted) ..... 235 0 0  
 [All of Colchester.]

**COLCHESTER.**—For converting private house into coach street, Colchester, into two shops, for Mr. D. Prior. Mr. Horace Darlin, architect:—  
 G. Dobson ..... £230 0 0  
 F. Dupont ..... 235 0 0  
 C. H. Oldridge (accepted) ..... 215 0 0  
 [All of Colchester.]

**DARTMOUTH.**—For alterations and repairs to present Clarence-street, Dartmouth, for Mrs. Ladd. Mr. H. Back, architect, Dartmouth. Quantities supplied:—  
 B. Williams ..... £242 0 0  
 H. Winsor ..... 237 0 0  
 E. J. Henley (accepted) ..... 210 0 0  
 [All of Dartmouth.]

**DARTMOUTH.**—For alterations and repairs to premises, Bayard's Cove, Dartmouth, for Miss Stone. Mr. E. H. Back, architect, Dartmouth:—  
 E. J. Henley ..... £78 0 0  
 F. Mander ..... 65 0 0  
 H. Winsor ..... 58 0 0  
 [All of Dartmouth.]

**DARTMOUTH.**—For alterations to the Guildhall, Dartmouth, for the Town Council. Mr. E. H. Back, Borough surveyor. Quantities supplied:—  
 H. Veale ..... £143 10 0  
 H. Winsor ..... 143 15 0  
 [Both of Dartmouth.]  
 [Surveyor's estimate £146 15s. 8d.]

**DARENTH (Kent).**—For repairs to oak fencing round the estate belonging to the Managers of the Metropolitan Asylum District. Messrs. A. & C. Harston, architects, 16, Leadenhall-street. Quantities not supplied:—  
 Barnes & Co. .... £234 0 0  
 S. Riches ..... 274 10 0  
 Beale Bros. .... 184 0 0  
 W. H. Martin ..... 173 13 0  
 J. Wood ..... 165 0 0  
 J. O. Curtis ..... 144 5 8  
 M. Marshall ..... 140 0 0  
 A. Cook ..... 114 0 0  
 G. Law, 112, Week-street, Maidstone\* 59 0 0  
 \* Accepted.

**DARENTH (Kent).**—For painting and other works at the Asylum for Imbeciles, Darenth, Kent, for the Managers of the Metropolitan Asylum District. Messrs. A. & C. Harston, architects, 16, Leadenhall-street. Quantities not supplied:—  
 E. P. Palmer ..... £327 0 0  
 W. Dudley ..... 270 0 0  
 E. Proctor, Wellington-street, Woolwich (accepted) ..... 260 0 0

**FOREST-HILL.**—For additions and alterations to Tewkesbury Lodge, Forest-hill, for Mr. A. Richards. Mr. Frank T. Baggsley, architect. Quantities by Mr. Edwin Pink:—  
 T. Roberts ..... £3,520 0 0  
 E. L. Wood ..... 3,380 0 0  
 J. & C. Boyver ..... 3,183 0 0  
 Redman ..... 3,075 0 0  
 Candler ..... 3,030 0 0  
 J. C. Arnard & Son ..... 2,998 0 0

**HANWELL.**—For building pigeries at the Central London District School, Hanwell, for the Board of Management. Mr. Arthur G. Langdon, architect, Craven-street:—  
 T. Riches ..... £289 0 0  
 T. Lingfield ..... 509 0 0  
 J. W. Cowland ..... 444 12 0  
 G. Gibson ..... 384 0 0  
 H. Haynes ..... 370 0 0  
 A. & E. Addis ..... 350 0 0  
 Nene & Neave ..... 314 0 0  
 T. Nye ..... 318 15 0  
 W. Brown ..... 330 0 0  
 A. Chissold ..... 310 0 0  
 \* Accepted, subject to references proving satisfactory.

**HORNSEY.**—For the making-up of Harold-road, Hornsey, for the Hornsey Local Board. Mr. T. De Courcy-Meade, engineer and surveyor:—  
 Williamson, Grace Lane ..... £210 0 0  
 Dunmore, Crouch End ..... 169 0 0  
 Heard, Hoxton ..... 161 0 0  
 Nicholls, Wood Green ..... 151 0 0  
 Aspinall & Son, Hoxton ..... 150 0 0  
 Jackson & Son, Finsbury-park ..... 145 0 0  
 Marshall, Brighton ..... 114 0 0  
 Flizey, Hornsey ..... 113 0 0  
 Mowden & Co., Westminster ..... 134 0 0  
 A. Walker, Upper Holloway ..... 129 0 0  
 \* Accepted.

**HENLEY.**—For the execution of sewerage works on the Shone Hydro-pneumatic System, at Henley. Mr. Isaac Shone, engineer, Westminster-chambers, London:—  
 Contracts Nos. 1, 2, and 4.—Sewers, Iron Mains, and Buildings.

|                                  |             |
|----------------------------------|-------------|
| J. Jackson, Westminster          | £10,487 5 7 |
| G. Munday & Son, London          | 10,252 10 3 |
| W. J. Butterill, London          | 8,923 0 0   |
| Beale Bros., Epsom               | 9,508 16 7  |
| H. Young & Co., Fimble           | 9,434 0 0   |
| H. R. Trehearne & Co., Battersea | 9,234 0 0   |
| G. Gibson, Southall              | 9,187 17 11 |
| W. Neave & Son, Paddington       | 9,075 0 8   |
| J. W. & J. Neave, Leytonstone    | 8,929 17 3  |
| S. & E. Collier, Reading         | 8,590 3 1   |
| G. Bell, Tottenham               | 8,417 19 3  |
| J. W. Pickett, Southampton       | 8,427 0 10  |
| T. D. Ridley, Harwich (accepted) | 8,253 1 0   |
| B. Cooke & Co., Battersea        | 7,781 13 0  |

|                                              |            |
|----------------------------------------------|------------|
| Contract No. 3.—Air-compressing Machinery.   |            |
| H. R. Trehearne & Co., Battersea             | £3,435 0 0 |
| H. Young & Co., Fimble                       | 3,468 0 0  |
| J. Warner & Sons, London                     | 3,400 0 0  |
| G. Scott & Son, London                       | 3,318 0 0  |
| W. Waller Bros., Wigan                       | 3,290 0 0  |
| Warson & Hill, Nottingham                    | 3,062 0 0  |
| G. Waller & Co., London                      | 3,010 0 0  |
| E. Thompson, Leeds                           | 2,937 15 0 |
| Causey, Smith, & Co., Birmingham             | 2,964 0 0  |
| J. Sles & Co., Barlastown, Lancashire        | 2,670 0 0  |
| Thornhill & Warham, Burton-on-Trent          | 2,565 0 0  |
| F. Silvester & Co., Newcastle, Staffordshire | 2,370 0 0  |
| Colbrookdale Co., Shropshire                 | 2,256 0 0  |
| John Fowler & Co., Leeds                     | 2,217 0 0  |
| Pearce Bros., Dundee                         | 2,200 0 0  |
| W. & J. Yates, Blackburn                     | 2,173 0 0  |
| Grange Iron Co., Durham                      | 2,076 0 0  |
| Hartley & Arnoux Bros., Stoke-on-Trent       | 2,070 9 6  |
| Galvey, Bainbridge, & Co., Warington         | 2,064 0 0  |
| Hughes & Lancaster, Chester                  | 2,053 0 0  |
| G. Kirk & Co., Stoke-on-Trent                | 2,021 0 0  |
| Franchitt Bros., Carlisle                    | 1,997 0 0  |
| J. Wolstenholme, Radcliffe, Lancashire       | 1,935 0 0  |

\* Accepted.

**HULL.**—For the erection of warehouse buildings between High-street and the River Hull, for Messrs. John Hilton & Co., Messrs. Butterill, Son, & Eison, architects. Quantities by the architects:—

|                                   |             |
|-----------------------------------|-------------|
| T. D. Ridley, Middlesbrough       | £29,939 5 3 |
| H. Grassby, Hull                  | 27,155 14 9 |
| J. T. Skinner, Hull               | 26,589 5 0  |
| J. & W. Bealand, Bradford         | 26,471 0 0  |
| J. Drury, Hull                    | 26,248 0 0  |
| M. Harper, Hull                   | 25,910 0 0  |
| Armitage & Hodgson, Leeds         | 25,925 0 0  |
| A. Jackson & Son, Hull (accepted) | 23,250 0 0  |
| A. V. Stanley, Hull (withdrawn)   | 22,593 10 0 |
| B. Muegrave, Hull (withdrawn)     | 22,534 0 0  |

For Cast-iron Columns for the same Buildings.

|                                    |            |
|------------------------------------|------------|
| T. D. Ridley, Middlesbrough        | £4,705 0 0 |
| J. Allot & Co., Gateshead          | 4,357 10 1 |
| A. Handyside & Co., Derby          | 4,307 13 0 |
| T. & W. Bradley, Newark            | 3,776 0 0  |
| J. Butler, Stanningley, Leeds      | 3,768 10 0 |
| York Engineering Co., York         | 3,719 5 0  |
| Newton, Chambers, & Co., Sheffield | 3,550 11 0 |
| King & Co., Hull (accepted)        | 3,597 14 0 |

**KENSINGTON.**—For the erection of a new chapel at the Mall, Kensington, for the Trustees. Messrs. T. Chatfield Clarke & Son, architects. Quantities by Messrs. Leonard & Clarke:—

|                      | A.*     | B.†    | C.‡   |
|----------------------|---------|--------|-------|
| Mowlem & Co.         | £13,693 | 21,892 | 2,888 |
| Peto Bros.           | 13,393  | 2,189  | 1,086 |
| Clarke & Bracey      | 12,997  | 1,629  | 825   |
| Holland & Hansen     | 12,900  | 1,410  | 925   |
| Dove Bros.           | 12,800  | 1,713  | 866   |
| Brown, Son, & Bloom  | 12,600  | 2,351  | 820   |
| E. Lawrence & Sons   | 12,469  | 1,487  | 809   |
| J. Morter            | 12,339  | 1,613  | 537   |
| B. E. Nightingale    | 12,275  | 1,668  | 854   |
| Bywaters             | 11,980  | 2,241  | 1,170 |
| Colls & Sons         | 11,620  | 1,705  | 689   |
| Hall, Beddall, & Co. | 11,497  | 1,747  | 814   |
| J. T. Chappell       | 11,211  | 1,190  | 717   |

\* Church and tower.  
 † Lobbies and pews if in wainscot.  
 ‡ Lobbies and pews if in pitch pine.

**KENSINGTON.**—For the erection of a minister's house adjoining the Mall Chapel, Kensington, for the Trustees. Messrs. T. Chatfield Clarke & Son, architects. Quantities by Messrs. Leonard & Clarke:—

|                      |            |
|----------------------|------------|
| Bywaters             | £2,837 0 0 |
| Peto Bros.           | 2,840 0 0  |
| J. Morter            | 2,827 0 0  |
| Clarke & Bracey      | 2,810 0 0  |
| Dove Bros.           | 2,803 0 0  |
| Holland & Hansen     | 2,741 0 0  |
| Mowlem & Co.         | 2,778 0 0  |
| Colls & Sons         | 2,777 0 0  |
| Hall, Beddall, & Co. | 2,713 0 0  |
| Brown, Son, & Bloom  | 2,700 0 0  |
| B. E. Nightingale    | 2,651 0 0  |
| E. Lawrence & Sons   | 2,641 0 0  |
| J. T. Chappell       | 2,517 0 0  |

**KENSINGTON.**—For making up carriage-way of Lexham-gardens, for the Kensington Vestry. Mr. William Weaver, surveyor:—  
 G. Felton, Ironson-yard, Ironson-road (accepted) ..... £174 0 0

GLASGOW:  
335, ARGYLE STREET.



# The Builder.

Vol. XLIX No 2221.

SATURDAY, AUGUST 29, 1935.

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### The Depression of Trade.

**W**HATEVER may be the ideas of different observers as to the causes that have brought about the long-continued and unexampled depression of British trade, there can be no two opinions that such a depression exists, and that it is a high time that a searching inquiry be made into the whole subject, while there is still left to us some trade to inquire into. The appointment of a Royal Commission for this purpose marks an era in the history of our commerce, and one of quite a novel character, and it shows how the alarm has at last taken possession of the public mind. A large amount of criticism has been lavished in certain quarters upon the composition of the Commission, which, perhaps, is not to be wondered at, considering the theoretical element at must needs enter into such an inquiry, and of the complaints of the leading journaling that the names of the gentlemen who were agreed to serve were more or less unknown, and that there was a marked absence of statesmen. Now, to our view, the presence of statesmen is by no means objection; as, in the first place, it is wanted is reliable information from various representatives of the mercantile manufacturing community, and this information should be to the point, and free from crochets, political motives, or panaceas of any kind. We do not hesitate to say that crochets, and our lamentable habit of making everything a party question, have gone a long way to injure English trade, and for that reason do not particularly grieve at the absence of professional politician and statistician. These two personages together are generally to make out that black is white, and usually succeed, as is probably their aim, in leading a goodly proportion of the unwary into their toils. The appointment of a Commission seems to be a fairly practical for it contains many names well known in their respective callings; and if we are successful in getting from them a trustworthy report, we may be well satisfied.

The chief difficulty throughout the whole of the subject lies in the numerous causes concurring, or said to conduce, to the depression; although it may turn out on inquiry that one or that cause has really nothing to do with the others are still plenty left to be viewed with suspicion. First and foremost comes the great constantly-recurring quarrel between Free

Trade and Protection or Fair Trade, according to the modern nomenclature, and this, we fear, will remain a bone of contention about which no two parties will be reconciled. One thing, however, is especially noteworthy, and that is, the rapidly-increasing number of adherents to the Fair Trade belief, who have certainly stuck to their colours for many a day, when to avow any doubt of Free Trade was to show the courage of conviction. It is, of course, such a serious thing to alter the whole fiscal system of a great commercial country, that it is very probable that the whole inquiry will break down on this point; though, at the same time, there can be no doubt but that a grave responsibility will rest on the blind continuance of the Free Trade policy, unless we can distinctly trace the depression to other sources. Secondly, the long stagnation in agricultural affairs, these being the basis of prosperity in every country, is too evident for us to have any dispute about. It would be well not to make too much of the unfavourable harvests that have unfortunately been the characteristics of recent years. Bad weather and cycles of bad weather have happened many a time before, and will happen again, and though they may be the last straw on the camel, they are not the proximate cause. The fact is, that English agriculture is on its trial at the present time, and we must not overlook the altered conditions under which we are living. While our land under corn cultivation is diminishing, our population is rapidly increasing, and as a sequence, our dependence upon foreign supplies is increasing also. This tells unfavourably in two ways: first, that the supplies are liable to be lessened or cut off altogether by failure, war, and other reasons; secondly, the element of competition on the part of other food-providing lands is presented to us in a rather uncomfortable manner. Our limited area and our comparatively old-fashioned agriculture are overweighed by the wholesale and mechanical production of the United States, but for which production, indeed, many of us would go to bed supperless.

Thirdly, we have the disturbing factor of political uncertainty, and an ugly factor it is, "men's hearts failing them for fear," although, if any were asked to define the precise uncertainty, it is probable that no definite answer could be given. Speaking unpolitically, however, the whole course of legislation for the last five years has been so jerky and unballasted, that it is of itself quite enough to induce the utmost wariness and caution on the part of investors; and until men can see with some degree of confidence a tolerably clear horizon, with a freedom from experimental and speculative policies, not until then will the British breeches pocket be freely unbuttoned, and trade again become buoyant.

The fourth and the most practical cause of depression appears to us to lie in foreign competition and foreign wages. No unprejudiced observer can have failed to see that our shops are inundated with goods not made in England or by Englishmen, a somewhat discreditable fact to us as men of business, and one which is certainly not pleasing to our *amour propre*. The world, of course, will not stand still, as some people think it ought to do, to gratify our insular notions, but there is no reason why we should help it to go faster than it need,—and this we have assuredly done. By means of our numerous exhibitions we have shown the astute foreigner every thing that he wanted to know, and in this way our manufactures have had the barren privilege of educating the world at their own cost. By our expensive and cumbrous patent laws we have discouraged everything which shows inventive genius, while other countries and the United States, the cleverest of all, have stimulated it; and in the matter of wages and labour, a paternal Government has so arranged as to make them compare unfavourably with those of other countries. The questions of capital and labour are rather delicate to write freely about nowadays; but, *pace* the British working man, so much has been done of late years to meddle between the employer and the employed, that it is difficult to decide who is master of the situation. But there is no difficulty whatever in perceiving that the foreign artisan works a great deal longer for his wage than we do at home, although it is the fashion to say (and it may be true) that he does not produce either so much or so well, in his increased hours. But, however this may be, it is indispensable that we face the broad fact, that wages are lower and the hours of labour longer abroad than in England, while, as a rule, the Continental working classes spend far less on themselves. The reproach of insufficient technical education as compared with other countries, may, we think, now be eliminated; for although more facilities may be found necessary in special trades, the advance in general technical education has been very remarkable and well nigh equal to the demand.

If any doubt could possibly exist as to the diminution of English trade, it would soon be dispelled by a glance at the Board of Trade returns for July, 1885, as compared with those of July, 1884. In the imports there is an increase in almost every article of food or drink, while there is a marked decrease in almost every article required for manufacturing purposes, such as wool, cotton, silk, flax, wood, &c., the total decrease of all imports being at the rate of 6.9 per cent. In exports the decrease is greater, viz., 8.8 per cent., the principal falling off being in iron and steel (the backbone



of the land), woollen fabrics, and worsted goods. Coal exports have also decreased together with machinery and mill work to the value of 17.0 per cent. It must be remembered, moreover, that this July is not an isolated specimen of decline, but is only one of a long series. The non-producing classes in their way show quite as frequent symptoms of depression. Go to any country town on a market-day and hear of the dismal roll of farms thrown up, rents unpaid, or land out of cultivation; look at any house and estate agent's book and note the unprecedentedly long list of houses and land for sale, with a very short list of buyers; mark the same features in the revenue returns, especially those denoting the putting down of men-servants, horses, and carriages; inquire of the retail shopkeepers in London or elsewhere, and particularly those who deal in luxuries, and we shall hear the same tale of goods unsold (those that sell best being the cheaper foreign kinds) and accounts unsettled.

On the other side of the scale, we find the owners of manufacturing establishments straining every nerve to keep the concerns going on any terms, the old-fashioned ideas of running them to a profit having disappeared for some time past, while, for the artisans, the same story comes of wages lowered and trade union resources at a very low ebb. The recent report of the Iron Trade Employers' Association brings out these facts sufficiently clearly. Direct inquiries in the iron, steel, engineering, and shipbuilding trades, involving over 118,000 hands, show that trade is good only for 2,500 of that number, while 25,000 enjoy it to the measure of "moderate," and 90,500 to that of "bad."

The following brief table will, perhaps, put these facts in a clearer light:—

| District.                                | No. of hands<br>inquired into. | Good. | Moderate. | Bad.   |
|------------------------------------------|--------------------------------|-------|-----------|--------|
| London .....                             | 13,000                         | 2,000 | 4,000     | 7,000  |
| Lancashire and<br>part of Cheshire ..... | 39,000                         | —     | 4,000     | 35,000 |
| Yorkshire and<br>Durham .....            | 33,000                         | —     | 5,000     | 27,000 |
| Glasgow .....                            | 21,000                         | —     | 2,000     | 19,000 |
| Ireland .....                            | 4,000                          | —     | 400       | 3,600  |
| Total .....                              | 109,000                        | 2,000 | 15,400    | 91,600 |

This is a terrible revelation of the state of trade, that only 2,000 hands out of 109,000 should be in a condition to be satisfied, and we have no reason to believe that other trades do not show a corresponding condition. Of nineteen or twenty cotton factories at Oldham, only one showed a favourable balance-sheet at the recent trade report, and, doubtless, if, Asmodeus like, we could peep into the books of our manufacturers and dealers, we should see enough to make us regret our curiosity.

## CLOCKS IN RELATION TO ARCHITECTURE.—II.

BY A PRACTICAL CLOCKMAKER.

**T**HE old style of clock-frame, known in the trade as the "bedstead," is now generally superseded by the horizontal frame originally introduced by the French, which is far superior and more convenient, as all the parts of the clock are readily accessible, and any part can be removed if required, for cleaning or repairs, without disturbing the rest. In the old upright frame, or a modification of it which is still in favour with some makers, to remove a single portion, the whole machine must be more or less taken to pieces.

The escapement is the most important feature in the clock,—its essential and vital part,—which economises the motive power, regulates the speed of the train of wheels, and determines the rate of time.

Without an escapement, the clock would soon run down, expend its force in a few minutes, and give no useful result; whereas, by means of this ingenious and useful invention (the author and date of which are unknown), the motion of the wheels is evenly and uniformly checked.

Take away the escapement, and you have but a few wheels set in motion by a weight. The blind force of gravitation the escapement reduces to order, controls, and regulates.

The pendulum, acting through the pallets upon the last wheel, called the escape-wheel, which it allows to pass (or escape) a tooth at a time, constitutes the escapement. No matter what the arc of vibration may be, the time is always the same, the smallness of the arc being compensated for by a slower rate of motion.

Whether the credit of practically applying the mathematical theory of the isochronism of the pendulum is due to Galileo or Huyghens, the Dutch philosopher, or our own Dr. Hooke,—for they or their partisans all claim it,—this at least is certain, that the first clock fitted with a pendulum was made by Richard Harris, for St. Paul's Church, Covent Garden, in 1641 (see engraved plate in church vestry). This date is important, as the invention was claimed by Vincent Galileo in 1649, and also by Huyghens in 1657. This controversy as to authorship I must, however, leave as I find it, having neither the time nor the space to pursue it further.

The old iron rod pendulums were soon discovered to be considerably affected by the variations of heat and cold, losing time in hot weather through the expansion of the metal, and gaining in cold through their contraction, the variation from this cause amounting to as much as a minute a week.

Wood pendulums were also affected in a similar manner, the heat and dryness of the summer contracting them, and the damp and moist atmosphere of the winter having the contrary effect, thereby rendering their length (upon which exact time-keeping depends) very unequal.

To correct the error thus caused, the best clocks have their pendulums compensated with zinc and iron tubes, in such a manner that as the iron-rod lets down the bob (weight), the zinc tube pushes it up, and if the rod and tubes are in proper proportion, the centre of oscillation will always remain the same, so that the clock will be unaffected by any changes of temperature. In negotiating for a new clock, it will be seen that a "compensated" pendulum is well worth its slight additional expense.

In very large clocks, with a heavy bob, it is better to suspend the pendulum from an iron bracket fixed in the wall, and thus relieve the clock-frame from a great strain.

Graham's dead-beat escapement, as shown in fig. 1, is so called because the tooth falls dead

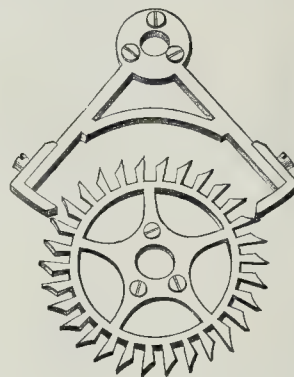


Fig. 1.—Graham's Dead-beat Escapement.

upon the pallet, and there remains until the pendulum returns and releases it. The escape-wheel turns not with a continuous motion, but by starts, being stopped by one or other of the pallets coming in the way of the teeth and receiving from them an impulse sufficient to keep the pendulum in motion, repairing the loss the latter sustains by friction and the resistance of the atmosphere.

This escapement was invented by George Graham, about the year 1700. He was also the inventor of the mercurial compensation for pendulums, the cylinder, or as it is better known, the horizontal escapement for watches,

and was undoubtedly a man of genius in his art.

The reason for the preference shown to this escapement is, that a moderate variation in the force of the clock train produces hardly any effect upon the time of oscillation of the pendulum. The Graham has, moreover, the further practical advantage that, being so simple and made on such true principles, it is not easily deranged, and in the unlikely event of its becoming so, a man of ordinary capacity can rectify it, which is not the case with more complicated escapements.

It is, moreover, equally well adapted to large or small clocks, is comparatively inexpensive to make, and requires no special attention. A large number of church and town-hall clocks with this escapement have been erected of late years in various parts of the country, and their owners are unanimous in testifying to the satisfactory results obtained. Graham's dead-beat has stood the test of time, when properly made gives an accurate rate, and, like Earnshaw's compensation for watches, has never been radically improved upon, simply because it could not be altered for the better.

The escape-wheel should be small and light, so as to economise force and diminish friction. When the wheel is thus made, the action of the pallets is light and their working with the escape-wheel smooth and even, with a total absence of that heavy thud which is heard a very beat when the wheel is unnecessarily large and heavy. The pallets should be of specially hardened steel, and fixed to the arm with screw nuts, so as to be easily removable in case of need.

The invention of the pin-wheel escapement (fig. 2) is ascribed to J. A. Lepaute, author of a treatise on clockwork and maker of clocks for the Military School (A.D. 1755) and the Hôtel des Invalides, Paris. It is a simple and ingenious escapement, which, after some years of use both in France and England, went out of favour until it was revived by an English clockmaker.

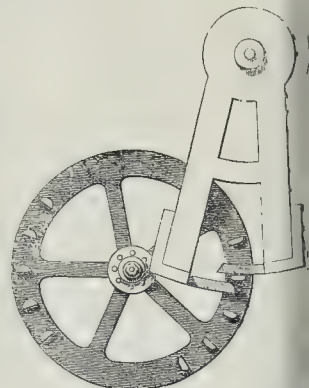


Fig. 2.—Lepaute's Pin-wheel Escapement.

The teeth are pins of steel set in the face of the wheel (see fig. 2), the upper half of an cylinder being cut off, as well as a portion of the front; this last improvement (compare pin on right side with those on the left of wheel) was introduced by Sir Edmund Beckett, and permits the use of shorter pallets and renders the action safer.

This escapement has the advantage of requiring such a nice accuracy of construction, more pins than teeth, can be made to act in wheel of given size, and if a pin is worn injured it can be replaced, whereas a damaged tooth renders the whole wheel useless.

The pin-wheel is not, however, an escapement that is in general use, being almost entirely superseded by the dead-beat and gravity escapements.

The double three-legged gravity escapement (fig. 3) was invented by Sir Edmund Beckett and applied to the great clock he designed the Westminster Tower. The gravity is an excellent escapement for very large clocks with



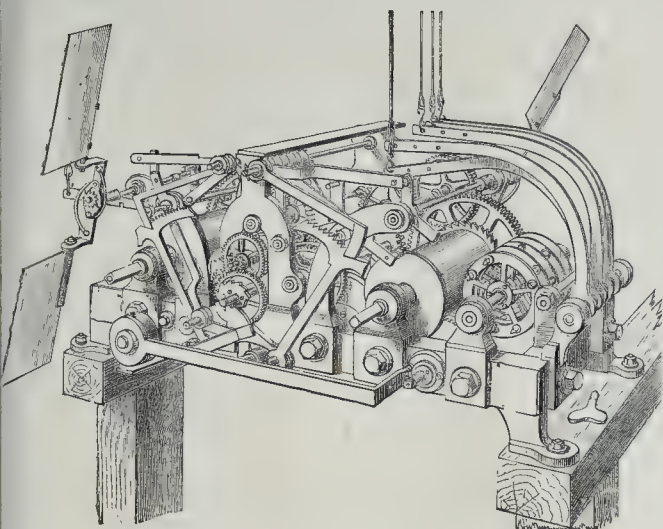


Fig. 4.—Quarter or Chime Clock, for Church or Town Hall.

heavy dial work, where the hands are much exposed to the wind, as it admits of great driving-power being applied without sensibly affecting the escapement.

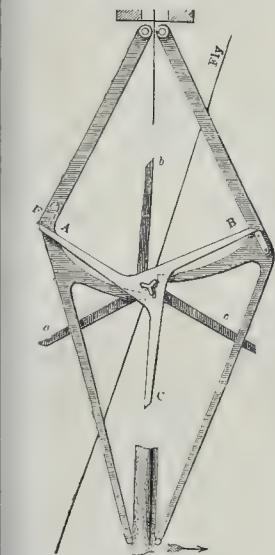


Fig. 3.—Sir E. Beckett's Gravity Escapement.

It takes its name from having two three-toothed wheels, A, B, C, and *a*, *b*, *c*, with one of three lifting-pins between them. The action will be understood from the drawing.

Notwithstanding the mathematical perfection and great accuracy this escapement possesses, I should still recommend, for the reasons already stated, especially for clocks in remote country places, Graham's dead-beat.

All these escapements may be seen in action (without leaving London: the gravity at Westminster, the pin-wheel at King's-cross station large clock, and the dead-beat at Benson's Factory, Ludgate-hill. Actual inspection and comparison will enable the investigator to form an independent judgment as to which kind of escapement is best adapted to the clock he proposes to erect.

As the utility and value of a public clock depend so much upon the dials, which show

the results given by the mechanism concealed from view, it is of the utmost importance that these should be thoroughly effective and visible from a considerable distance. In this matter, the clock-maker is entirely in the hands of the architect, whose design is, in most instances, made and adopted without any reference to the former. When the work is in a forward state, and it is too late to make alterations, the clockmaker is summoned, to find an utterly inadequate provision has been made for his requirements.

The rule for the size of the dials has often been published, and is very simple. One foot diameter for every 10 ft. elevation is the *minimum*, but the best clocks have larger dials than this proportion would give. The Westminster clock, for example, has an elevation of 180 ft., diameter of dials, not 18 ft., as by this rule, but—22 ft. 6 in.; St. Paul's Cathedral, elevation 126 ft., diameter 17 ft.; Hoseinabad Tower, Lucknow, 120 ft. elevation, diameter 13 ft. If the reader will take a stroll in the suburbs where new churches abound, he will find that the neglect of the moderate requirements of this rule has spoiled many otherwise good clocks.

With respect to the material of the dials, there is no particular rule. The old-fashioned copper dial, painted black, with gilt hands and figures; or, for an illuminated clock, white opal glass, with hands and figures in black or dark blue, cannot be surpassed in making the time visible at the greatest possible distance. Slate, enamelled in black and polished, with gilt figures and hands, is also an excellent material for dials, having a handsome appearance, and being at the same time effective. A skeleton metal frame, fixed on the wall of the building, also makes a good and inexpensive dial.

The plainer and simpler the dial, the better it is for service, and designs involving much ornament are, for that reason, unsuitable, as there is no good background for throwing into relief the hands and numerals. Some elaborate dials and hands we have seen are, whatever may be their artistic merits, eccentric and grotesque for clockwork, utterly spoiling the utility of the instrument. After trying the patience of the public for some time, they were removed and replaced with plainer but more effective work.

Of late years it has become the custom to illuminate the dials after dark; and when we consider the great length of the night during the winter months, the advantage gained is considerable. The late Mr. Samuel Gurney was so struck with the deprivation suffered by the poorer inhabitants of Stratford, Essex, that he defrayed the expense for the alterations neces-

sary to illuminate the Parish Church clock after dark. This has been regarded by the frequenters of a populous thoroughfare as a great boon, and the brilliantly-lighted clock is a nightly memorial of the philanthropist. St. Bride's, Fleet-street, was, in 1826, the first public clock to be illuminated.

With regard to the lighting, an automatic machine is used to turn up the gas in the evening, and to lower it at daylight. This is effected by a twenty-four hour wheel with movable pins, which support a lever acting on the gas-cock. By altering these pins the period of illumination can be extended or shortened according to the length of the nights.

The question of ventilation seems a small matter to notice, but its neglect will entail serious consequences. Unless an efficient system be adopted, the moist vapour caused by the gas will settle upon the clock movement to its manifest injury, or the heat may be so great as to crack the glass dial.

I know of a case where a bracket clock intended to be illuminated, has to remain in darkness, because the ventilators designed by the architect, were inadequate to carry off the products of combustion, which in a week left a black, sooty deposit on the glass dial, necessitating cleaning; but this could not be done without removing the motion work, and stopping the clock.

If you go into a properly-constructed light-house when the light is burning, you will find the ventilation so perfect that, notwithstanding the great volume of flame, neither smoke nor moisture dims the glass of the lantern.

One cause for the begrimed appearance of many dials of drum and bracket clocks, one sees, is obvious. Whilst openings are made at the top for the escape of smoke, there are none at the bottom for the admission of fresh air to feed the flame with oxygen. The combustion is, consequently, very defective, and will always be so, until the ventilation is better provided for.

In negotiating for the erection of a clock, stipulation should be made for the rate of time it is to give. A public clock that is a bad time-keeper becomes an object of distrust and deserved contempt. Five or six seconds of variation per week is a fair standard, and good makers will not object to have their work thus tested.

The striking of public clocks is of equal or even more importance than the dials, because the hands cannot be seen, at a high level, in their true relation to the divisions of the dial, especially if the spectator be close under the clock, and people are almost as much accustomed to listen for the stroke of the bell as to consult the dials.

For the quarter and striking parts two additional trains of wheels are required, one for chiming the quarters, as shown on extreme right of fig. 4, and the other at the opposite end of frame for striking the hours. The middle train is the time-keeping mechanism, technically called the "going part." But where the clock strikes the hours only, it will be observed that but one additional train of wheels is required.

The striking train consists of a barrel similar to the "going train," but has a cam or toothed wheel fitted on its outer edge for raising the hammer tail, by which the blows are delivered on the bell.

This striking from the great wheel is a modern improvement, the advantage of which is, that a much heavier blow is given, and more sound obtained, than under the old system, by which a wheel higher up in the train lifted the hammer, necessitating a heavier weight and causing a greater strain on the clock.

Gearing into the great wheel is a small one called the pallet pinion, on the arbor (axle) of which are pallets of steel working in the teeth of the rack (see fig. 6), and gathering it up as the blows are given by the hammer.

Upon the largest wheel, known as the hour-wheel, is fixed an eccentric or "snail" (see fig. 6), which has twelve steps, one for each hour, so as to let the rack fall the distance of one of its own teeth for every hour the clock ought to strike.



The repeating work for the striking train, consists of the rack, rack-hook, warning, lifting, and locking pieces.



Fig. 5.—Hour-wheel and Snail.

The rack is a segment of a circle with a number of teeth cut on its edge (see fig. 6); at its end is the rack arm, fitted with a spring having a nib or pin which falls upon the "snail" that regulates the number of strokes to be given at the different hours: as the pin falls nearer the centre of the "snail," the rack drops a greater number of teeth, and more blows are given on the bell.

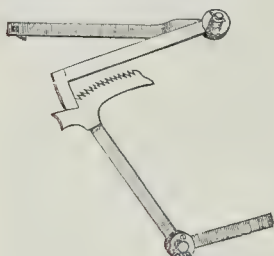


Fig. 6.—The Rack.

The rack-hook catches the rack as it is drawn up by the gathering pallets, and when the proper number of strokes has been given, this hook falls into a deep tooth, the effect of which is to cause the locking-piece (shown on fig. 6) to fall before the stop-piece and arrest the motion of the train.

The lifting-piece lifts the rack-hook out of the deep tooth of the rack previously to striking.

At the instant the hour expires, a stud on a wheel set on the hour-wheel arbor (axle) raises a lever which releases the striking-train, lifts the rack-hook, and when the proper number of blows (determined by the step on the "snail"), are struck, the rack-hook drops into its place and causes the locking-piece to stop the striking-train in the manner above described.

This system of striking is called the rack-repeating principle, and is much to be preferred to the old-fashioned locking plate or count wheel, which is open to serious objections, being liable to run past its lockings and strike the wrong hours, and if the striking once gets wrong, the clock strikes wrong at the succeeding hours.

I therefore strongly advise architects in arranging the terms for a new clock to insist upon its being fitted with rack-repeating work, which is the easiest in its action, and the safest in its lockings.

To diminish the velocity of the striking-train (which, being without an escape-wheel, revolves with great rapidity) a pair of metal fans (see fig. 4) are provided, which are set in quick motion every time the train is released. By means of these fans or flies, the intervals between the strokes can be regulated, and faster or slower time obtained, as desired.

The mechanism for chiming the quarters is precisely similar to the hour-striking train, save that the number of hammers to be raised being greater, a separate wheel has to be provided for each. These cam wheels are fitted, at proper intervals, with half-pins of steel to lift the hammer tails, and are all on the same arbor (axle), which gears directly into the barrel wheel.

There has been of late years a revival of the ancient custom of chiming the quarters, and many churches have four or more bells un-

utilised, as the clock strikes the hour only. It may be thought that a new clock would be necessary, in order that the "Cambridge quarters" might be duly chimed; but this is not the case, an auxiliary quarter-train is all that is needed, and its comparatively small expense is well repaid by the effect obtained and the increased usefulness of the clock.

Even a "ding-dong" on two bells, one being a musical fourth higher than the other, is not at all unpleasing, and would be a boon to the villagers in many country places.

The fixing of a turret clock requires careful forethought and skilled labour; because whatever oversight has been made by the architect in planning the clock-room (not at all an unusual occurrence) must be rectified by the clockmaker.

The supports of the clock should be of great strength and free from vibration, whilst the movement should be securely bolted to iron girders or strong oak beams. The bell-chamber should be as high in the tower as possible, and well open at the sides, so as to allow of the free escape of the sound. St. Paul's Cathedral is a good example on this point. The bell-chamber is so open that the hour-bell, weighing 5 tons 4 cwt., can be heard, in favourable conditions on a clear night, at Windsor.

The clock-chamber should be not less than 7 ft. square, inside measurement, to receive a movement of sufficient power for dials of 4 ft. to 5 ft. diameter, and to strike on a bell of about 5 cwt. Existing towers, however, in which the dimensions are less, can be fitted with clocks, the frames of which can be specially designed to suit the available space.

Properly the floor of the clock-chamber should be arranged so that the clock may stand immediately behind and on a level with the dials; for the separation of the movement by a long distance from the latter, involves a corresponding increase of dial-rods and bevelled wheels, heavier weights, and additional expense. Accurate time-keeping is, moreover, on account of the extra friction, rendered more difficult. At the same time, this requirement, although desirable, is not essential, and a clock can be made to give a good rate of time, even where the movement is at a considerable distance from the dials. For example, at East Meon, Petersfield, the place of the nest of bevelled wheels which work the dials was occupied by the bells, the dial rods had in consequence to be led round the sides of the tower, necessitating the use of no fewer than eleven bevelled wheels and 35 ft. of dial rods. The weights should hang, if possible, immediately from the barrels, and have a clear fall of 30 ft. to 35 ft. without the intervention of pulleys.

To give an exhaustive account of the subject within the limits of this article is, indeed, impossible, and some points are necessarily left untouched, but the leading principles, both of theory and construction, have been more or less fully treated.

#### NOTES.

It is being urged that the Royal Commission on the depression in trade should include the question of railway rates in their inquiry. Among the many propositions that have been put forward,—and they have been so numerous that the Commission would have an almost endless task were they all adopted,—this appears to be a very practical one. The Government, in replying to questions put in the House, have given but little encouragement to those desiring this step to be taken, though Mr. Stanhope, in a speech delivered on Monday last, acknowledged that the incidence of railway rates was an important factor in the matter. Probably the question is looked upon as being too large for the scope of the inquiry, for each time it is brought forward the difficulties in the way of dealing with it seem to multiply; and the subject is shown to comprise so many debatable points, that the hesitation of the new Government to deal with it may be easily understood. Still, there are one or two points intimately connected with trade depression,—such as preferential rates for foreign produce,—which might well be

included in the inquiry. Railway matters seem to be brought forward alternately by Parliament and by the companies themselves, the last step taken being initiated by the latter. This having failed (or, as the London and North-Western report recently issued puts it, "not being proceeded with owing to the general misapprehension existing as to the scope and objects of the Bills"), it is for the Government to again take the matter in hand, now that a fair opportunity presents itself for so doing. The advantage to trade in general that would be derived from an investigation into such distinct branches of the question as that alluded to cannot be doubted. The complaints which flowed in from all quarters during the recent rates agitation, as to the prejudice to various industries caused by the superior advantages enjoyed by importers of foreign produce in the matter of freightage, all tend to prove this, and it is to be hoped that the Government will give due consideration to the appeal now made.

The Chairman of the Midland Railway made the very frank admission, at the half-yearly meeting, that if the directors "could have foreseen in 1880 what the state of trade was likely to be at the present time, they would not have asked the consent of the shareholders to the carrying-out of such large schemes as they had done." The receipts from all sources during the past half-year, were 23,703*l.* less than in the corresponding period of 1884, the coaching receipts having decreased by 24,371*l.* and the merchandise by 34,459*l.*, while the unprofitable mineral traffic had increased 132,259*l.*, and the charges on capital had increased by 30,725*l.* But for a decrease of 22,197*l.* in working expenses, the decrease of 1 per cent. in the ordinary dividend would have been larger. 99,543 fewer first-class and 115,533 fewer third-class, passengers had been carried, and the corresponding diminution of income from coaching had been 29,018*l.* Eight hundred and six thousand more train miles had been run by passenger trains, but the earnings had declined by one and five eighths a per train mile. The balance-sheet of the company, reduced to the above extent, the general depression of trade, forms another voucher for the demand of distinct account for the earnings and expenditure under the several heads of passenger, merchandise, and mineral traffic.

The Commissioners of Public Baths for the Parish of Kensington have unquestionably made the best choice, in the main, from the seven designs sent in, and now exhibited in Kensington Town Hall. "Leander," which is placed first, is a very well-arranged plan, and the elevation follows the suggestion in the instructions, for an exterior "treated in a broad massive manner with as little ornamentation as possible, to give character to the building, though that is a very odd way of putting it; and much more "character" might have been given than is the case here. The scheme provides for first, second, and third class swimming and private baths for men; first and second class private baths and one swimming-bath for women. Competitors seem to have been uncertain whether both classes of women were to have access to the swimming-bath; some of them give an access for both from opposite sides, some the selected one among them; the second-class women out from the swimming-bath. The instructions should have been explicit on this point. The separation of entrance is not efficiently arranged in most of the plans. In "Leander" the first and second class do lead into the same vestibule. But some of the competitors do not in the least appreciate the fact that ladies using a public swimming-bath do not care to go in and out by a door immediately contiguous to that of the men's bath. This may be over-refinement, but it must be recognised, and it is surprising how it is ignored by some architects. Thus the author of "Efficiency and Economy" places the first class men's and women's entrance-doors close together, almost like a double doorway; a "Light and Air" is so unacquainted with the conveniences that he brings the men a



women into the same outer vestibule. Many ladies would not go to a bath planned in that way.

THE Instructions for this competition remind us of a point that was raised in regard to the Chelsea Vestry-hall competition; viz., that when the promoters of a competition state that they will employ "an architect of established reputation" as assessor, competitors do not understand by that term a surveyor, however respectable. In neither this nor the Chelsea case was injustice done, as it happens, but there are matters in which something more than practical knowledge is required to decide on the merits of designs, and it ought to be understood that "an architect" means "an architect." The neglect of this gives a handle to unsuccessful competitors in any case, and in some classes of buildings it may lead to a "miscarriage of justice." The Instructions in the Kensington Baths competition give, we observe, no hint as to the sum the promoters were prepared to spend; another serious omission. A recently-issued set of "Instructions" for the Fulham Vestry-hall competition give a further text for admonition. Intending competitors had to deposit two guineas for these "Instructions," to be returned if a design were sent in; the intention being, of course, to discourage idle applications from those who did not really mean business. This is all very well; but when people deposit two guineas they expect a well-drawn-up document and plan, whereas in this case the applicants received a very vague set of instructions, and a plan of the site to only half the scale intended for the drawings, with figured measurements which did not agree with the scale, and with no levels given! That is not the way to do it.

THE collision on the District Railway, near Earl's-court Station, on the 23rd inst., while it throws no slur upon the admirable care and skill with which the traffic of the Metropolitan and Metropolitan District lines have so long been conducted, raises more than one important question as to what may be called rather the strategical than the tactical part of the working of our lines. In the first place, it cannot be too strongly insisted on that the objections which the Legislature has always held to the crossing of roads and railways on a level, apply with much more force to the crossing of two railways on the same level. The collision at these "double-diamond points" adds very forcible evidence to this contention. In the second place, the collision may be traced to the breaking of a pin in one of those ingenious and complicated sets of interlocking points and signals, on the regular working of which the safety of the great majority of railway passengers may be said almost absolutely to depend. Pins will wear out, and the necessity of a very special and constant supervision of every working detail of this apparatus is most evident. But what strikes us most in regard to the accident is the desirability of having railway signals so constructed that in case of any breakage of the connexion they will set themselves automatically at "danger." It is certainly possible to construct them so, and this will give entire security against accidental derangement.

NEVERTHELESS, a total of five persons killed, and 175 persons injured, in accidents, out of somewhere about 10,000,000 passengers, presents a very close approach to absolute safety. Certainly it is to occupy a seat in a railway train than saunter through the streets of London. To the above, however, have to be added, for the months ending with last June, 35 persons killed and 295 injured by accidents from other causes; and 395 persons killed, and 1,237 injured, being servants of the companies, or contractors; persons passing over level crossings, and trespassers, including suicides. But, on so, the grand total gives 54 fewer deaths, and 357 fewer persons injured, than during the corresponding period of 1884, showing a general improvement in public safety of no less than 17 per cent. in the year. But the total of 212 deaths, and 909 injuries, to servants of companies or contractors, is still unduly

high. The former, in 1884, were 367,793 in number, but we are aware of no data as to the latter. Even were they as numerous as the servants of the companies, however, the death-rate and the injury-rate are high, and present a remarkable contrast to the safety in which these unwearied servants of the public have carried so great a mass of travellers.

IT is customary to speak of this as the "silly season," more especially in regard to the efforts made by the daily newspapers to fill their columns, when there are no Parliamentary debates to report, with any and every sort of correspondence. To those, however, who are not besotted with politics and political squabbling, the pages of the *Times* are at this season sometimes of more than ordinary interest, and contain letters and communications much better worth reading than much of the Parliamentary speech-making. We were particularly struck with the long and ably-written communication a few days since from a correspondent who had visited the Durham coal-mines and their workers (as representing a proportion of "the new electorate"), and gave a graphic description of the way work is done among the coal-seams. A widely-circulated "daily" could hardly employ its columns to better purpose than in letting one half of the world know how the other half lives. Some of the items in the history of the "other half" in the coal-mines are pathetic to read, and suggest the question why coal-mines should be worked with such low headings that men have to crawl like reptiles from one working to another, and that a man is found crouched on the ground going through work which would be arduous enough in the most favourable position, with an exertion which brings a deep gasp from him at every stroke of his pick. Is it impossible to work some parts of the coal question by low headings, or is it merely a question of economy in working? If the latter, surely some reform is called for.

A SUBSTANCE entitled "Carbolineum Avenarius" has been brought to our notice by the patentees, Messrs. Peters, Bartsch, & Co., as possessing specially valuable qualities as a preservative of wood. We have subjected it to chemical analysis, the result of which is exceedingly favourable. "Carbolineum Avenarius" is an oily fluid of dark brown colour, largely made up of tar oils and a proportion of the antiseptic products of the distillation of tar-yielding substances. It is free from dangerous volatility, its boiling point being a high one, so that it can be used with safety under all ordinary conditions. It is a decided antiseptic, and, therefore, calculated to be of great service in preserving wood from decay and the attacks of insects. Its power in this direction is considerably enhanced owing to its oily nature, enabling it to penetrate well into the substance of the wood. In one experiment a piece of well-planed deal,  $\frac{3}{4}$  in. thick, was taken and treated with one coating of the composition, which, when dry, was found to have penetrated the wood uniformly to the depth of a little more than  $\frac{1}{2}$  in. This is an important point in favour of this material, as it removes the necessity for any inconvenient and costly appliances for subjecting the wood under pressure to the action of the composition. The covering power of the material is good, and it dries with reasonable rapidity, twenty-four to thirty-six hours being the time which elapsed between the application of the stuff and its absorption by the wood in several experiments where the treated wood was freely exposed to the air. For all outdoor and buried wood-work, and for all exposed to the action of water, salt or fresh, this substance should be decidedly serviceable. The one objection to its employment for the preservation of wood-work used in the internal construction of buildings is to be found in the fact that wood so treated with it burns more readily and fiercely than if merely painted in the ordinary way or left entirely unprotected. This must be borne in mind; but apart from this, and under circumstances where danger from fire is not a primary consideration, there seems scope for much use of the material.

AT the meeting of the Society of German Engineers, held at Stettin, on August 17th, a paper was read by Dr. Delbrück, of Züllchow, on "The Development of the German Cement Industry, and the Methods of examining Cement," in which the author first gave a historical review of the German cement industry. The first step for its introduction in Germany was taken in 1852, when Dr. Bleibtreu, of Bonn, made an effort to establish a Portland cement manufactory at Züllchow, and thus to put an end to the monopoly enjoyed until then by England. The manufactory was opened in 1855, and its management was taken over by the author in the following year. The establishment was planned for an annual production of 30,000 barrels; but at the present time there exist in Germany about sixty cement manufactories, producing about 5,000,000 barrels of cement. In describing its mode of manufacture, the author stated it as a remarkable fact that up to the present no reliable theory had as yet been established as to the property possessed by cement, when mixed with water, of acquiring an increasing hardness and solidity. There were as many different theories current regarding this point as there had been chemists who had approached the question. The author said it might be accepted as an established fact that the hardening of cement is due to the mechanical attraction of minute particles, caused by certain chemical reactions; but the questions still remained to be solved whether alumina plays a part in it or not, whether the absorption of water in silicic acid already present causes combinations, or whether the absorption of carbonic acid in the lime and the liberation of silicic acid cause the cementing together of the most minute particles. The author finally objected strongly to the system of mixing cement with foreign substances, especially slag powder, up to 40 and 50 per cent., leading to the manufacture of an inferior product, which had been the cause of raising a prejudice against German cement in foreign markets.

AT a meeting of the Anthropological Society at Carlsruhe, on the 10th of August, Dr. Schliemann read a paper on the results of his excavations at Tiryns during the spring and early summer season. His work began in April, and, owing to the heat, was brought to an end for the present in July. It is to be resumed next spring. Dr. Schliemann has succeeded in establishing, he thinks, this main fact, that, whatever be the actual date of the architectural structure he has laid bare, the palace itself and the surrounding fortification walls belong to one common plan, and are therefore of the same age. On the south part of the fortification walls are a series of small chambers all of the same dimensions and all covered with an arched roof. How these chambers were lighted remains uncertain, as the outside walls are much destroyed. There seems no doubt that these chambers were used as storehouses. What makes them of such special interest is that they are in size and structure closely analogous to the wall chambers found at Carthage. This bears out Dr. Schliemann's highly probable conjecture, that Tiryns, as well as Mycenæ, was once possessed by a Phœnician colony.

DISCOVERIES in the interior of the palace seem to point the same way. The excavators have lighted on a great circular trench, which evidently belonged to an ancient altar. In it had been found a quantity of remains of pottery of the "Mycenæ" style. So far as can be made out from the fragments, the broken vessels are oinochoës and funnel-shaped vases, and also clypeus. A great many new ornamental motives have been noted. The terra-cottas found are, for the most part, the customary whorls and rude idols. In the south-east corner a whole pile of little painted figures of gods and goddesses were found together. Besides the terra-cottas were a number of objects in bronze, glass, horn, and also some knives and arrow-heads of obsidian. Evidently we have here a find of "votive" objects of the Phœnician and pre-Phœnician



periods. A somewhat fuller account of the excavations will be found in the *Berliner Philologische Wochenschrift*, August 22.

THE *Western Mail* of the 25th gives a full report of an address on Art Culture, delivered by Colonel Cornwallis West at the Cymrodorion Society meeting at the National Eisteddfod at Aberdare. The address dealt a good deal with architectural subjects, and in a very sensible and "enlightened" spirit. Among other points, Colonel West urged the employment of local stone, where it was available, as in harmony with the character of the district, observing that natural surroundings were much disregarded by builders in Wales. We can well believe it; a great many builders who came from Wales have done much to deface our national surroundings in the neighbourhood of London. Colonel West thinks of starting an "Anti-Stucco and Whitewash Society" for Wales. He commended, however, the spirit and the manner in which many Welsh churches had been restored, as creditable alike to their ecclesiastical custodians and to the architects employed. The speaker inquired what had become of the Welsh cabinetmaker, who could once produce the fine old chests still found in many a peasant's house, or of the genius for metal-work which had enabled a Welsh smith in the seventeenth century to produce such work as the beautiful gates at Chirk Castle. He urged that working joiners and others who showed any ability and disposition to produce work in an artistic spirit should be assisted by the loan of drawings of good examples, "and such helps in disposing of their work as you may be able to command."

ON Saturday, August 15th, Mr. Burdett Coutts cut the first sod of the new Sutton and Willoughby Railway, of the Company for which Mr. Alfred Giles, M.P., is the chairman. The railway will be only seven miles long, and will have no very special engineering features, as the ground it will traverse is as flat as a billiard-table. It is part of a scheme for connecting the Midland towns with a new watering-place at Sutton-le-Marsh, on the East Coast between Grimsby and Yarmouth, sixteen miles north of Skegness. The "speculative builder," if he is not busy already, will probably soon make his appearance on the scene and introduce the Victorian style of architecture. Combined with the railway scheme is a project for a fishing-harbour of about 35 acres and a depth of 10 ft. at low-water. If this latter project is carried out, and it appears to be the backbone of the railway, a great boon will be conferred on the fishing trade, which is suffering from deficient accommodation at Grimsby. The harbour at Sutton will be independent of the tide, as there is no river to go up, and will be twenty miles nearer to the London market than Grimsby; besides which Sutton is nearer to the fishing grounds of the North Sea than any port on the coast.

MR. OSWALD BROWN, late hydraulic engineer to the South Australian Government, has written to the *Times*, strongly urging, as we have before urged, the adoption of the meter system of water supply in London, and pointing out that it is used in Paris, Berlin, Vienna, and Brussels, and in Adelaide, South Australia, so that the practical working of the system has received sufficient test. The adoption of the meter system would do more than anything else to check culpable waste and to put the water companies and their customers on an equitable business-footing in their dealings with one another.

MR. MITCHELL HENRY, M.P., has published in pamphlet form his speech on the Westminster Hall "Restoration" question. In the course of it he confirms what we have more than once remarked upon in regard to the temper and tactics of the Chairman of the Committee:—

"He was anxious personally to give evidence. The right hon. gentleman, however, took very good care that all the days should be filled up until the end of the sitting of the committee; and, not being

a member of the committee, he (Mr. Mitchell Henry) had no opportunity of calling any witnesses. He never saw a committee which gave less encouragement to witnesses to come forward. A number of eminent men did give evidence before the committee adverse to the plans of Mr. Pearson; but, really, the encouragement they met with was of such a nature that the whole profession took fright, and refused to come forward. He was acquainted with a most eminent architect who was desirous of giving evidence, and who was so much alarmed at the tone of the chairman of the committee, who treated the scientific witnesses who came forward for the public good as if they were witnesses in the Old Bailey, and put the most disagreeable and impertinent questions to them, that this gentleman abandoned his intention of coming forward to give evidence."

UNDER the title of "The Sirens Three," a rather remarkable production by Mr. Walter Crane has been running this year through the pages of the *English Illustrated Magazine*, and is concluded in the number for September: a work which will not appeal much to the average magazine-reader, but which is full of interest for those who can appreciate the play of fancy and imagination in the poem and its illustrations. The author has been thinking of Blake and his illustrated poems, and has in the same kind of way produced a poem written (not printed) in a slightly decorative handwriting, and each page filled out with symbolical illustrations in the wide margins, or sometimes running through or behind the writing. Part of the poem is occupied in tracing the relation of man to art and nature, and the growth of the social and artistic life, and the illustrations to this, as well as to other portions of the poem, are full of poetic suggestiveness, and the decorative accessories also are most effective. We hope that now that it has run its course in the magazine it will be published as a separate book: it would make a charming volume.

#### ART IN THE LONDON CHURCHES.

ST. MARGARET'S, WESTMINSTER.

CONSIDERING the antiquity of London, it is surprising how very little ancient art, save that stored up in our two great museums, exists in our midst. London possesses a fair proportion of churches, but of those in the City of London not more than five are really older than the Great Fire of 1666, which made such havoc in our buildings, religious and secular. St. Andrew Undershaft, St. Mary Overie, or—as it is now called, St. Saviour's, Southwark,—St. Bartholomew the Great, the only remains of the priory left, the Temple, and the Savoy, to all intents and purposes, comprise the churches now existing in anything like a recognisable condition built prior to the Great Fire. St. Dunstan's, Stepney, at that time merely a country village, is still left us, and in Westminster there is St. Margaret's standing within the shadow of that venerable and cherished pile, the Abbey Church of St. Peter's, the only fine Mediaeval building London possesses. And taking the churches collectively, there is less about them internally or externally that is interesting to the student than the intelligent foreigner might imagine there would be in such a city as London; little that is, when we take into consideration the number of churches there are in what is now known as London; still less when we compare our churches with those Stow saw, and fragmentally described in his "Survey," written in 1598.

One of the most interesting features in a town like Oxford is the diversity of style exhibited in the buildings, but in the London churches erected previous to the last fifty years, there is a degree of uniformity that produces upon the beholder a feeling of monotony. This was perhaps inevitable, when we consider that one architect had the building of some seventy churches all at about the same time. If we had just two or three Wren churches in our midst, we should admire them much more than many of us do,—some of us, perhaps, do not admire them at all; as it is, we are surfeited with his Classic edifices, and are apt to pass them by with neglect.

But if, by comparison with some continental or even English towns, London churches are uninteresting, there is still a great deal of notably excellent art stowed away in them, and

\* Rather pusillanimous.—En.

to some extent, lost upon the general public. Even students, who are supposed to make a point of seeing the art that is to be found in London churches, are surprisingly ignorant of the contents of even our notable churches. The work of our painters and sculptors and, to some extent, that of our engravers and etchers, finds an annual home for a few months each year in our Academy and other exhibitions, and the public can take note, if it will, of the work done in the various departments of fine art year by year, and thus artists need never lose touch with the public. But, with the craftsmen, the case is wholly different. A man paints a stained-glass window, and it is fixed in the church, and there the matter ends. A brief paragraph announces the fact that So-and-so has given a window, painted by —, but few professional men go expressly to see it, and the casual visitor, perhaps, hardly notices it, even if he sees it, and he is little likely to go expressly to see it. And it is so with the other crafts adorning our churches; and, when we come to the architecture itself, what surprising ignorance is manifested outside professional circles on all matters relating to this most important art! The public seem to be apathetic about the art that makes a city beautiful and a nation noted. The architectural room at the Royal Academy is generally the one place where one can rest in comfort when all the other rooms are crowded to suffocation. Yet all the other arts beside architecture are comparatively insignificant. The erection of a building poor in design and bad in construction is a national misfortune. Bad pictures finally get hung out of sight of those who deem them bad, but all of us have to see the buildings in our streets and receive the sensation that a good or bad building produces upon those sensitive in such matters. People are more impressed by fine buildings than fine pictures or statues, and it was for this reason that architecture played so much greater a part among the other arts in the Middle Ages, owing to the influence it exerted on the impressionable and untutored minds of the early Christians. Architecture was then the "Hamlet" of the play; the other characters were wholly subordinate. And the crafts employed to adorn the interior of an architectural pile are only in a lesser degree important than the building itself. The decoration on the walls, the paintings in the windows, the sculptures on the tombs, the carvings on the seats and other places, the beaten iron and brass work of the various fittings are really more seen than pictures and other works of fine art that perhaps are only looked at in a gallery; for these crafts adorn a frequented building are dwelt upon, and not merely passed by in a hurried, thoughtless manner. These are perhaps truisms, but that makes them none the less important. We have been astonished at the ignorance displayed even by professional men about notable buildings, and the crafts adorning the same; and if men who, by reason of their training and occupations, are supposed to know about these things, are, to a great extent, ignorant, it follows that the general public is in a still worse condition. And to some extent this is not their fault, for whereas the names of painters, sculptors, and draughtsmen are well known, the names of notable craftsmen are known only among the cognoscenti, or nearly so. Now, if one admires a work, one instinctively desires to know who wrought it. We desire to invest it with a personality, but as craftsmen's work is rarely signed, unless we take the knowledge with us, one is apt to remain in ignorance of the author of the work one admires. A very few visits to the Royal Academy soon teach people how to know the different works by noting the characteristics of the several painters, and a slight acquaintance, let us say, with painted glass soon enables one to tell from which atelier a particular window came. Work that has no characteristics of the craftsman about it is of very little account.

In taking a brief glance at a few of the London churches, which contain work worthy the attention of the student, we wish to direct as much attention to the modern as the old work, for, after all, that which is being done in our own day has a special interest for us,—an interest wholly different to that we feel for old work. And in St. Margaret's, Westminster, there happens to be comparatively little old work, for the church has undergone so many alterations, improvements, and re-embellishments that the original fabric is somewhat lost sight of.

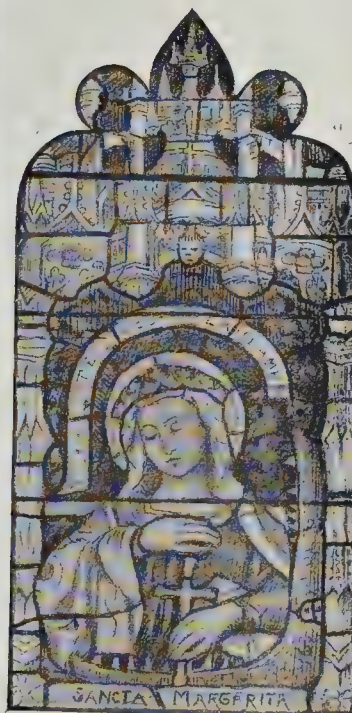




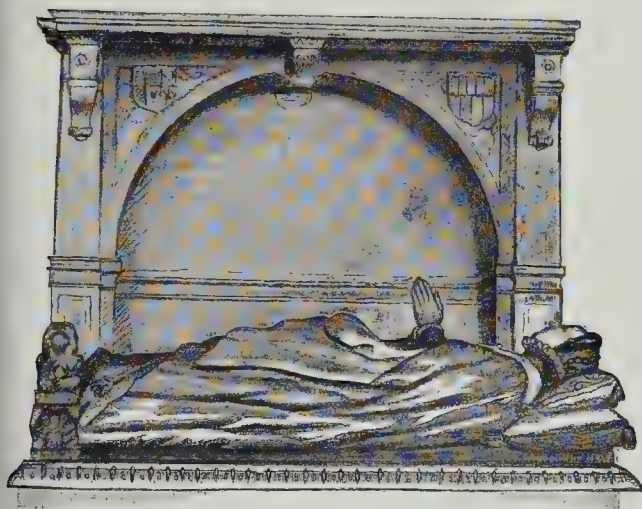
Light from Window in South Aisle.



Portion of one of the Lights of Great West Window, called the Raleigh Window.



Light from Window in South Aisle.



Tomb of Lady Dudley.



Centre Light of East Window in South Aisle, called Caston Window.



The Parish Church originally stood inside the Abbey, but was removed by Edward the Confessor, as it was thought the attendance of the laity disturbed the monks. The church then built stood till the reign of Edward I., when the merchants of the Staple and the parishioners built the present edifice, with the exception of the great chancel, which was built by the Abbots of Westminster. In the reign of Edward IV. the church was "re-edified," mainly through the piety of Dame Mary Billing and her husband, Sir Thomas, Chief Justice of England.

The tomb of this good lady is on the south of the altar, date 1499. The church is described in Seymour's survey as a Gothic building on stone arches, and he further states that it was repaired in 1651 and again in 1682. Galleries were built in 1641 and 1682, which have since been removed. The steeple was being rebuilt when Seymour wrote 1735, and various other works executed. The carved reredos, representing the Last Supper at Emmaus, was executed by Mr. Soffrin Alken of St. Ann's, Soho. It is taken from the noted picture by Titian, in the Louvre. This carving was executed the year the Tower was repaired, viz., 1735. It is a fair piece of workmanship, though strangely lacking in religious feeling.

But the most notable example of old work in this church is the great east window. The story of this window, though told before, will bear re-telling, as few works of art have passed through so many vicissitudes as this notable glass painting. The window, said to have been executed at Gouda in Holland, was intended by the magistrates of Dort as a present to Henry VII. Another story is that it was ordered by Ferdinand and Isabella on the occasion of Prince Arthur being affianced in 1499 to Catherine of Arragon. It passed into the possession of the Abbot of Waltham, who kept it till 1540. William Fuller, the last abbot, to prevent it falling into the hands of the Puritans, had it fixed in his private chapel. It next passed into the hands of Sir Thomas Boleyn, father of Henry's second wife. It was bought by Geo. Villiers, Duke of Buckingham; and then by General Monk, who had it buried. After the Restoration, Monk replaced it in his chapel at New Hall. It was finally bought by Mr. Conyers, of Copt Hall, Epping, for fifty guineas, and he paid a Mr. Price a large sum to repair it. His son sold it to the Commissioners appointed to repair and beautify St. Margaret's Church in 1758 for 400 guineas. When it was fixed, an action was brought against the churchwardens for having placed in the church an article forbidden by an Act of Edward VI., and the suit was continued for seven years. Few painted windows have had so romantic a history as this east window, and apart from its historical associations, it is a notable example of the glass-painter's craft. It is a five-light window of the Crucifixion, with the thieves on either hand. The six small tracery lights at top are emblematic of the Crucifixion, and consist of angels holding hyssop, crown of thorns, nails, rod and hammer, &c. In the two outer lights are figures of a knight in armour, well drawn, and a female figure, but the canopies are clumsy and in bad taste. The figures below, in small niches, of a young king and queen, are supposed to represent Prince Arthur and his affianced bride. The general tone of the window is blue, from the amount of sky in the design, and, owing to the depth of the shadows, the window has a dark appearance, and much of the work is consequently lost. The lower part of the window is occupied with many figures, two of them on horseback, while at the foot of the Cross are weeping figures, but much of the details are lost, owing to the strong shading. The subject portion of the window is contained in the three centre lights. The window is an example of the transition period in glass-painting. It lacks the simplicity, both in design and execution, of earlier work, and there is that leaning towards the pictorial, which, later on, brought such disaster on glass-painting. It is, nevertheless, a fine window, and well worth studying. It is said to have been five years in executing, and it was undoubtedly one of the best specimens of glass-painting of the day.

Coming to the modern glass, we turn, of course, to the great west window erected by the American people to the memory of Raleigh, who is buried in this church, and executed by Messrs. Clayton & Bell. This window, of five lights, is filled with large figures of Prince Henry, Sir Walter Raleigh, Elizabeth, Spenser

and Sir Humphrey Gilbert, and below these are small panels representing the "Sailing of Raleigh for America," "Landing of Raleigh in America," "Spenser Presented to Elizabeth by Raleigh," "The Imprisonment of Raleigh," and "The Burial of Raleigh." It will be seen, therefore, that the window is purely a secular one,—a notable departure in painted glass executed for Church purposes. The figures are treated in Messrs. Clayton & Bell's well-recognised manner, under white canopies, and, apart from the subject, are just as "churchy" as their other windows here. The colouring is throughout most rich and harmonious, and the execution leaves nothing to be desired. The drawing is bold, vigorous, and good, and the window is a very striking and beautiful object in the church. The following is the inscription below the window:—

"The new world sons from England's breasts we drew  
Such milk as bids remember whence we came,  
Proud of our past wherefrom our present grew,  
This window we inscribe with Raleigh's name."  
"This window, dedicated to the memory of Sir Walter Raleigh, was placed here by subscriptions from the U.S. of America, 1883."

Messrs. Clayton & Bell have also filled two large three-light windows in the south aisle, and the upper portions of two other windows in the same aisle. In the one nearest the east end three female saints,—Dorothea, Barbara, and Perpetua,—are figured. They are merely busts, with the emblems of each saint, and angels holding up a kind of figured curtain at the back of each figure. The execution of these windows is strikingly good, and we do not know better specimens of Messrs. Clayton & Bell's work than these three windows.

Two other windows deserve attention. These are the window erected to the memory of Lord Frederick Cavendish and the Caxton window. Both these were drawn by Henry Holiday, and, we believe, executed under his personal superintendence. The Cavendish window, in the west end of the south aisle, is in four lights, with upper and lower subjects illustrating scenes from the life of Christ. This window is in strong contrast to the Raleigh window, and it must be confessed that the Cavendish window does not compare favourably with the great west window. The drawing is delicate and refined, though a little too effeminate; but its chief fault is its pictorialness. It is an attempt to paint a strongly-coloured picture instead of a glass window, and the result is to some extent a failure. The colouring is too rich, and there is consequently an absence of that sparkle or gemlike quality which Clayton & Bell are generally successful in obtaining. We always welcome a new departure in any craft, and an intelligent striving after original effects is most laudable, but if the result is a failure, one would prefer a less striving after originality and a closer adherence to well-known and safe methods. This Cavendish window, looked at as a whole, is wanting in breadth and simplicity, and there is, furthermore, an absence of tone. There are individually some splendid bits of colour, notably some blues, in the window, but there is very little white glass employed, and, owing to the strong contrast of the other colours, what there is looks too much like holes in the window. It is full of work,—too full, in fact,—and the execution, careful as it is, is wanting in vigour and simplicity. It may interest some readers to re-read the inscription below, so we give it:—"Dedicated by his fellow-members of the House of Commons to the beloved memory of Fred. Chas. Cavendish, son of William, 7th Duke of Devonshire, Member for the Northern Division of the West Riding of Yorkshire for seventeen years; and Chief Secretary for Ireland. Born on the Feast of St. Andrew, 1836, and, like him, permitted, in singleness and humility of heart to follow his Lord, and with his blood to seal a life devoted to duty. On the day of his arrival in Dublin in company with, and in attempted defence of his colleague, Mr. T. N. Burke, he was murdered in the Phoenix Park, May 6th, 1882."

At the other end of the aisle is the Caxton window. It is a three-light window, containing figures of Bede, Caxton, and Erasmus, in niches with white canopies. The rich colour is entirely confined to the figure portions, and the canopies are strikingly white,—a little too much so, in fact,—but, on the whole, this window is successful; it follows the well-recognised lines, and little attempt is made to start aside from established methods. Caxton is in an olive-green dress, brown rose-pink for trimming, brown

boots, bluish-green head-dress. Erasmus a purple ruby dress, light pinkish-brown lining, brownish-green cap, warm brown boots, dark cold-green under mantle. It will be seen that the coloured portions of this window are very dark. Here, again, there is, perhaps, a slight want of tone, the white of the canopy being somewhat harsh against the coloured centres.

The church is crammed full of monuments, mostly of the sixteenth and seventeenth centuries. One of the most striking is the one,—*"To Marie, la Dudley, daughter of Wilt. 1st Howard of Effingham, in his time 1st High Admiral of England."* The tomb consists of the recumbent figure of a young woman, in the dress of the time, with a long red mantle, and high collar and ruff, set in a vari-coloured marble architectural niche. The figure is coloured,—as, indeed, most of the tombs of the time were,—and is in excellent preservation. The date is 1600. There is a quaint brass incised with figures, to a burgess named Cole; date 1597.

There is also a figure of Blanche Parry, chief gentlewoman of Queen Elizabeth, dated 1589, and another of Dorothy Stafford, "who served Queen Elizabeth forty years lying in her bed-chamber," date 1604.

Another earlier bust of a man, in a round niche, is that of "Cornelius Vandun, borne at Breda, in Brabant, soldier, with King Henry 8th Turney," date 1577.

Most of the tombs are interesting owing to the figures upon them, which, being dressed in the style of the time, have an antiquarian as well as artistic interest; and, from their number, it shows the church has always been a very important one. The church itself is of a distinct architectural value, and consists of a nave with clearstory windows, north and south aisles, with windows, and a chancel.

There is very little mural painting; and what there is, though admirably serving its purpose, is not noteworthy in any special manner. The pulpit is elaborately painted and decorated.

#### THE BRIGHTON CONGRESS OF THE BRITISH ARCHEOLOGICAL ASSOCIATION.\*

In our last issue we brought the report of the proceedings of the Brighton Congress down to the end of Wednesday, and we now resume the narrative.

On Thursday, the 20th, the party, in rather reduced numbers (on account of the overcast and threatening state of the weather), left Brighton for New Shoreham. On arriving at that town, now showing signs of the recovery of its old prosperity, the grand old parish church of St. Mary was the centre of attraction, and it was carefully and closely inspected by the visitors. Taking his stand in the chancel, in which service is now held, the nave having been demolished many years since, Mr. Loftus Brock, F.S.A., referred to the valuable monograph of the church prepared by the late Edmund Sharpe, M.A., which required no eulogium from him. He referred to the few points of the meagre history of the church relating to the building, by which it appeared that the church is first mentioned about 1103; the document quoted refers to St. Mary "de Haura Soraham," so that this cannot be the mother church of St. Nicholas, (Old Shoreham, and he read Mr. Sharpe's three propositions,—that the Norman Church was built after one original design that it was carried out at once, without interruption; and that it belongs to the later part of the Norman period, about 1130, not earlier. The later choir dates from about 1175, and of the clearstory, which is later still, the westernmost bays are about 1190 to 1200, and the rest of the choir about 1200 to 1210. Mr. Brock called attention to the three low arches, two leading into the lofty Norman transepts and the third into the choir, there being the line of the old Norman roof close above it on the eastern side, marking the height of the old choir, now superseded by the present lofty Transitional choir. He differed from Mr. Sharpe as to the date of these arches, and pointed out the various reasons why the work may be considered of earlier date, and not of continuous erection with the present Norman transepts, which are too large and lofty for their design, and later. The fourth arch opening into the nave is lofty and in proportion to it, the work being very ornate

\* See p. 252, ante.



mental with carved capitals, while the three arches have no mouldings whatever, and such plain caps of earlier work. The lower part of the piers agrees with the rest, but the shaft-like stone, probably from Quarr Abbey quarries, used as bonders, does not appear above the height of the other arches, where it also occurs, and this lower portion is of earlier date. This will account, Mr. Brooks said, for the respondents to the demolished nave which exist not being under the western piers, if we believe that they were of earlier date, and the nave dated at a later period. Also for two lines of roof of the side aisle, which appear on the east side of the transept wall. The top stage of the tower has pointed arches, but the workmanship and mouldings are the same as to the transepts and the lower part. Commenting upon the addition of the massive flying buttresses, two on each side of the chancel, the lecturer pointed out that these must have been added after the erection of the present early English vaulting, since traces remain of the older pilaster-like buttresses removed to make way for them. The site of the nave is low level with the churchyard, but one bay was reserved when the rest fell into decay, as an outcrop for the fine central tower, which needed it for support. The church, although of monastic type, has never been otherwise than parish church. Indeed, it is spoken of in the taxation of Pope Nicholas in 1292, only as "capella."

Mounting a well-appointed service of dogonettes and carriages, the party drove along the pleasant road to Old Shoreham, where another cruciform church was inspected. It is of smaller size, with a central tower supported on four ornamental arches, the zigzag pavement appearing here, although it does not so at any of the earliest existing parts of Old Shoreham. The external belfry windows are all but identical with the plainly moulded arches of the latter church, and were probably designed by the same hand although somewhat earlier. Proceeding to the north side of the nave, Mr. Brock pointed out that Saxon work and short work exists at the north-west angle, while near it, on the north side, is a blocked doorway of the same early date. It is a ring of arch stones and jambs of hard alk, with a narrow plaster strip on each side, carried around as a label. Three different kinds of building stone are used, as if for some variety of colour. The whole of the nave walls are of Saxon date, but on the south side this early work is somewhat obscured, although some of the windows are visible, cut into by the recent restored Norman windows.

Two plain Norman doorways, one on each side, exist, both being blocked, and exhibit in their neatly-worked Caen stone arch-stones, a great contrast to the rough work of the earlier period. Proceeding to Bramber, the party was met at the ivy-covered church, a relic of a great building of the earliest Norman period, Mr. Matthew Holbeche Bloxam and other antiquaries. Under his guidance the church and the ruined castle were inspected, a lucid description of each being given by him. The site consists of a deeply-moated hill, rising abruptly from the level ground once covered by the Arun, there being an elevated mound at the centre on which probably a Saxon shell of timber palisading formerly stood.\* An animated discussion ensued, in which Messrs. Bond and Buckler and Sir J. Picton took part, after which Mr. Buckler (architect to the Duke of Norfolk) pointed out the site of the building, the traditional site of the chapel.

The carriages being resumed, the next place visited was Steyning Church, where Mr. Gordon Hills acted as *cicerone*, and rendered a description of the building, which he has recently restored in a very careful and painstaking manner. The well-known Norman part of the church was carefully examined, and it was pointed out by the lecturer that the elaborate carving on the arches was of later date than the Norman arches, since some few portions are still plain, with the carving wholly wanting, while the labels of the north aisle arches are carved with a flower of fourteenth-century work. The church consists of a fine lofty nave, bold low western tower, erected since the Dissolution; the transepts and choir have disappeared, the present chancel being of shorter length and of more modern date. No traces remain of the canons' residences, the church

having been monastic. The town is remarkable for some interesting timbered buildings of very picturesque appearance. At the luncheon the health of the veteran antiquary, Mr. Bloxam, was proposed by Sir Jas. Picton, and responded to in a touching speech, in which Mr. Bloxam referred to his having passed his eightieth year.

The day had long since been enlivened by a full glow of sunlight, causing the beautiful scenery of this portion of the county to appear in its most brilliant aspect. The drive was continued to Edbarton Church, which was described by the Rev. F. Gell. The building is a very interesting example of a Sussex church of thirteenth and fourteenth century dates, the tower being somewhat later, and added to a western end, which had originally only a timbered spire. While tea was being partaken of, a sudden and violent shower burst over the party, the shelter being thus additionally welcome. It speedily passed away, and the party proceeded to the quaint little church of Pyecombe, where the chancel arch is of early Norman work, refaced, and having two small side arches. At the evening meeting in the Pavilion, papers were read as follows:—Notes on some Anglo-Saxon charters of the seventh and eighth centuries, relating to Sussex, by Mr. W. de Gray Birch, F.S.A.; and a description of the ancient earthworks at Wolestanbury, Ditchling, and Hollingbury, by Mr. Thos. Morgan, F.S.A., hon. treasurer, the chair being taken by Mr. Brinton, M.P.

On Friday, the 21st, a large party proceeded by train to Arundel to inspect the ancient castle, by invitation of the President of the Congress, his Grace the Duke of Norfolk, E.M. On arrival, the visitors were received by Capt. Mostyn on the Duke's behalf, and conducted through the whole suite of apartments, thrown open for inspection.\* The buildings are erected around a spacious courtyard, and are rectangular in plan, situated on a bold rising ground, well elevated above the level ground through which the river Arun flows. The whole mass presents an imposing appearance, rising finely above the town at the base of the hill, the ancient parish church of the Town and the Roman Catholic cathedral recently erected being very prominent buildings, particularly the latter. The ancient keep of the castle stands on a lofty conical hill, apparently artificial, and it is surrounded by a deep ditch. The entrance gateway is close to the keep, which commands the approach to it, and the group of the ancient buildings at this portion of the castle is extremely picturesque. The ruined keep was ascended by a large number of the party, and its relation to the other buildings examined. The mass of the castle is of modern date, having been erected at the close of the last century. The library is built with cypress wood, in the Gothic style of the period named; but much work of re-modelling has been done here and elsewhere, and to the exterior, by the present Duke. Most of the rooms have modern chimney-pieces, of great beauty, elaborately carved in stone. There are many beautiful works of art and interesting portraits, mostly of the long line of the dukes of Norfolk.

After leaving the castle, the Fitz-Alan Chapel was opened to the inspection of the party, who proceeded to examine the remarkable and unique series of ancient sepulchral monuments, which fill not only the Chapel, but the Lady-chapel parallel to it on the north side, attention being specially called to the little chantry chapel of Earl William, 1488, where the chantry altar remains. The work is of very great beauty, executed in closely-grained Purbeck marble, in seatings of long length, the uprights and the twisted pillars being in one stone. The whole was once highly polished, but is now, alas! in a state of ruin, an iron girder has, however, been inserted above it, to carry the mass of the wall above. The effigies are all remarkable, and the arrangements of this curious building have come down to our own times all but intact. The high altar remains, as does that of the sacristy beyond it to the east, and also the altar of the Lady-chapel. The fine open-timber roof has been removed long since, and a temporary makeshift placed over the building, but the elaborately-moulded oak stalls are rotting, the floor is perishing from decay, and the whole aspect of this noble building presented the saddest and most forlorn aspect. It is satisfactory, however, in examining the fragments of the roof

laid out for observation, that they are preserved for purposes of contemplated restoration.

The monument of Earls Thomas and William, 1524-1535, is covered with tracery and ornament, having a remarkable Renaissance feeling. After rendering thanks for the inspection of this seldom-opened building, the party proceeded to examine the parish church. The readers of the *Builder* have no need to be told that the church is cruciform on plan, having a central tower of no great height, the Fitz-Alan Chapel being the eastern arm of the cross, the choir of the College of Secular Canons founded here about 1380 when the whole building was erected.

The architecture agrees exactly with this date, and the workmanship of both buildings, design, &c., is identical.

Luncheon having been partaken of at the Norfolk Arms, the Bishop of Chichester being in the chair, a start was made to Bignor to inspect the Roman pavements there. The road taken was through Arundel Park, through scenery of great beauty. On arrival at Bignor, the story of the discovery of the beautiful pavements was told by Mr. C. Roach Smith, F.S.A., who proceeded afterwards to point out their principal points of interest. The father of the present proprietor, Mr. George Tupper, found one of the pavements in course of ploughing in 1811, and, further search being made, the foundations of a villa of large size were laid bare, together with many other tessellated pavements of great beauty and elaborate workmanship. One of these has a figure of Ganymede, another the head of Medusa, another the four seasons, &c., the whole being of excellent design. Mr. Roach Smith referred to the existence of the building, evidently of great size, to fit it as the residence of some persons of importance, and suggested that it was that of the official who had the collection of the local taxes. The villa may well compare with that in the Isle of Wight, of recent discovery, but the beauty of the workmanship here is greater. The size is about 250 ft. by 250 ft., the buildings being arranged along three sides of what appears to have been an open court. The ancient road, the Stane-street, from London to Chichester, runs along the hills in front of the villa. Mr. Thomas Morgan, F.S.A., followed with some remarks with respect to the general style and mode of arrangement of the Roman villas found so frequently in England, and pointed out that while in the south and west they were highly ornamented, those in the north were found destitute of ornament, but with the arrangements for heating all the more elaborate. Here at Bignor are some chambers with open fireplaces, but no flues are apparent. The pavements are preserved within three or four thatched huts. After Mr. Tupper had been cordially thanked for his care in the preservation of these remains, which so amply repay a visit to the remote spot where they are situated, the party proceeded to Amberley Castle and church, their journey being much hindered by meeting a huge traction engine in a narrow lane. Tea was partaken of in the grounds of Amberley Rectory, having been provided by the Rev. E. G. A. and Mrs. Clarkson. A hasty visit was then paid to the church under the guidance of Mr. Loftus Brock, who pointed out the beautiful Norman chancel arch. Passing through the postern opposite the western tower of the church, the castle was inspected, and the position of the principal buildings pointed out. A long day's work was brought to a close by the party being brought back to Brighton by a special train. Here, however, a pleasant evening was provided for them by the care and thought of the Mayor of Brighton, Mr. E. J. Reeves and Mrs. Reeves. The whole of the spacious rooms of the Pavilion were brilliantly illuminated and thrown open for the reception of a company of about 1,500 ladies and gentlemen. A lecture on Sussex songs and music was given by Mr. F. E. Sawyer, aided by a choir who rendered vocal illustrations. Many quaint old ditties were heard for the first time by people of this age, and were warmly applauded. Dancing followed, and was continued to a late hour. While the lecture and the dancing were in progress, a public fête took place in the Steyne Gardens, which were brilliantly illuminated by Chinese lanterns and electric light, and were witnessed by many thousands of spectators. A fine collection of rubbings from brasses in the Sussex churches

\* For a plan and description of Bramber Castle, see *Builder*, vol. xxiv., p. 565.

\* For a description of Arundel Castle, see *Builder*, vol. xxiv., p. 161.



was also on view in the Masonic Hall, prepared by Mr. T. C. Woodman.

On Saturday, the 22nd, the day was spent in visits to the little church of Preston, where there are some well-preserved wall-paintings, representing the martyrdom of St. Thomas-a-Becket, on the north side of the chancel arch, and of an angel weighing souls on the south side. Patcham Church was next inspected, where the recently-discovered wall-painting over the little Norman chancel arch was described by Mr. Geo. R. Wright, F.S.A. The subject is the usual one of the Day of Judgment, the work being in outline, red ochre on a white ground. It is almost, if not quite, of the same date as the arch. Wolstonbury Camp, a remarkable circular earthwork, was then visited, under the guidance of Messrs. Roach Smith and Thomas Morgan. It stands on a lofty hill overlooking the Sussex valley, a scene of great beauty and extent. It is circular in form, and contains many traces of hut circles, probably of ancient British date. The carriages being resumed, a visit was then paid to Hollingbury Copse, the residence of Mr. J. O. Halliwell-Phillips, F.S.A., where the whole of his remarkable collection of Shakespearian deeds, prints, and rare books were laid out for the inspection of the visitors under his guidance. Luncheon was offered to the whole of the party. Congratulatory speeches were made by Mr. George Wright, Mr. Roach Smith, and others, and many good wishes tendered to the hospitable owner of the collection, this being his birthday. After a prolonged stay, a visit was paid to the entrenchment, Hollingbury Camp, close to the copse.

This is a square earthwork, the angles being rounded. The position is a high ground overlooking the modern town of Brighton, and in full view of Wolstonbury Camp, while in the remote distance Chantebury Camp is clearly visible. Ditchling Camp can be seen nearer, and also the earthworks at the Devil's Dyke. The camp was described by Messrs. Roach Smith, Morgan, and Round, and Sir James Picton. In the evening a paper was read at the Pavilion, on Sussex Monastic Cartularies and early Charters relating to Brighton and Athingworth, by Mr. Richard Sims, of the British Museum, Sir James Picton being in the chair. This being the closing meeting of this week's portion of the Congress, complimentary votes of thanks for courtesies rendered were then accorded to the Mayor and Corporation, with a special vote to the Mayoresse; to M. De Paris and his friends, for the formation of the collection of paintings and drawings on public exhibition; to Mr. Woodman, for his rubbings of brasses, &c.; and to various others who had rendered such efficient aid to the Association in thus far carrying out the arrangements of the Congress.

On Monday, visits were paid to Lewes Priory and Castle, to Alfriston, and Pevensey, and the proceedings were brought to a close by another extra day spent in visits to Worth Church, Cuckfield, &c. Some notes of these visits will appear in our next.

## Illustrations.

### ST. GEORGE AND THE DRAGON: SCULPTURE BY MR. J. E. BOHEM, R.A.

WE give this week an illustration, from a photograph lent by the sculptor, of this work, which was the central object in the Octagon Hall at this year's Royal Academy Exhibition. We should, of course, have included it among the sculpture illustrated during the continuance of the exhibition, but as photograph of it was then available. We commented on it in our usual notice of the Academy sculpture, p. 717, vol. xlviii.

### NEW TOWN HALL, NEWPORT, MONMOUTHSHIRE.

WE give this week plans, two exterior views, and one interior view of the new Town Hall at Newport, which was opened on Monday last. It is now about three years since advertisements were issued for designs for a new Town Hall to be erected upon the site of the old building, which had become too small for the increasing business of the corporation. This resulted in 38 designs being sent in by competitors from all parts of England, the estimated cost varying from 6,000l. to 30,000l. After con-

siderable deliberation two plans were accepted, the first prize being given to Mr. E. A. Lansdowne, of Newport, and the second to Mr. Thomas M. Lockwood, of Chester; and these gentlemen were ultimately appointed joint architects for the new building. The main public entrance is under the centre of the tower. On the right is placed the commercial reading-room. The opposite side is occupied by the town clerk's offices, consisting of public office, with desk and inquiry counter, and two private offices behind. A munition-room is provided in the basement. Provision is made by means of a lift for conveying books and papers to the committee-room on the first floor. The police court, with retiring-room, is conveniently placed, having entrances from the main corridor for magistrates, solicitors, and other persons having business in the court. The public have their entrance from Dock-street, up the staircase through a special corridor. Convenient rooms are also provided for witnesses in waiting, and for consultation.

The Council-chamber is situated on the main floor, at the corner of Dock-street and Austin Friars, having access for officials and councillors from Commercial-street as well as from the staircase leading to Dock-street. Besides this, there is an entrance for the public from Austin Friars, and a public gallery is provided at this end of the council-chamber. This room is lighted on two sides facing Austin Friars and Dock-street, and is 26 ft. from floor to ceiling. It is paneled and finished in oak. The wood ceiling is decorated, and there is stained glass in the windows. The tables for councillors have two circular ends, and are so arranged that they can be disengaged, and form eight distinct tables. The chairs are of special design, and with the mayor's seat form a very handsome suite of furniture. Tables are also provided for the Town Clerk and Surveyor, and special provision is made for reporters.

The Mayor's parlour is close to the Council-chamber, and is furnished in walnut, with chairs finished in tapestry work. The upper portions of the windows have stained glass.

The assembly-room is placed on the first floor over the police-court and its adjoining offices, having its main entrances on each side, one from the grand staircase on the Commercial-street entrance, and a second up the stairs from Dock-street. Besides these there is a third entrance to the platform, in connexion with retiring-rooms, lavatories, water-closets, &c. The public hall is lighted on both sides by eight large double windows, the upper portions of which are filled in by stained glass with figure subjects and various mottoes appropriate to its public and municipal uses. From the doorway of the room nearest Commercial-street access is gained to a wide and ample corridor leading to a large committee-room on the left, facing the street, in which the larger committees will sit. The Town Surveyor's suite of offices are on the opposite side of this corridor.

The offices for rate collector, clerk to cemetery, nuisance inspector, weights and measures, and gas-testing office are approached by an entrance from Austin Friars, from which access is also gained for the public to the Council-chamber. Provision is also made for the School Board, with Board-room, clerk's office, and inquiry office in Dock-street.

The police offices comprise public office, superintendent's office, parade-room, and sergeant's-room. Adjoining this is a corridor leading to the cells, those for drunkards being placed close to the parade-room, so as to admit of constant inspection. The remainder of the cells—eleven in number, seven for males and four for females, with special means of separation,—are so arranged that each has its light and air from the open courts.

The warming and ventilating has been carried out by Messrs. Haden & Son, of Trowbridge and Manchester. The system of heating is by means of hot-water pipes, while that of ventilation is by means of an extraction shaft, 95 ft. in height from basement, in which is placed a cast-iron smoke-flue from the heating apparatus. The artificial lighting of the Council-chamber, police-court, and assembly-room is effected by means of sun-lights, the latter room being lighted by four of Messrs. Sugg & Sons' patent sunlights: the remainder of the rooms, corridors, &c., being by means of pendants and brackets of modern design, the whole being executed by Mr. Greenway, of Newport.

The whole of the floors throughout the building are of wrought-iron fire-proof con-

struction, by Messrs. Dennett & Ingle, of London, this arrangement being not only for protection against fire, but preventing transmission of sound through the floors.

The exterior towards Dock-street and Austin Friars is faced with blue Pennant wall and Grinshill stone dressings. The Commercial-street front is executed in Grinshill throughout, including the central tower, rises to a height of 150 ft. to the top of the tower. In the upper portion of the tower are four circular openings, about 8 ft. diam. filled in with clock dials, which may be from all parts of the town. The clock has been manufactured by Messrs. Lund & Blockley, London.

The general contract has been carried out by Mr. John Linton, and the special work by following firms:—Constructional ironwork fireproof floors, by Messrs. Dennett & Ingle, Whitehall, London; warming and ventilation by Messrs. Haden & Son, of Trowbridge; ornamental wrought-iron gates and railings, by Messrs. W. H. Baker & Co., of Newport; fittings, including pendants and sunbursts, also the speaking-tubes, by Mr. G. Greenway, of Newport; locks and internal ironmongery, by Messrs. Charles Smith & Sons, of Birmingham; stained glass and ceiling decorations, by Messrs. Shrigley & Hunt, of Lancaster; pavements, by Mr. Ludwig Oppenheimer, Manchester; lifts by Messrs. Thomas, of Cardiff; town clock and bell, by Messrs. Lund & Blockley, of Hall-mart, London; carving, both exterior and interior, by Mr. Tudor Davis, of Newport; internal fittings and counters, by Mr. J. Linton. The whole of the furniture has been designed by the architects, and the work carried out by Messrs. Trappell & Gane, of Bristol. Cardiff. Mr. George Jones, of Newport, the clerk of the works.

### A HOUSE AT WIMBLEDON-COMMON

THIS house has just been completed, the designs of Mr. E. J. May, of 21, Hart-street, Bloomsbury-square. The entrance, or elevation, faces the Common, and the window by the fireplace in the drawing-room to obtain that view, but nearly all the room in the house have the southern or garden aspect. The house is built with red bricks and a roof, and the half-timber work is carved by the illustrations are taken from drawings this year's Royal Academy. The builders are Messrs. Adamson & Son, of Tarnham-green.

### SCIENCE AND ART DEPARTMENT

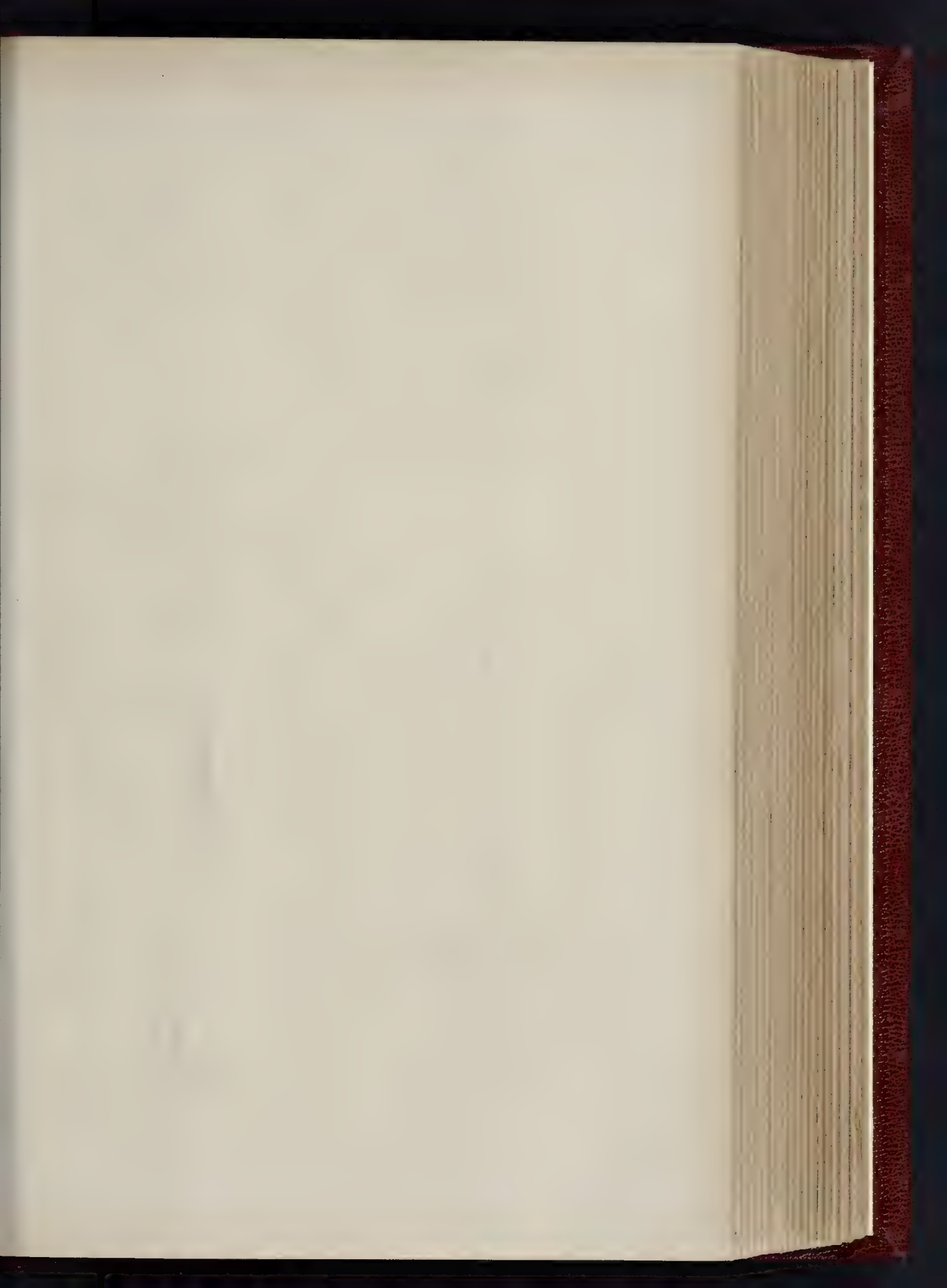
The following is a list of successful candidates for Royal Exhibitions, National Scholarships, and Free Studentships, May, 1885:—

| Name and Age.            | Occupation.           | Address.                |
|--------------------------|-----------------------|-------------------------|
| Burton, William, 23      | Science Teacher       | Manchester              |
| Gray, Philip L., 19      | Assistant Master      | Southampton             |
| Lang, Charles, 23        | Engineer              | Johnstone, N.B.         |
| Clarkson, Thomas, 20     | Engineer              | Pendleton, Manchester   |
| Hadley, Harry E., 18     | Student               | Worcester               |
| Sandmore, William, 16    | Student               | Northampton             |
| Lanchester, Fred W., 16  | Architect's Assistant | Southampton             |
| Holland, Thomas H., 18   | Student               | Helston                 |
| Hey, Harold E., 14       | Student               | Manchester              |
| Blackmore, William, 18   | Student               | Sheffield               |
| Bennie, Hugh O., 20      | Engineer              | Glasgow                 |
| Kelsall, William, 17     | Student               | Bradford                |
| Sowerbutts, Henry, 17    | Student               | Manchester              |
| Chattaway, Frederick, 24 | Chemist               | Birmingham              |
| Young, James, 23         | Shoemaker             | Belfast                 |
| Moulton, Arthur J., 20   | Engineer's Apprentice | Preston                 |
| Coots, Harold C., 17     | Student               | London                  |
| Unsworth, Robert H., 20  | Engineer              | Pendleton, Manchester   |
| Woolhouse, Sidney H., 16 | Student               | Wesley, Manchester      |
| Wilkinson, David, 21     | Agent                 | Preston                 |
| Mottram, Henry P., 19    | Student               | Small Heath, Birmingham |
| Briscoe, Albert E., 17   | Machinist             | Birmingham              |
| Preston, Orlando J., 16  | Student               | Bristol                 |
| McKenzie, James, 20      | Engineer              | Glasgow                 |
| Coultais, Philip C., 18  | Student               | Bristol                 |

\* National Scholarship. † Royal Exhibition.  
‡ Free Studentship.

**Folkstone.**—A single-light window has been placed at the east end of Christ Church, Folkstone. It represents a cross surmounted by foliage and other ornamental work. The artists are Messrs. Mayer & Co.





THE BUILDER, AUGUST 29, 1885







BY PHOTO. SWAN, N. & CO. LONDON.

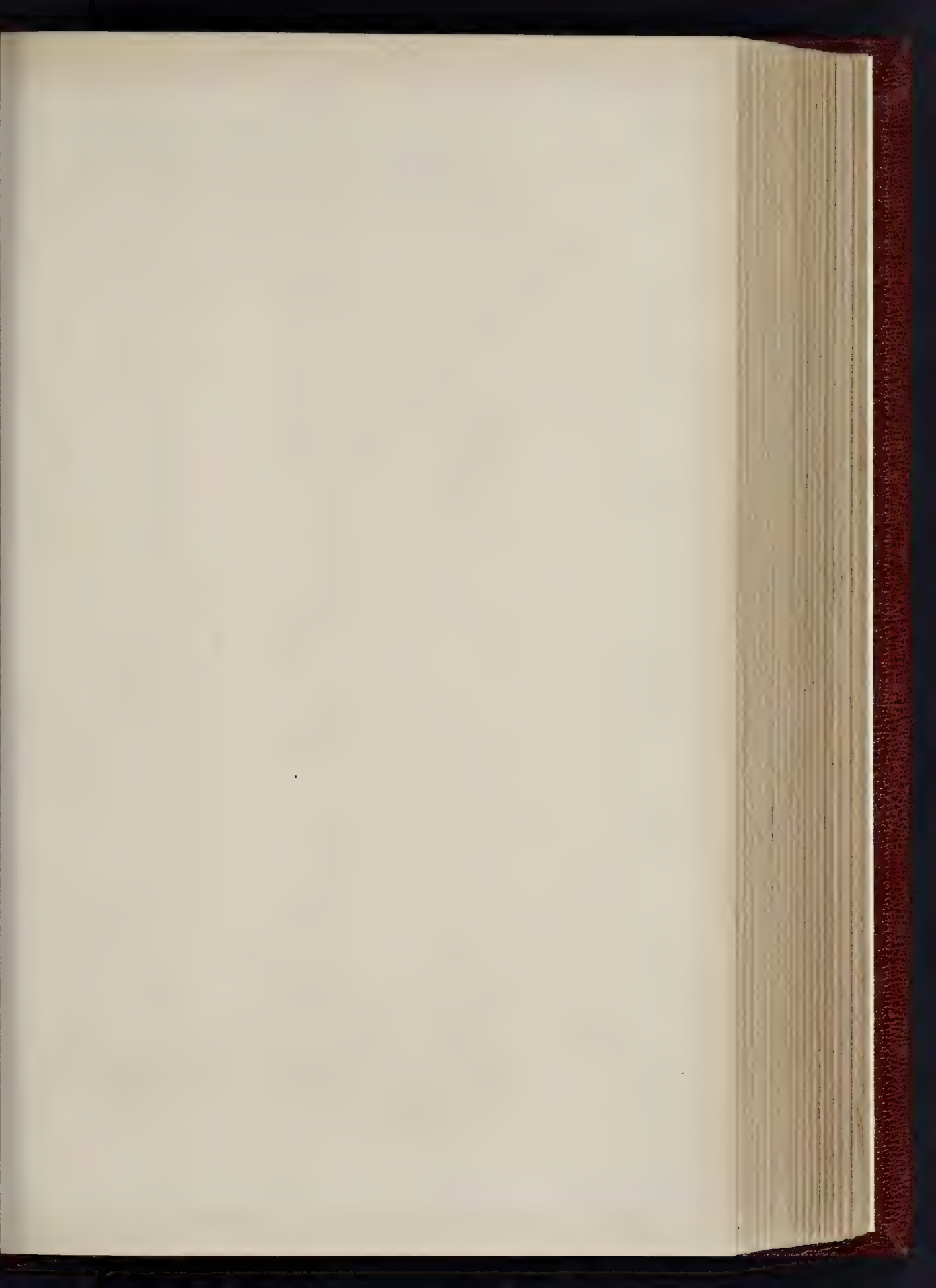
ST. GEORGE AND THE DRAGON

FROM THE RECENT ROYAL ACADEMY EXHIBITION

MR. J. E. BOEHM R.A. SCULPTOR

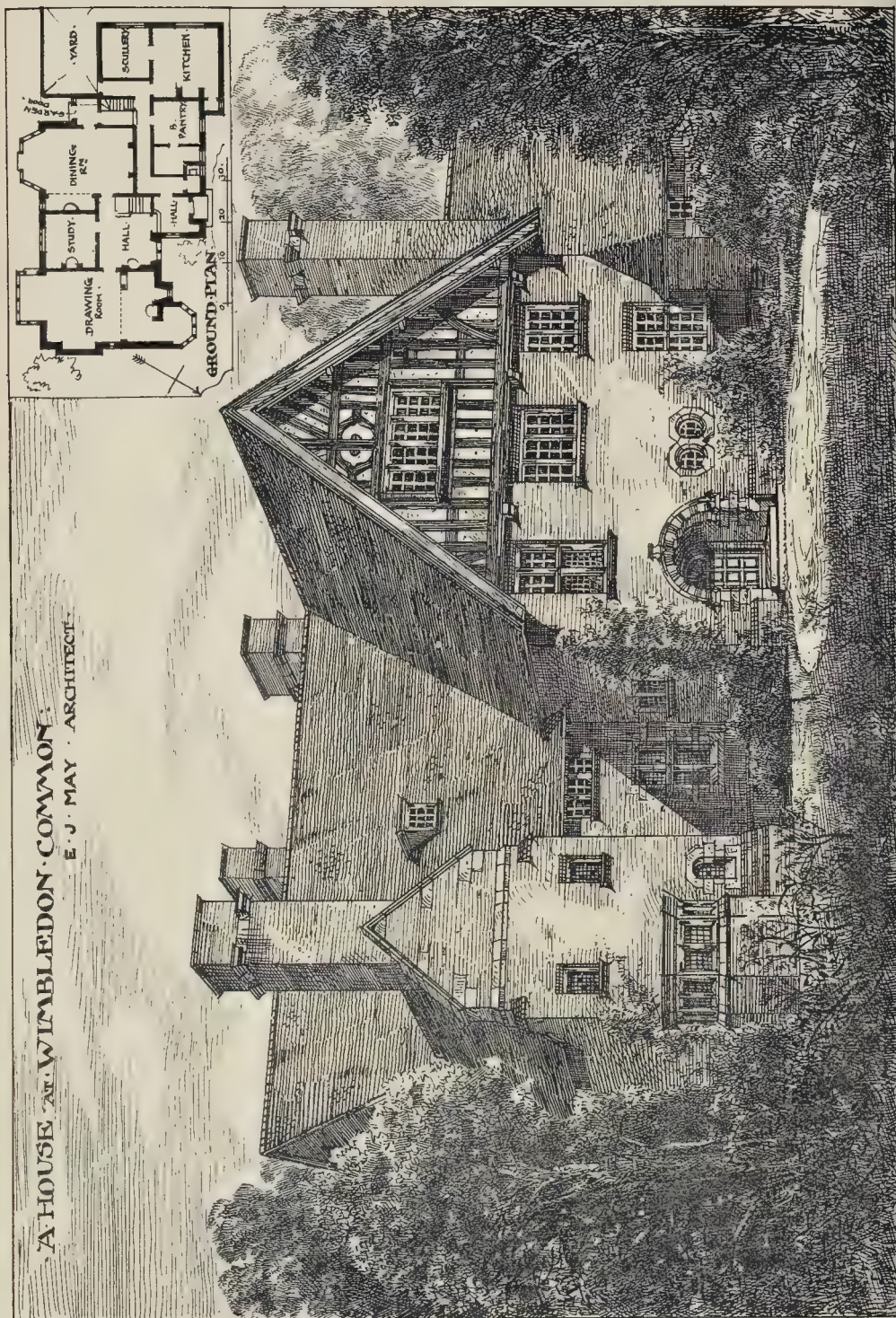
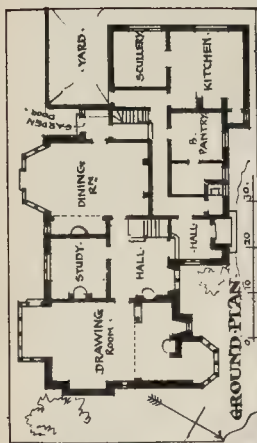




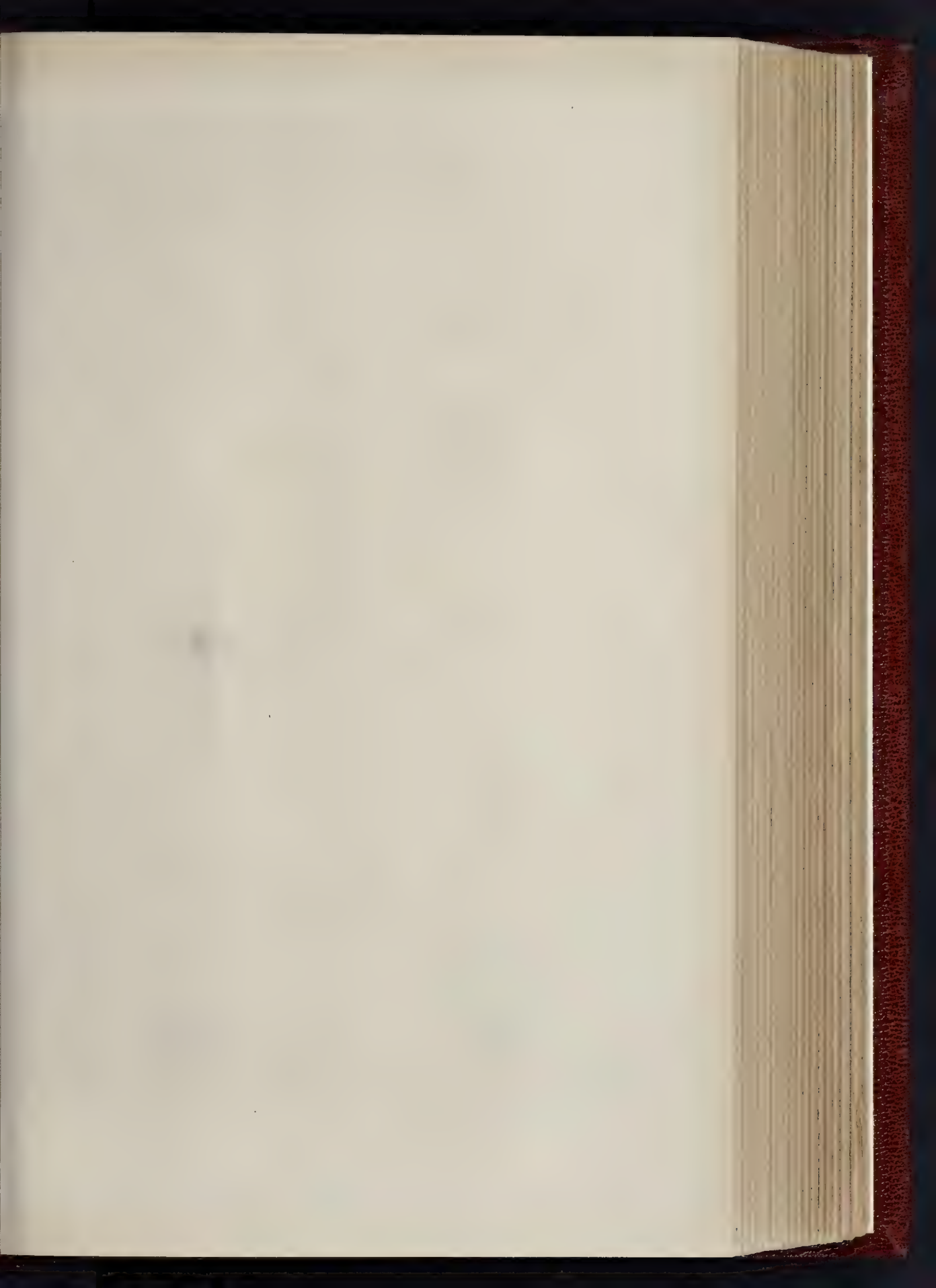


THE BUILDER, AUGUST 29, 1885.

# A HOUSE AT WIMBLEDON COMMON. E. J. MAY, ARCHITECT.







NEW TOWN HALL  
and Municipal Offices.

NEWPORT MON.

Prospect from Commercial St.



MESSRS. T. M. LOCKWOOD AND E. A. LANSDOWNE, JOINT ARCHITECTS.





NEW TOWN HALL: NEWPORT: MON.: INTERIOR VIEW OF COUNCIL CHAMBER:.

MESSRS. T. M. LOCKWOOD AND E. A. LANSLOWNE, JOINT ARCHITECTS.





HOUSE AT WIMBLEDON COMMON.

E. J. MAY, ARCHITECT.

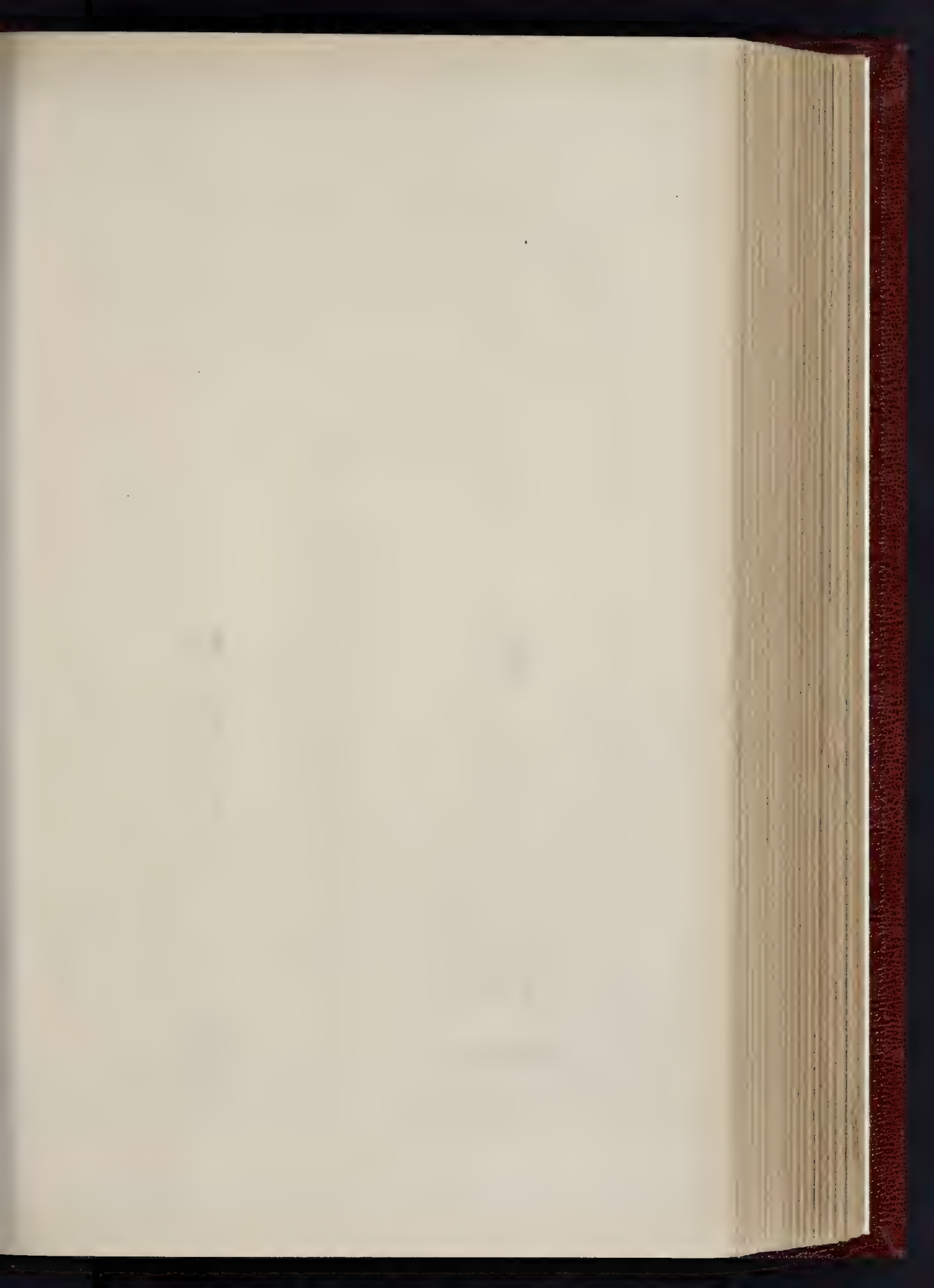


Photo. Lubbock

Wimborne, Dorset, W.C.







— · BOROUGH · OF · NEWPORT · MON. · —  
 — · NEW · TOWN · HALL · —  
 and · Municipal · Offices · —

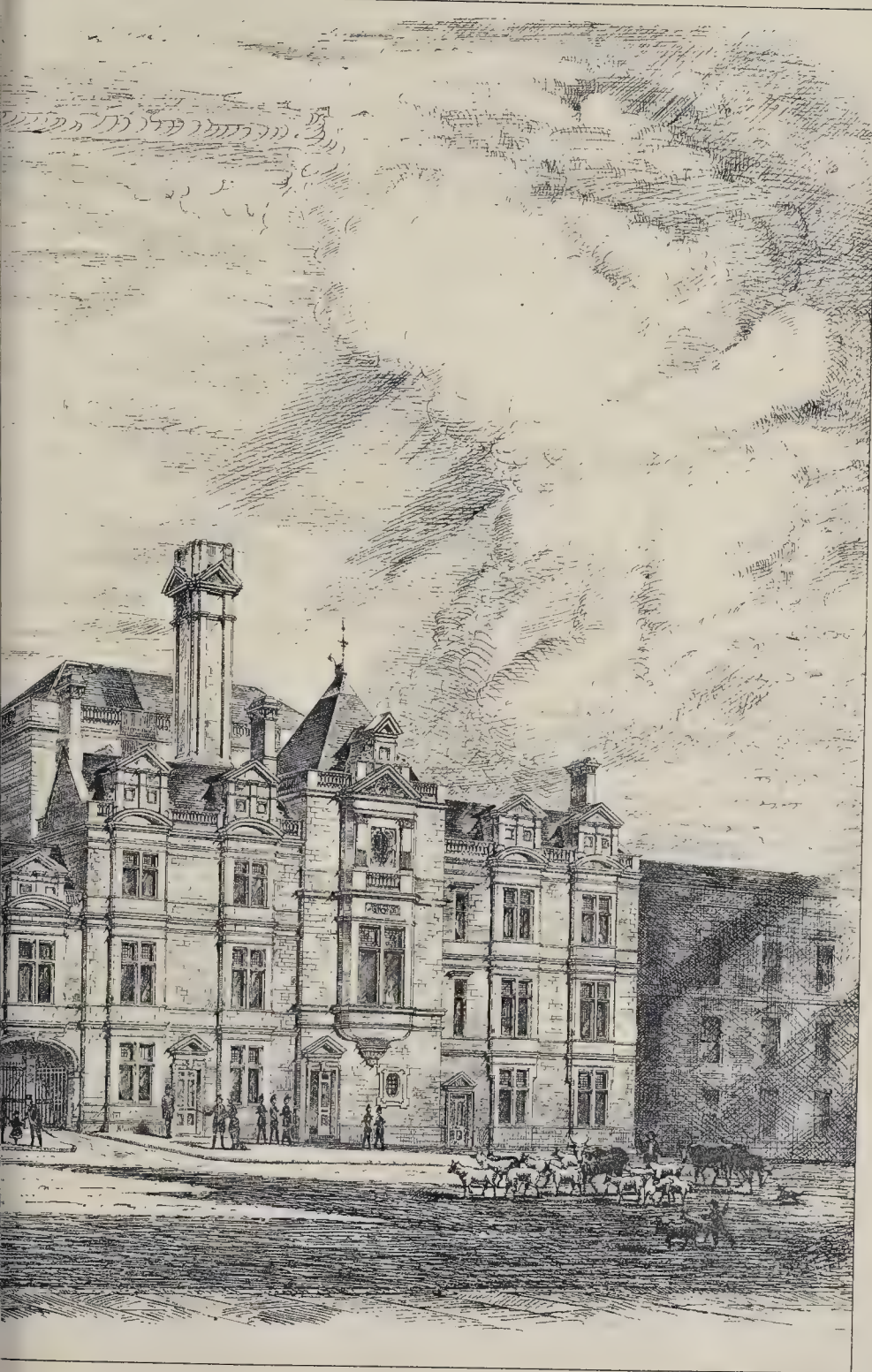
: Prospect from Dock Street : —



C F Kell Photo Lith & Printer

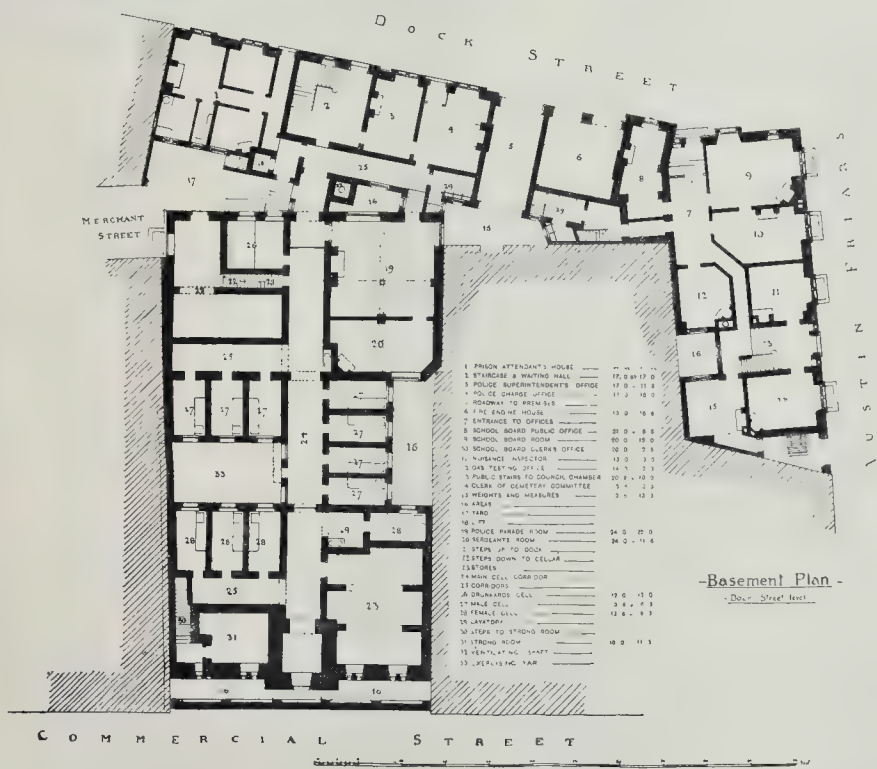
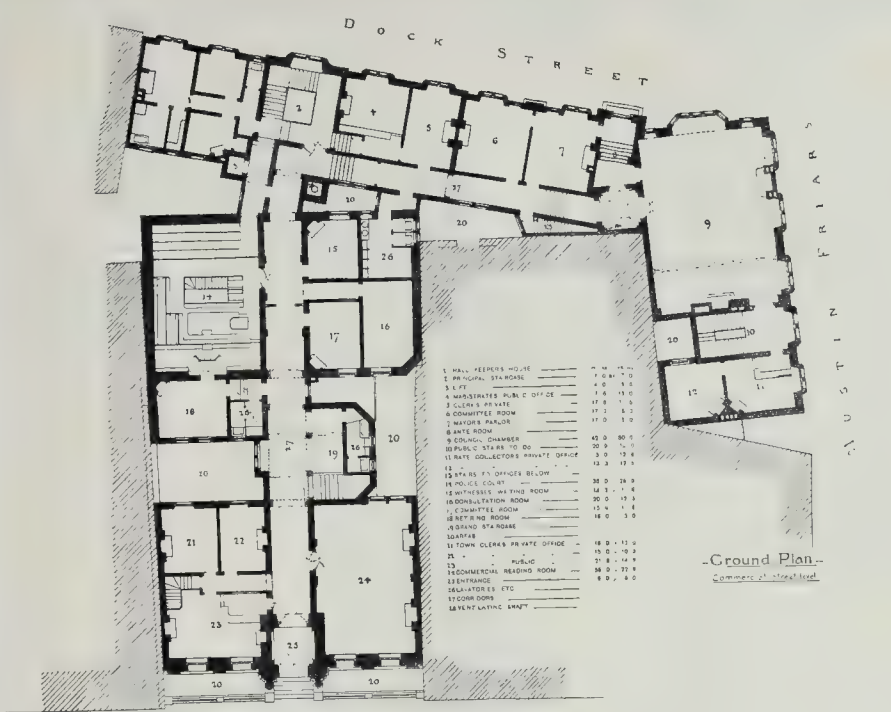
MESSRS. T. M. LOCKWOOD & CO.











New Town Hall, Newport.—Plans of Principal Floors.

THE CAMBRIAN ARCHAEOLOGICAL  
ASSOCIATION AT NEWPORT,  
MONMOUTHSHIRE.

On Monday, August 24th, the Cambrian Archaeological Association opened their Fortieth Congress, in the town of Newport, Monmouthshire. Although this county was severed from Wales and united to England 350 years ago, it still remains to all intents and purposes Welsh to the backbone. Kymric place names are retained in many of the churches, services are held alternately in English and Welsh, while frequently in the Dissenting chapels not a word of English is heard from one year's end to another, and to this happy bourn law-abiding Kymric comes in his hundreds on each succeeding Sabbath-day to evade his own Sunday Closing Act. Though Monmouthshire ceased to be Welsh land in the reign of King Henry VIII., the authority of the Lords Marchers was maintained until 1689, so that it clearly comes within the province of a society whose *raison d'être* is to study the antiquities of Wales and the Marches.

Newport strangely resembles the great towns of South Wales, Swansea, Cardiff, &c. Though built on very ancient sites, these towns themselves are of quite recent growth. Newport and Swansea were founded in the reign of Henry I., and Cardiff long before, yet in the earlier part of this century they were all three insignificant villages, lying under the shadow of their ruined castles, Carmarthen and Haverfordwest being the largest towns in the principality. In 1881 we find Carmarthen with a population of 10,514, and Haverford 9,177; but Swansea numbered 100,590, and Cardiff, 82,761; Newport, 38,875. The growth of these towns has been so rapid, that apparently the builders had not time, even if they had the inclination, to study effect. The result is, a hideous conglomeration of squalid houses, reminding one of a cross between Wapping and the slummy parts of Hull. Sweetness and light are conspicuous by their absence, particularly sweetness. Such, at all events, was the state of things a very short time ago, but at length slumbering art has awoke, fine streets are being driven through rookeries, and handsome houses are rising on all sides. Newport is not behind her sister towns; indeed, her sons do say that there is a more healthy progress in action here than can be found elsewhere on the shores of Severn Sea, and that it will not be long before their neighbours will address letters "Cardiff near Newport." Among the outcomes of this regeneration is the new town-hall of Newport, which was inaugurated on Monday last by the reception of the Cambrian Archaeological Association, and is described and illustrated elsewhere in the present number.

It was a pleasant chance that led the Cambrian Archaeological Association to fix on Newport as their headquarters this year, and the good folks of this town at once decided that the popular President-elect, Lord Tredegar, should inaugurate their town-hall as well as the Cambrian Congress with his address.

At eight o'clock the members and visitors met in the Assembly-room of the new Town-hall, and Mr. Banks, the treasurer, proposed that, as the presidency was vacant by the death of the late Sir Watkyn Williams Wynn, the chair should be taken by Mr. Octavius Morgan. This was seconded by Mr. Wood. Mr. Morgan briefly returned thanks, reminding the members that he was the oldest "Cambrian" present, and then called on his nephew, Lord Tredegar, to give his address as President.

His Lordship, after thanking the meeting for the honour they had done him in electing him President, alluded to the great loss sustained not only by the Association but by all Welshmen through the death of Sir Watkyn. He proceeded to state that, personally, though not a professed archaeologist, yet, as a good Monmouthshire man, he could not be indifferent to their studies; in truth, the history of Monmouthshire was an epitome of the history of England. Silurian, Roman, Welshman, Saxon, Dane, and Norman had each in turn left his trace on their land. One great objection he had to archaeologists, and that was their evil custom of upstaging good old stories. Doubtless there were many present who disbelieved in King Arthur; for his part, when hunting in the neighbourhood of Caerleon with the Liangbby hounds, he had often fancied he had actually heard Arthur's mystic pack give tongue. He

feared this was not strict archaeology, but if he had worked up his "Cox's Monmouthshire" no doubt he might have done better; the only drawback was that he would have been found out. The other day he was reading a "History of Newmarket," and in that he discovered that the first horse-race in Great Britain was held at Caerleon-on-Usk. Of late years an inscribed stone had been discovered, which the members would see to-morrow. This definitely settled a question which had for a long while been a crux to Monmouthshire antiquarians, "Who was it who embarked their shores?" The stone answered this question in full. It was done by the second, or Augustan, Roman legion. Many British camps in the neighbourhood were well worthy of their notice, and he hoped in the course of the week to show them one in Tredegar Park, but he warned them that the hill up to it was steep, and that the attacking force must not be faint-hearted.

The Rev. Canon Thomas proposed a vote of thanks to his Lordship, which Mr. Banks seconded.

Mr. Laws, the general secretary for South Wales, then read the report, which was duly adopted.

Canon Thomas then proposed a vote of condolence with Lady Wynn, the widow of the late President.

Mr. Mitchell read a very able paper on the history of Gwentlog, which concluded the business of the evening.

On Tuesday morning the members of the Association, having mustered at the King's Head Hotel (their head-quarters), crossed over to the railway station, and took the 9-17 train for Magor (Welsh Magwyrt, the wall). Here carriages met the party, who drove to the church. In this there is a fine fourteenth-century coffin lid, which might be better cared for, and a little scrap of beautiful carved work, proving that once upon a time this church was adorned with a grand rood screen.

From Magor the party proceeded to Caer Went, Venta Silurum, one of the best preserved relics of Roman occupation in a country abounding in these memorials. The Romans seem to have found some sort of a stronghold at Caerwent, which was known to the natives by a name not dissimilar to that which it now bears; as Gwents, or Wents, were very common in Britain, the conquerors distinguished this town as Venta of the Silures. On the old British site, the Romans built a walled town, and their lines of defence are still easily to be traced. They fortified a little hill, which rises out of the surrounding plain, their walls being in the form of a parallelogram, 500 yards long by 400 wide. Through this permanent camp ran the Via Julia, which was the main road from Gloucester to South Wales. The walls are singularly perfect in places, and are built of carefully-hewn stone; the interior where that is laid bare showing the herring-bone construction. Caerwent seems to have been destroyed or to have fallen into decay during the period of Roman occupation, no trace of any subsequent race is to be found. Major Lowe acted as *cicerone* for the party, not only at Caerwent, but until they parted at Chepstow, and did his work wonderfully well. He pointed out to the party that the southern wall was known as the Port Wall. Tradition declares that this is so-called because in Roman days the sea came up to the foot of the fortification, and certain iron rings were fixed in the walls that ships might be moored thereto. The relative levels of sea and land show that in this, as in many other matters, tradition cannot be trusted; but Major Lowe averred that he had excellent reason for believing that the rings did exist, a man still living having described to him an iron ring, with a diameter of some 10 in., which he remembered seeing affixed to the top of the wall. The Major believed these rings led to the tale of the seaport. What the use of the rings may have been is a mystery. The walls of Caerwent inclose a space of some 40 acres; within this area coins are frequent; pottery, on the contrary, is rare. Outside the fortification many Roman foundations have been found, which are described in the *Journal* of the Monmouthshire and Caerleon Archaeological Society.

From Caerleon the carriages drove on to Caldicott. The interesting castle in this village they did not see. The present owner (who is a member of the Cambrian Archaeological Association) is at present engaged in enlarging and beautifying the ruin, and wishes to complete

his improvements before submitting them to the judgment of the antiquarian world.

Port Skewet (or "Portskewett," as the "Post Office Guide" has it) was the next halt. At this place there was a great fight over the meaning of the name, and as the combatants seemed to the writer to be working in a vicious circle, he strolled off and discovered a good specimen of the village stocks, which in all probability are the last that have been used for the correction of offenders. About six weeks ago a navy employed on the Severn Tunnel got drunk. His comrades were so shocked by such an unwonted sight that they clapped him into the stocks, and left him there all night.

At Portskewett is a very old church, though it cannot claim, perhaps, the honour of having been built by Harold; though its friends aver that this was the case, it seems to be Norman.

From Portskewett the party drove to St. Pierre, through the beautiful deer park, where they were most kindly entertained by Mrs. Lewis in the absence of her husband. St. Pierre, for five long centuries, has passed from father to son in the Lewis family. As may be supposed, it is filled with relics of various kinds that make a collector's mouth water. Long may they (the relics, not the collectors) stay there.

Pausing at the interesting old palace of the bishops of Llandaff and their manor-house of Moynes Court, which was kindly opened to them, the party passed on to Chepstow. Chepstow shows by its name that it is an English foundation, "the fortified market-place."

Growing, as it were, out of the live rock, Chepstow Castle guarded the mouth of the Wye. Few, if any, of the magnificent fortresses with which the Normans bridled England and Wales excel William Fitz-Osbern's stronghold, for it is usually ascribed to this comrade of the Conqueror. After the disgrace of its founder, Chepstow fell to the great family of Clare, then to the Marshalls, the Herberts, and the Somersets, to which family, as represented by His Grace the Duke of Beaufort, it now belongs. It consists of four wards. The great gate, defended by two circular towers, is entered from the town side. Round the first quadrangle were ranged the hall, the state apartments, and the kitchen. The curtain between the first and second ward is pierced by a gateway; the third ward is entered from this; going thence into the fourth division we find a postern flanked by two towers, and giving an exit by a drawbridge across the moat. The keep is in the first ward, the chapel in the third.

Of the many generations who have lived in Chepstow Castle, no individual is better known than the regicide, Henry Marten, who, for twenty long years, was a close prisoner in this fortress. Marten was a member of the Rump. Who his constituents were is not very clear, but it is generally supposed that he represented some place in Berkshire. He was tried after the accession of Charles II., and found guilty of regicide, but his life was spared, and he was confined in the keep of Chepstow until 1680, when he died, and was buried in the chancel of Chepstow Church. According to the great Protector, Marten was "a lewd liver"; but in an epitaph of his own composition he declares himself to have been,—

"A true Englishman,  
Who in Berkshire was well known  
To love his country's freedom 'bove his own.  
Examples preach to th' eye; care then, my sons,  
Not how you end, but how you spend your days."

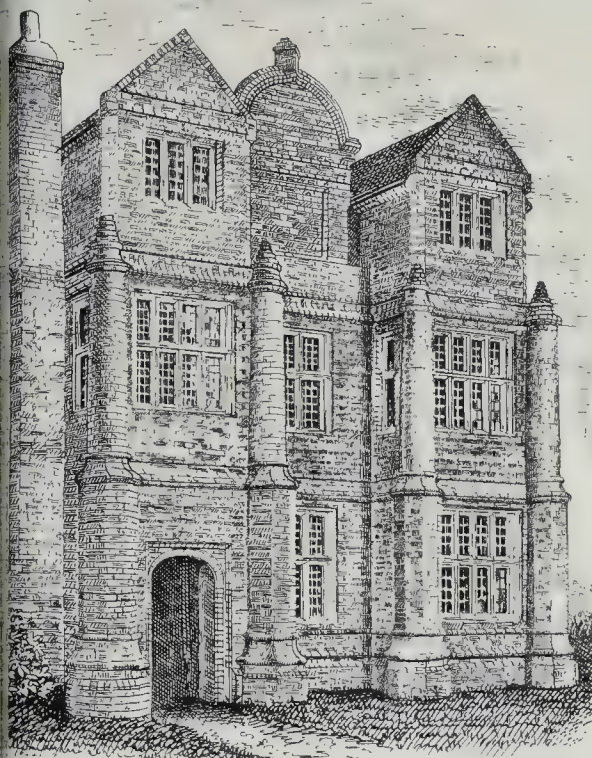
We will continue our notes of the meeting next week.

THE ARCHITECTURAL ASSOCIATION'S  
VISIT TO ROCHESTER.

The Architectural Association made their fourth Saturday afternoon visit to Rochester, on the 22nd inst., Mr. Arthur Baker acting as guide.

The first place visited was the Castle. A short historical account was given by Mr. Baker. The first notice of a castle at Rochester is in the year 670, when it is recorded by Bede that Bishop Picta at a Synod at Hereford, spoke of a castle in Kent, called Rochester, which would apparently show that the castle and bishopric went together. In 789, the charter of King Offa speaks of land given to Bishop Weremund for the use of the Church of St. Andrew, placed in the castle of Rochester. In the Domesday Survey, reference is made to an exchange of land between the Conqueror and Odo, Bishop of Bayeux, for the site of the





Quarry House.—From a Drawing by Mr. H. Baker.

castle at Rochester. Odo espoused the cause of Duke Robert and fortified Rochester, but the castle fell into the hands of William, and was held by the king till 1126. Between 1077 and 1108, Gundulph, Bishop of Rochester, who rebuilt the cathedral, agreed to rebuild the castle for 600, in consideration of Rufus restoring to his church the manor of Hedenham; but it is hardly probable, even at his early age, that a complete castle could be built for 600, as the castle at Dover, of the same age, cost 1,085. In 1126, Henry II. granted to William de Corbeil the custody of the castle, with permission to make within it a defensive tower such as he liked. This is probably the tower now remaining. At the close of John's reign it was besieged and taken by the king. In 1216 the barons invited Louis of France to take the crown of England. He occupied the castle, but lost it on the 30th of May, 1216. In 1368 the large sum of 12031. was spent in repairing the castle by the then Prior of Rochester. The only architectural remains of any interest are the arches of the arcade in the banqueting-hall and two fireplaces. These appear to have had no flues, but only openings through the wall just above the arch of the opening. The position of the well in the centre of the tower is curious with a circular shaft, which passes up through the centre wall with openings on each floor. There is also a shaft which is supposed to have been used as a flue for food.

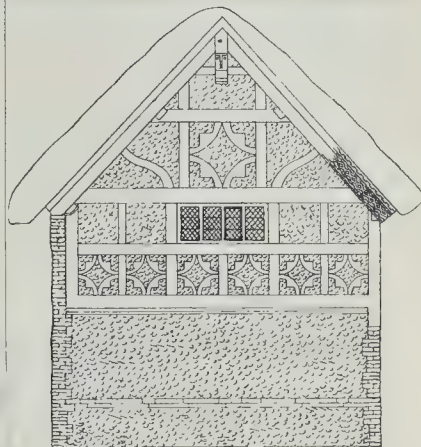
The next visit was made to the cathedral. Here Mr. Baker, by means of a large plan which had been prepared by Mr. St. John Hope, pointed out the various dates of the different portions of the cathedral. The members then went to Restoration House, which was illustrated in the *Builder* of the 22nd inst., and, after spending an hour in examining the interesting woodwork of the interior, they passed to Eastgate House, which bears the date of 1691 on one of the beams of the principal rooms. This old house is built of timber and stucco, and probably at one

time had some connexion with Restoration House, as the curious squint in the front room of the latter house looks directly on the Eastgate House, and it is thought that a secret passage passed from one to the other. The turret staircase has a quaint roof, the turret being six-sided, and the roof (an ordinary saddle back) is more curious than pleasing. There are some elaborate plaster ceilings, but the scale is very coarse for the height of the rooms. There are also several good wooden mantel-pieces.

The last house visited is now called Quarry House, from the quarries which surround it, and which, within a few years, will necessitate its being cleared away altogether. It is a quaint red brick Jacobean house, only a part of which remains, and is used as a tenement; there is a fairly good wooden mantelpiece on the first-floor, but the chief interest is in the exterior, of which we give a view from a drawing kindly lent for the purpose by Mr. Herbert Baker.

The visit was a great success, and great service was done by Mr. Herbert Baker, who prepared the drawings which we published last week, and who brought also several other interesting drawings of Restoration House on the occasion of the visit.

**The Chapter House, St. Paul's.**—This building is about to be extended by the erection of an additional story. The frontage of the structure is also to be cleaned and refaced by pointing, while the interior will undergo rearrangement. A short time since the Bishop of London, at a meeting in connexion with diocesan affairs, expressed a desire to have a residence near the cathedral, and there is reason to believe that the works in progress have been undertaken with a view of meeting his wishes, and are being effected in anticipation of his residing at the Chapter House during a certain portion of the year. The alterations are being made under the superintendence of Mr. Penrose, the architect to the Dean and Chapter.



Selden's Birthplace.—Elevation next Roadway.

#### SELDEN'S BIRTHPLACE.

THIS cottage is situate at Salvington, Sussex, and was recently visited by members of the British Archaeological Association. The lower portion appears to have been faced to support the timber framing, which is delineated in the sketch, for which we are indebted to Mr. F. H. Stringer.

#### WINDOW-SASH FITTINGS.

SIR,—I was much moved at reading in to-day's *Standard* of two fatal accidents to servants whilst engaged in window-cleaning, and of which I enclose the accounts cut out of the same paper.

May I be permitted, in the interests of humanity, through your columns, to beg the attention of architects, builders, and others to a patent for improved window-sashes which I saw at the Inventions Exhibition on Monday last, and which, where used, will do away with any risk of such catastrophes in future. The patent improvement can, I believe, be fitted to existing frames.

The invention in question is "Thos. Tobitt's Patent Window-sashes," and is to be seen in the South Gallery, North Court, Group 3, No. 310.

I may mention that I am quite unknown to Mr. Tobitt, and have no interest in recommending his invention beyond my own recognition of its merits, and a desire, on behalf of humanity at large, that others should be as favourably impressed as myself by an examination of the specimen sashes.

Aug. 20, 1885.

C. E.

#### GOVERNMENT QUANTITIES.

SIR,—Permit me to call the attention of your readers in the building trade to the system employed by the several Government Departments when advertising work to be tendered for, *i.e.*, in charging a certain amount of money for the quantities. Surely this is a great injustice, considering the expense and time it takes to prepare an estimate, with the probability of not being accepted if the lowest. I would suggest to the Secretary of State, or the heads of departments, the advisability of discontinuing this method of raising a few pounds, and that the expense of preparing the quantities (which are not to be taken as accurate) be borne by the Department under which the work is done. I would also call attention to the scant courtesy one gets for the trouble and expense he may have been put to, in not having a list of the tenders sent him when one has been accepted, and which would prove the *bona fides* of same. Under the present method one is apt to think there must be a good deal of hole-and-corner work.

C. R.

\*.\* We have had other complaints of the same kind from members of the building trade.

**A Hospital Lift.**—We are informed that the American Elevator Company have just completed the erection of one of their Standard Hydraulic Passenger Lifts in the Royal Hospital for Diseases of the Chest, City-road. The car is of such a shape that it will contain a cot with the patient at full length upon it, thus enabling the attendants to move the patients from or to a ward with great facility. The machinery is all placed in a separate shaft several feet distant.

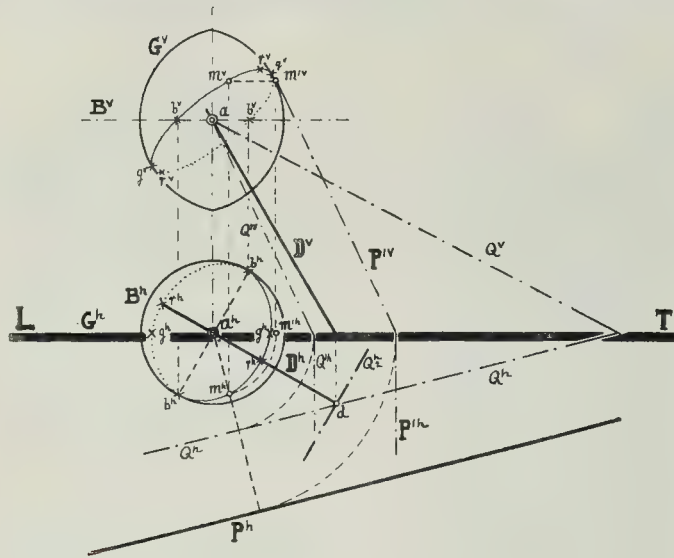


Fig. 150.

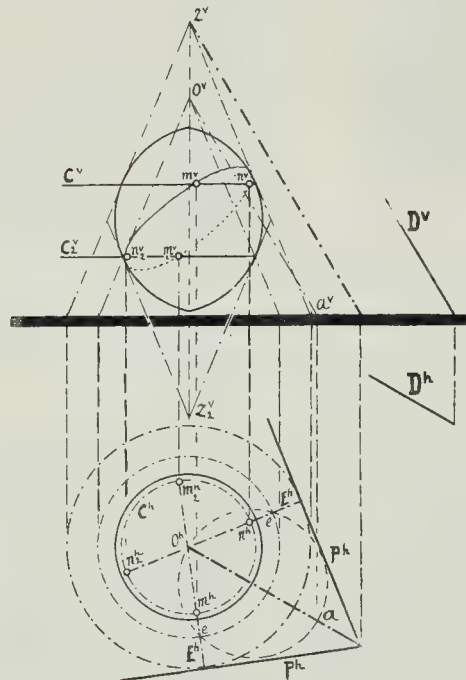


Fig. 152.

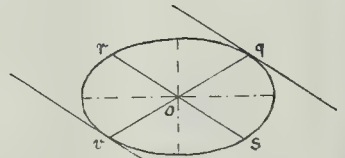


Fig. 149.

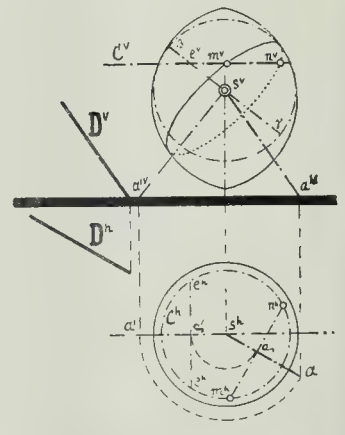


Fig. 153.

### The Student's Column.

#### DESCRIPTIVE GEOMETRY.—PART II.

XIV.

**A**S we wish to be understood by persons but slightly acquainted with mathematics, such as intelligent workmen as well as students of architecture, we beg our readers to accept without demonstration the two following important facts based on the properties of conic sections.

The curve of contact, *C*, of a cone or a cylinder circumscribed to a surface of the second degree, such as ellipsoids, hyperboloids, and para-

boloids of revolution or otherwise, is always PLANE; and the plane of the curve of contact is parallel to the plane of the diameters of the surface, conjugate with the diameter drawn through the apex of the cone.

The first part of the above paragraph needs no explanation, but the last sentence contains unavoidable technical terms which we will endeavour to make plain to those who are unacquainted with conic sections (for a fuller treatment of the subject see Gwilt's "Encyclopedia of Architecture," par. 1056, et seq.). A straight line, such as *vq* in fig. 149, drawn through the centre and terminated at each extremity of the curve, is called a diameter. If a diameter be

drawn through the centre parallel to a tangent at the extremity of another diameter, these two diameters are called conjugate diameters. Thus *vq* and *rs* are conjugate diameters (see fig. 149). In fig. 147, the line *aod*, which passes through the apex of the cone and through the centre of the ellipsoid is a diameter of the ellipsoid and of all the elliptical sections *B*. The lines *on*, *on'*, *on''* are conjugate diameters of diameter *aod* in the various elliptical sections *B*, *B'*, *B''*, to which they belong, and they are all contained in a plane parallel to the plane of the curve *C*; such is the meaning of the last part of our paragraph.

Note.—We may conclude from the above that



limit of the shade of a sphere is always a circle of the same diameter as the sphere and perpendicular to rays of the sun.

Surfaces of the second degree, the diversions made by parallel planes give SIMILAR CURVES, the centres of which are on the diameter conjugate with the one of the section the plane which passes through the centre of the sphere.

It simply means that in fig. 147 the sections  $a^1 m^1$  and  $a^2 m^2$  are similar ellipses, and their centres are all on the diameter  $a o d$ . A plane,  $P$ , tangent to a surface of revolution, is parallel to a line,  $D$ , given; and mark the point,  $m$ , where the plane  $P$  is tangent.

We could use the general method already given, but it is a very long one, for it means finding a number of sections of the surface, and, on account of the properties of surfaces of revolution, we have much simpler ways of finding.

We could, for instance, through the line  $D$  draw any plane,  $Q$ , we like; and then the problem is brought back to finding a plane,  $P$ , tangent to a surface of revolution, and parallel to a line,  $D$ , given; a question we have solved in fig. 144.

We wish to find not only one plane,  $P$ , tangent to the surface, but the points of contact, where a series of planes,  $P$ , all parallel to line  $D$  are tangent, a very great simplification is obtained by taking for the elevation a meridian plane,  $G$ , of the surface; in other words, in making  $L T$  pass through the centre,  $a^1$ , of the plan. From any point,  $a$ , of the axis we produce a line,  $D$ , parallel to the  $D$  given; then all the planes,  $Q$ , which contain that line will be parallel to the  $D$  given; their horizontal traces,  $Q^1$ , will pass through the point  $d$  foot of the line  $D$ , and their vertical traces will pass through the point  $a$  of the axis. Again (therein resides simplification), in rotating the diversions,  $Q$ , so as to make them perpendicular to the elevation, the new vertical traces,  $Q^1$ , or rotation will also all pass through the point  $a$ . We have in fig. 150 shown fully this construction for finding the tangent plane  $P$  at its point of contact,  $m$ , but there are also certain number of points of the curve of contact, or limit of shade, that can be determined at once without hardly any construction whatever.

1°. If we rotate the line  $D$  itself, or, you like, take the horizontal trace of the line  $D$ , perpendicular to  $D^1$ , we obtain the line  $r$ , which are the highest and the lowest points of the curve. 2°. If through the centre we draw a perpendicular to  $D^1$ , we get at the points  $b$  of the curve on parallel  $B$ , which is the largest horizontal section; this is, of course, equivalent to taking  $Q^1$  on  $D^1$ , and, therefore, the plane  $Q$  is vertical, and so are the planes  $P$ , which are parallel to it. 3°. If we draw a line parallel to  $D^1$  through the points  $g$ , where the curve is tangent to the vertical line of the figure; for this is equivalent to taking the plane  $Q$  perpendicular to the elevation, so that  $Q^1$  falls on  $D^1$ . With these six important points alone we can, in most cases, draw the curve of contact, so that with surfaces of revolution the delineation of the shade is a very easy and rapid operation; for persons who are not acquainted with descriptive geometry, it who have to make a series of sections, as given in Gwilt's "Encyclopedia," it is, of course, a very long operation, which amply explains why true shading is avoided and fudging resorted to instead. In fig. 150 we have shown the operations for finding any point,  $m$ , and the points  $r, b, g$ ; in fig. 151 we have shown the face shaded without any constructional lines, and line  $D$  represents the direction of a ray of shade.

We have seen that there are an infinite number of planes tangent to a surface of revolution, and parallel to a given line,  $D$ ; in the construction shown in fig. 150 we have limited the problem for each point  $m$  by giving, as an additional condition to be fulfilled, that the tangent plane  $P$  would be parallel to a certain plane which we selected as we liked. A glance at the drawing will show us that this selection of plane  $P$  was equivalent to selecting beforehand the meridian on which we desired to find point  $m$  of the shade, for the trace  $Q^1$  is necessarily perpendicular to  $a^1 m^1$ . We can find also points  $m$  of the curve by any other system, which may, in some cases, be more convenient than the one given. Instead of electing on which meridian the point  $m$  is to be, we elect,

on the contrary, the parallel  $C$ , on which  $m$  is to be found. The problem becomes therefore: find a plane,  $P$ , parallel to a line  $D$  and tangent to a surface of revolution along one of its parallels,  $C$ .

If we substitute to the surface of revolution (fig. 152) the right cone of apex  $Z$ , which is tangent to the surface of revolution all along the parallel  $C$ , it is evident that any plane  $P$  tangent to the cone will touch also the surface of revolution on some point  $m$  of the parallel  $C$ ; and, as the plane  $P$  is tangent to the cone all along the generator  $E$ , the point of contact  $m$  will be at the meeting of the parallel  $C$  with the generator  $E$ . We have seen before, in fig. 104, how to find a plane  $P$  parallel to a line  $D$ , and tangent to a cone, and we have only to apply it.

Such is the system, but we can in practice save ourselves both space and time by the following consideration: If we lower the cone so that the apex  $Z$  comes down to the point  $O$ , the plane  $Z^1$  of the generators  $E$  will still be on the same lines; therefore in making our operation on that smaller cone we find  $E^1$ , and at the intersection of  $E^1$  and  $C^1$  we find  $m^1$  plan of the point  $m$  required. There is, of course, a second point of contact,  $n$ , on the same parallel,  $C$ . The dotted circle of diameter  $O^1 a^1$  is only a means of accurately determining the points of tangency of the planes  $P$  with the base of the little cone.

In a surface of revolution, such as that of fig. 152, where the top is symmetrical to the bottom, there is a second parallel,  $C_2$ , equal to  $C$ ; the cone tangent along that parallel would have its apex,  $Z_2$ , below the figure, but its sides would be parallel to those of the other cone. When the apex  $Z_2$  is moved up to  $O$  the generators of both cones will coincide, only the second cone will form the upper sheet of the first cone. These cones will have, of course, the same planes  $P$  tangent along the same generators  $E$ , so that, without any further construction, one can mark also the points  $m_2$  and  $n_2$  on the lower parallel, remembering that they are on the prolongations of the generators  $E$ .

The same point  $O$  can serve as apex to the cones for all the parallels on which we may elect to find points of the shade, and therein lies the simplification to our drawing. (See fig. 152.)

If, instead of a cone, we substitute a sphere touching the surface of revolution all along the parallel  $C$ , we get a very rapid way of determining the points of shadow  $m$ ; for it is evident that the sphere and the surface of revolution will have the same planes tangent to both surfaces along the parallel  $C$ . We have pointed out before that the limit of the shade of a sphere is a main circle thereof, the plane of which is perpendicular to the rays of the sun, or, in our case, to the given line  $D$ . If from the centre  $s$  of the sphere we take a line  $s a$  parallel to the given line  $D$ , this line will be perpendicular to the shade limit of the sphere; if we rotate the line  $s a$  until it comes in  $s a^1$  parallel to the elevation, then the elevation of the sphere's shade will be a straight line  $\beta \gamma$ , which will cut the parallel  $C$  in the points  $e$ ; when we rotate back the line  $s a^1$  to its former position  $s a$ , the points  $e$  come to be the points  $m$  and  $n$  of the shade of the surface of revolution. (See fig. 153.)

Our diagrams, being made for the purpose of demonstration, are necessarily complicated by many lines useless in practice; but whichever of the three systems indicated is used, the process of delineating the shade is really very rapid, and we have repeatedly drawn the shade of such surfaces in less than one minute.

# PROVINCIAL NEWS.

Wakefield.—Extensive alterations and additions have recently been made to the Denby Dale Engine Works, Wakefield, consisting of new engine-houses, boiler-houses, wire-mills, retort-houses, washing-houses, warehouses, testing-rooms, and laboratory. One of the engine-houses is considerably below the ground level, so placed for the convenient working of wire-drawing, and as the buildings are situated in the low-level part of the town, adjoining a stream, great difficulty was experienced in keeping the water out of this engine-house. This difficulty has, however, been thoroughly overcome by the use of Claridge's Pyramont Seyssel asphalt round the walls of the engine-house, and over the floor under the engine-bed, laid by the company's own workmen. The

buildings have been erected by local contractors, under the supervision of Mr. William Watson, of Wakefield, architect.—The Clayton Hospital, at Wakefield, which has only been built a few years ago, was subject to an outbreak of fever early in the year. The committee received an unsatisfactory report on its sanitary condition after a thorough examination by Mr. William Watson, architect, who recommended alterations and the thorough disconnection and ventilation of all drains, soil and waste pipes, as well as extra ventilation to corridors. This work has been done throughout, and the whole of the buildings cleaned, renovated, and painted; all soil-pipes now at the foot before entering the drains have interceptions fixed outside the buildings; the pipes are also all carried up above the roofs, and terminate by ventilating cowls. The specialities used are Dodd's self-cleansing interceptors, Goodwin's traps for sinks and bath wastes, and Boyle's ventilators. The entire work has been executed by local contractors at the cost of £551, under the supervision of Mr. Watson.

Shobdon (Herefordshire).—Lord Bateman has effected a restoration of the old hostelry on the high road, near the Park-gates, called the "Bateman Arms." The rough-cast having been removed from the walls brought to light the ancient oak framework, and this has been treated in a similar way to that of the well-known "Old House" in the High Town at Hereford, now in the occupation of the Worcester City and County Banking Company. The roofing has been entirely stripped and relaid, and several constructional alterations and additions have been made, including a picturesque pent-roof verandah. A new sign, in wrought-iron, from Mr. Letheren's Art Works at Cheltenham, has been fixed over the principal entrance; but the contract work generally has been executed by Mr. C. Edwards, of Leominster, under the supervision of his lordship's architect, Mr. E. H. Lingen-Barker, of Hereford.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

902, Roofing Tile. J. G. Stadler and E. Schmid.

A clay band is made and cut off by wires to the right length. The tiles are then put into a press in which the ends are trimmed and the centre of the bottom of each tile bulged up to fit over the joint of the two next lower tiles. The raised part also turns the course of the water running down the roof and keeps it out of the joint. A bar is formed on the band, the superfluous parts of which are cut off with a wire to leave layers by which the tiles are hung on the roof laths.

3,861, Pitch Chains. J. Harrison.

The ends of a slip are made so as to form an irregular slot, so that the links can only be coupled up when thrown into certain positions which they cannot assume when at work. To adjust the pitch of the chain the links are made slightly longer, and turned to their sides or ends as convenient.

5,194, Bricks. H. Hart.

The stretchers are made with a central longitudinal ridge on one side and a depression on the other. The headers are made with two transverse grooves near the ends to fit the ridges on the stretchers and two corresponding ridges engage with the grooves.

4,204, Sanitary Trap. A. C. Henderson.

Between the inlet and the outlet branches of the trap, a cylindrical chamber rises vertically from the surface of the water. A ball float, guided in the chamber by a flat rib on it sliding in grooves, carries a valve which closes against an inclined seat across the bend of the trap. When water passes from the house the valve rises clear of the passage, but prevents the return of water from the sewers.

4,260, Glazing. D. Mackenzie and W. Aitchison.

A cast-iron sash-bar has a rebate, into which are fitted strips of asbestos or some woven material. Other metallic or wooden sash bars may be made of a similar pattern.

5,256, Coping Tile. W. Tupper.

The sides of the tile stand over the wall, and are bent downwards. At the transverse joints a raised portion of the tile is made to overlap the edge of the next. On a level wall the overlapping portion of one tile has a lip fitting in a groove in the adjacent tile.

5,907, Doors and Gates. F. Grazebrook.

A cast-iron frame forms the stiles and rails. Boards or panels of wood are inserted, and a frame is further provided to protect the edges of the boards.



**Awards to Exhibitors at the Inventions Exhibition.**—In the list of awards which we gave in our last, we inadvertently omitted the name of Messrs. T. Thomas & Sons, of Cardiff, who were awarded a gold medal for "self-sustaining lifts and hoists with automatic brake."



**1e Proposed Undercliff Drive at**  
**St. Andrew's.**—Twenty-nine plans were sent  
in response to the offer of the Improvement  
Commissioners of premiums of 200l., 100l.,  
50l. respectively for the three best  
plans submitted. The invitation to compete  
was not restricted as to cost beyond  
requiring that the Commissioners desired to  
have "the utmost economy consistent with  
efficiency, artistic, and general character of  
scheme," hence it is not surprising that  
estimates of the cost of carrying out  
designs, as given by their authors, range  
from 22,000l. to 116,000l. From a discussion  
which has taken place at a meeting of the Com-  
missioners, it appears to be the feeling that  
100l. or 40,000l. is the limit of expenditure  
which would meet with approval. No decision  
has been arrived at with regard to the award of the  
premiums, but it was resolved to invite the  
President of the Institution of Civil Engineers  
to recommend a civil engineer to advise the  
Commissioners in deciding on the merits of the  
plans.

**Alfreton Sewerage.**—A combined meeting  
of the rural and urban authorities was held at  
Alfreton Board-room, on August 20th, in  
order to consider a letter from the Local Govern-  
ment Board complaining of the foul state of the  
unsewered Delves Brook. It was resolved to  
negotiate terms on which the rural authority  
should consent to receive the sewage from a  
portion of the urban district, called Sleet Moor,  
in order that the sewage may be dealt with by  
incineration in accordance with a scheme drawn  
up by Mr. W. H. Radford, Assoc. M.Inst. C.E.,  
Nottingham, for the disposal of the sewage  
at Swanwick and Leabrooks.

**Artisans' Dwellings.**—The Prince of Wales  
has consented to open the Chatham Gardens  
Artisans' Dwellings, which have been erected  
by the joint trustees of the parochial estates of  
Giles, Cripplegate, and St. Luke, Middlesex.  
The City Press says the buildings are being  
erected rapidly, but are not yet sufficiently for-  
ward to fix a date for the ceremony.

**PRICES CURRENT OF MATERIALS.**

| TIMBER.                                 | £. | s. | d. | £. | s. | d. |
|-----------------------------------------|----|----|----|----|----|----|
| Heart, B.G. .... ton                    | 4  | 10 | 0  | 7  | 10 | 0  |
| Heart, E.I. ....                        | 12 | 10 | 0  | 15 | 10 | 0  |
| Heart, U.S. ....                        | 0  | 2  | 6  | 0  | 2  | 9  |
| Heart, Canada ....                      | 3  | 0  | 0  | 3  | 4  | 10 |
| Heart, Baltic ....                      | 3  | 10 | 0  | 5  | 0  | 0  |
| Dantzig, &c. ....                       | 1  | 10 | 0  | 4  | 10 | 0  |
| Heart, Canada ....                      | 3  | 0  | 0  | 7  | 0  | 0  |
| Heart, Baltic ....                      | 3  | 0  | 0  | 4  | 0  | 0  |
| Heart, red yellow                       | 3  | 15 | 0  | 5  | 5  | 0  |
| Heart, Dantzig .... fathom              | 5  | 0  | 0  | 5  | 0  | 0  |
| Heart, Baltic ....                      | 3  | 0  | 0  | 4  | 10 | 0  |
| Heart, Dantzig, &c. .... log            | 3  | 0  | 0  | 4  | 10 | 0  |
| Heart, Finland, 2nd and 1st, std. 100   | 8  | 0  | 0  | 8  | 0  | 0  |
| Heart, 4th and 3rd                      | 6  | 10 | 0  | 7  | 10 | 0  |
| Heart, Baltic ....                      | 10 | 0  | 0  | 17 | 0  | 0  |
| Heart, Petersburg, 1st yel.             | 8  | 0  | 0  | 8  | 15 | 0  |
| Heart, 2nd                              | 6  | 10 | 0  | 7  | 10 | 0  |
| Heart, white                            | 8  | 10 | 0  | 17 | 0  | 0  |
| Heart, Sweden ....                      | 8  | 10 | 0  | 19 | 0  | 0  |
| Heart, Sea                              | 18 | 0  | 0  | 32 | 10 | 0  |
| Heart, White, Pine 1st                  | 12 | 10 | 0  | 10 | 10 | 0  |
| Heart, 2nd                              | 9  | 0  | 0  | 12 | 6  | 0  |
| Heart, Spruce 1st                       | 6  | 10 | 0  | 8  | 0  | 0  |
| Heart, 3rd and 2nd                      | 4  | 0  | 0  | 13 | 0  | 0  |
| Heart, all kinds                        | 0  | 8  | 0  | 0  | 13 | 0  |
| Heart, Board, sq. 1 in.—Prepared, first | 0  | 8  | 0  | 0  | 13 | 0  |
| Heart, second                           | 0  | 7  | 6  | 0  | 8  | 0  |
| Heart, quality                          | 0  | 0  | 3  | 0  | 0  | 4  |
| Heart, Cuba, .... foot                  | 0  | 0  | 3  | 0  | 0  | 4  |
| Heart, Honduras, &c. ....               | 0  | 0  | 3  | 0  | 0  | 4  |
| Heart, Australian                       | 0  | 0  | 0  | 0  | 0  | 0  |
| Heart, Rio de Janeiro                   | 0  | 0  | 0  | 0  | 0  | 0  |
| Heart, Domingo cargo av.                | 0  | 0  | 0  | 0  | 0  | 0  |
| Heart, Mexican                          | 0  | 0  | 0  | 0  | 0  | 0  |
| Heart, tobacco                          | 0  | 0  | 0  | 0  | 0  | 0  |
| Heart, Caracas                          | 0  | 0  | 0  | 0  | 0  | 0  |
| Heart, Rio                              | 7  | 0  | 0  | 17 | 0  | 0  |
| Heart, Bahia                            | 6  | 0  | 0  | 15 | 0  | 0  |
| Heart, St. Domingo                      | 0  | 0  | 0  | 0  | 0  | 0  |
| Heart, Porto Rico                       | 0  | 0  | 0  | 0  | 0  | 0  |
| Heart, Ant, Italian                     | 0  | 0  | 0  | 0  | 0  | 0  |

**HAMMERSMITH.**—For building almshouses at Victoria-road, Starch-green, Hammersmith, for the Trustees of the Waste Lands:—  
 Braithwaite ..... £245 0 0  
 Nethercliff ..... 832 0 0  
 Mansell ..... 800 0 0  
 Chamberlain Bros. (accepted) ..... 759 0 0

**HEMEL HEMPSTEAD.**—For the erection of a detached villa in Broad-street, Hemel Hempstead, Herts, for Mr. B. Piffard. Mr. W. A. Fisher, architect and surveyor, Marlows, Hemel Hempstead:—  
 Martin, Wells, & Co., London and Aldershot ..... £900 0 0  
 T. F. Reavel, Hemel Hempstead ..... 600 0 0  
 \* accepted.

**HEMEL HEMPSTEAD.**—For the erection of six cottages, near the Midland Station, Hemel Hempstead, Herts, for Mr. B. Piffard. Mr. W. A. Fisher, architect and surveyor:—  
 Martin, Wells, & Co., London and Aldershot ..... £1,250 0 0  
 T. F. Reavel, Hemel Hempstead ..... 1,020 0 0

**HEREFORD.**—For alterations and improvements at Chandos House, for the Girls' High School Company. Mr. E. H. Lingen Barker, architect, Hereford:—  
 W. B. Partington ..... £165 0 0  
 E. Symonds ..... 147 0 0  
 W. Pritchard ..... 137 0 0  
 Bosvan & Hodges ..... 131 7 6  
 H. Welsh ..... 129 0 0  
 Taylor & Hammonds (accepted) ..... 119 18 2  
 W. Rowberry ..... 118 0 0

**ILFORD (Essex).**—For alterations and additions to the St. Mary's National Schools, Great Ilford, Essex. Mr. C. J. Dawson, architect, Barking:—  
 Watson ..... £1,681 0 0  
 Roberts ..... 1,628 0 0  
 Wood ..... 1,430 0 0  
 Coulson ..... 1,363 0 0  
 Stewart ..... 1,315 0 0  
 Buckle ..... 1,310 0 0  
 Barnes ..... 1,315 0 0  
 Brickell ..... 1,297 0 0  
 Webb ..... 1,175 0 0  
 Walter ..... 1,160 0 0

**ISLINGTON.**—For cleaning, painting, and decorating offices at the Vestry-hall, Upper-street, Islington, for the Guardians:—  
 McCormack ..... £115 0 0  
 Grover ..... 102 0 0  
 Woutner Smith ..... 97 0 0  
 Dearing & Son (accepted) ..... 95 0 0  
 Hewitt (withdrawn) ..... 65 0 0

**LONDON.**—For repairing roadway, relaying channels, &c., in Fumal-street, Holborn. Mr. R. Groom, surveyor, 171, Queen Victoria-street:—  
 Nowell & Robson ..... £145 0 0  
 York paving, 8d. per foot.  
 Mowlem & Co. (accepted) ..... 103 0 0  
 York paving at 8d. per foot.

**LONDON.**—For warehouses in Carthusian-street, for Mr. R. W. Perks. Mr. George Vickary, architect:—  
 J. Allen & Sons (accepted) ..... £5,793 0 0  
 [No competition.]

**LONDON.**—For new offices in Bunhill-row, for Messrs. W. List & Sons. Mr. Chas. Bell, architect:—  
 J. Allen & Sons (accepted) ..... £2,572 0 0  
 [No competition.]

**LONDON.**—For providing and fixing bar-fittings at the Rum Punch-house public-house, Upper Whitecross-street, for Mr. Cain. Mr. G. Treacher, architect:—  
 John Beale (accepted) ..... £551 0 0  
 [No competition.]

**PETERSHAM (Surrey).**—For the erection of a coffee-house and reading-room, for Mrs. J. H. Master. Mr. E. Maynard, architect, Richmond. Quantities supplied:—  
 Carless & Co. ..... £895 0 0  
 Gascoyne & Blake ..... 689 0 0  
 Sims ..... 650 0 0  
 Sweet & Loder ..... 645 0 0  
 Maton ..... 190 0 0  
 Lillywhite (accepted) ..... 670 0 0

**PETERSHAM (Surrey).**—For additions to the Petersham Schools, for the Right Hon. Countess Russell. Mr. E. Maynard, architect:—  
 Carless & Co. ..... £169 0 0  
 Lillywhite ..... 130 0 0  
 Sweet & Loder (accepted) ..... 113 0 0

**RICHMOND (Surrey).**—For additions to the Union Workhouse. Mr. E. Maynard, architect. Quantities supplied:—  
 Lillywhite ..... £1,688 0 6  
 Carless & Co. ..... 1,477 0 0  
 Sweet & Loder ..... 1,477 0 0  
 Maton (accepted) ..... 1,437 0 0

**ROTHERHITHE.**—For building mission church, Dalston-grove, Rotherhithe. Mr. G. Legg, architect:—  
 Little ..... £1,683 0 0  
 A White & Co. ..... 1,406 0 0  
 W. Shurman ..... 1,422 0 0

**WOOLWICH.**—For alterations and additions to the Elephant and Castle, Beresford-square, Woolwich. Mr. Henry H. Church, architect, William-street, Woolwich:—  
 Proctor, Woolwich ..... £1,180 0 0  
 Walker, Limehouse ..... 820 0 0  
 Coombs, Plumstead ..... 800 0 0  
 Brown, Plumstead (accepted) ..... 745 0 0  
 Fenn, Woolwich ..... 650 0 0

**WOOLWICH.**—For seven houses in Taylor-street, Woolwich, for Mr. J. F. Randall. Mr. Henry H. Church, architect, William-street, Woolwich:—  
 Brown, Plumstead (accepted) ..... £1,200 0 0

**WROTHAM (Kent).**—For the erection of coachman's cottage, Basted, Wrotham, Kent. Mr. H. Percy Monckton, architect, Great James-street, Bedford-row:—  
 Igden ..... £248 9 0  
 Lemark ..... 235 0 0  
 Allcorn & Sons (accepted) ..... 214 17 0

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### Suggestion touching the Public Safety.

THE daily papers are full of not undeserved complaints as to the state of the Thames and its affluents, the Wey and the Lea. Year after year, as the month of August arrives, the like note of alarm is raised,

year after year there is more cause for alarm. The population increases with a dity that is concentrated and intensified in great centres of population. And there is reason to fear that one result of agricultural drainage, and of the clearance of timber, diminish the regular water supply of our rivers, throwing down more in times of flood, leaving less to flow when it is most needed. At all events, the Thames has been an almost unexampled ebb,—while denuded and made on it by the Water Com-

as is larger than at any previous time. In the present year, moreover, a new reason of anxiety is given by the terrible ravages of cholera in Spain. It is but too certain this disease has lost none of the force which, on former occasions, has conducted its approach into a source of panic. Spain is the only country afflicted. As the French authorities are on the alert, there is little doubt as to what is going at Marseilles, and those who know the state of the basin at Marseilles are aware it is such as directly to invite the spread of any pestilence that is nourished by

anytime public writers refer, almost hopelessly, to the number of the schemes which have been brought forward for dealing with the river. How numerous they are may be seen by the statement that, in the year 1884, as many as seventy-six patents were applied for for that purpose. It is a curious fact that these, and all similar schemes, are ranked in the index of the Patent Office under the head "manures." In fact, it may perhaps be found an indication of the main cause of the deadlock which has been on this subject, since the first report of the committee on utilisation of sewage in

outside theoretic chemical value of the sewage is estimated by Messrs. Gilbert and Gilbert at 8s. 4d., and by Dr. Gilbert at 9s. 3d., per unit of population per year. At the same detail prices which give the results, the value of a ton of stable manure is 15s. 7½d. As, however, this can be

purchased for 3s. (three shillings), it follows that the utmost value obtainable from sewage, by the most perfect chemical process, would be under 3s. per inhabitant, and there is ample evidence to show that the cost of extraction is considerably more than the market value of sewage manure.

By the attempt to secure a gain from what is actually a loss the attention of men of science has been turned from the real desideratum, namely, the most prompt possible destruction of the morbid matter in the sewage. In all processes of precipitation hitherto adopted the whole of the impurities, organic and inorganic, are precipitated together. The result is that the precipitate is putrescible; so that the source of danger is only displaced, instead of being destroyed.

Every inhabitant contributes in the course of a year 71·2 lb. of solid matter to the sewage of his district. Of this, 7 lb. is mineral, 18 lb. is gaseous, and 46·2 lb. is organic matter. It is in the last item that the source of danger occurs.

This organic matter is, roughly speaking, built up of one-half carbon, one-fourth oxygen, one-sixth nitrogen, and one-twelfth hydrogen. It is in the nitrogenous matter, which is generally measured by the quantity of albuminoid ammonia detected by analysis, that the sources of danger, such as putrescible matter, minute organisms, and the germs of disease are found.

If, therefore, chemistry can provide the means of splitting up and decomposing the organic matter, and destroying the germs of disease, in sewage, the difficulty of dealing with the remaining mineral and gaseous matters will be comparatively slight. It is to the object of decomposition and destruction, rather than to that of precipitation and storing up nitrogenous matter, that attention ought, therefore, on this ground, to be directed.

This view of the case has an immediate and very important result.

It is not only known, but the fact is practically in operation, that iron, in various forms, has the property of decomposing organic matter; and not only so, but that of entirely destroying the germs of organic life. Dr. Frankland, an accepted authority on this subject, had experiments made by Mr. Frank Hatton with a view of discovering some material which was capable of destroying these organisms. "He found that the bacteria were extremely lively under an atmosphere of pure oxygen; that they enjoyed themselves apparently equally well in an atmosphere of carbonic acid; and they were quite lively in nitrogen; that they did not look much depressed in sulphurous acid; that they got a little dull when put under cyanogen,

but in a few days recovered, even from that, and became nearly as lively as ever; but that when they were brought into contact" with water containing a certain dose of metallic iron the bacteria became lifeless forms. The mode in which the water was thus charged adopted by Mr. Hatton was by contact with spongy iron; but other modes of applying the mineral, such as magnetic oxide and granulated iron, have the same effect; and Mr. Ogston, a careful experimenter on the subject, says that he derived the best effect from cast-iron borings and turnings.

So practical is the outcome from a long series of observations that, at the present time, the water of the River Nethe, which is much polluted with sewage, is purified for the drinking supply of Antwerp by being charged with a dose of iron not exceeding one-tenth of a grain in a gallon. Ordinary sewage contains about four times as much solid matter as the Nethe water. So that the first step which has here to be taken is to ascertain whether four or five times the dose of iron—or any larger proportion—will have the same effect on actual sewage; and, if so, at what cost and by what method the dose of iron can best be given.

A paper on the purification of water, by Mr. G. H. Ogston, F.C.S., has lately been printed by the Institution of Civil Engineers, and forms part of vol. lxxxi. of the Proceedings. Mr. Ogston gives the result of the treatment of various samples of water, "varying greatly in composition and in the original quantity of organic nitrogen," with iron. The larger portion of these nitrogenous compounds is broken up by the action of the iron, as in the case of the Hertford sewage, where 330 parts of organic nitrogen were reduced to 80 parts. Only a very short time, however, was allowed in these experiments for the action of the iron, which Mr. Ogston states to be "astonishingly rapid." It may be worth inquiry how long the action will continue if undisturbed; as, if so much effect is produced in from eight to ten minutes, it would be very instructive to know what would take place in twenty-four hours. As to this, however, the mode of charging the water with iron, adopted by Mr. Ogston, opposes a certain difficulty.

Space would fail to give, on the present occasion, anything like an exhaustive account of what has up to this time been effected in this matter. Nor, in the absence of such a summary, do we wish to express any very definite opinion, further than this. There is a distinct parting of the ways between the path that leads to precipitation and that which leads to decomposition. By the former method, as hitherto attempted by hundreds of explorers, the grave danger of the maintenance of pu-



trescible matter is in every case incurred. By the latter, on the testimony of Dr. Frankland, Mr. Bischof, Mr. Baldwin Latham, Mr. W. Anderson, Mr. Hutton, Mr. Ogston, and others, not only the putrescible matter, but the germs of disease, are destroyed. Unless the evidence of those gentlemen can be upset, it therefore seems, at least, worthy of inquiry whether by any modification of a process that is said to be thoroughly effective in presence of a certain amount of contamination, a larger amount can be efficiently dealt with. At all events, it can hardly be denied that we should do ill to neglect the indication of what may possibly prove worthy of attention.

#### EGYPT EXPLORATION FUND. FIND OF POTTERY AT NEBEIRAH.

**I**N a past number (*Builder*, May 30th) we welcomed the arrival of the first-fruits of the excavations that for the two past winters have been carried on by English effort in the Delta. First-fruits, we ought to say, of the Greek harvest; for the abundant yield of Egyptian antiquities, and the new light afforded by them on questions of Egyptology, is now known through the length and breadth of Europe. It is the work done by the society for Greek archaeology that we desire to emphasise to-day. The Hellenic Society subsidised the excavations by a grant of 50*l.*, and we think the Egypt Exploration Fund has amply repaid these modest *θεμελίαι*. The interest of Greek scholars and archaeologists in an exploration in the Delta hinges, of course, on the Greek colony of Naukratis,—Naukratis that had its street of potters, Naukratis which Mr. Flinders Petrie rightly believes he has restored to us from the dead. Our pottery comes to us from Nebeirah,—a name unknown to guide-books and official registers. Nebeirah is within a day's walk of the ancient Sais. In a farmhouse within a stone's throw of the mound where Mr. Petrie found the pottery, it will be remembered, that he discovered a stone bearing a dedicatory inscription to the honour of "the city of Naukratis." The presumption is now a certainty that he has really given back to us all that remains of the great trading city of Milesian colonists; the city which held the monopoly of foreign trade; the city of vases and flower-wreaths, twined about, as Athenæus has told us, with "threads of papyrus plant."

In the right-hand wall-case of the fourth vase-room of the British Museum are the contents of a sample case of fragments of pottery which arrived some little time since as a precursor of treasure to come. From these fragments we have selected four of especial interest. We see at a glance that the bulk of these fragments belong to the archaic and black-figured period. Fig. 1 is a familiar figure,



Fig. 1.

Odysseus beneath the ram escaping from the cave of Polyphemus. This design decorates the exterior of a cylix of the early shape. Just such a cylix may be seen in the Fitzwilliam Museum at Cambridge, with the design of Odysseus and the ram imprinted on each side. The designer of the Cambridge vase has, however, added somewhat of scenic effect by placing a spectator on each side of the escaping hero. The scene of the escape of Odysseus is represented, as is well known, in three typical ways. First, the whole scene complete, cave and recumbent giant, with Odysseus and his companions escaping beneath their several rams. Second, the scene abridged to suit a limited space; cave and giant remain, but the fore-part of one ram only with Odysseus beneath it appears. Last and most mechanical, the type

on the Nebeirah vase; the cave and the giant disappear, the scene of the escape only is shown, the source of the danger left to the imagination, or perhaps forgotten. This last type is especially popular on the early black-figured cylix. In fig. 2 we have a bit of work of

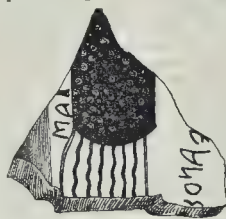


Fig. 2.

earlier style, and it gains an added value from the fact that it is inscribed. It is a fragment of a figure in close Doric "chiton," the folds of which are indicated by waved lines, while the upper diploidion (we adhere to the old nomenclature) is of thick material, showing no folds. The letters,—to the left, ΑΖ, to the right, ΑΝΟΣ,—written pillar fashion (*κονίγδοι*), are clearly seen. They represent, no doubt, the name of the figure, and the one following. The drawing belongs to the sixth century. In fig. 3 we have a bit of striking realism,—the



Fig. 3.

head of a negro, in all his native characteristic ugliness: thick lips, protruding jaw, pointed skull, receding brow. Just such a type appears on the vase in the British Museum, representing Memnon standing between two Ethiopians. Greek vase-painters, as was natural, seem to have much rather indulged in realistic portraiture of national types than Greek sculptors. No doubt the potter at Naukratis drew from the life. Our last specimen (fig. 4) is the most

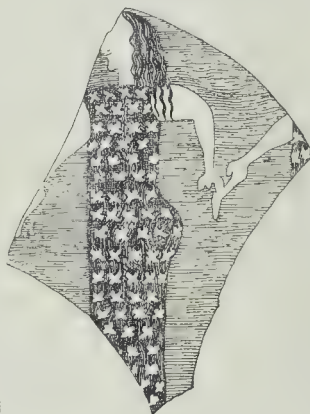


Fig. 4.

notable of all: the motive is obvious; we have the fragment of a *xópos*, maidens linked hand in hand in the dance. It may be at vintage time, a dance such as Hephaestus engraved on the shield of Achilles; or it may be in the dancing-place of the city, such a dancing-place as Dedalus wrought for Ariadne in Crete, a "dancing-place for youths and maidens.

Fine linen the maidens had on, and the youth well-woven doublets, faintly glistening with oil." Stiff as the figures are to our modern eyes, to the artist who drew them they were the best effort he could make at a realistic representation of the scene of simple old-world merry-making. Another monument of ancient art will rise to the memory of all,—the quaint naturalistic Phœnician bowl found at Idaliu in which there are seated goddesses and a scene of sacrifice, and also a *xópos* just such as we have here.

Eight large cases are shortly expected at the British Museum,\* and if they are of the degree of interest which we are led to expect, it will seem to the Greek archaeologist a fortune almost too great to be true that this Egypt Exploration Fund should yield so abundant a find of archaic Greek pottery.

#### TALL CHIMNEY-SHAFTS.

**T**HE book brought out on this subject by Messrs. R. M. & F. J. Bancroft is a disappointing one. It professes to be a practical treatise on the subjects of which it treats, but it is merely an expansion of two papers read in 1878 at 1883, at the Civil and Mechanical Engineers' Society, with illustrations of twenty examples of chimney construction, a few general remarks, twenty pages of tables of tests of building materials, from various textbooks, and detailed descriptions of about eighty shafts erected in this country, America and Germany. The authors have been at pains to put together a mass of information upon various points, but it is not properly tabulated or digested, and they do not appear to have any notion of applying the formulae for determining the size and strength of shafts they have collected from various authorities.

The illustrations are not well selected, in some cases only show a portion of the shaft. The basement only, and a portion of the capping of the St. Rollox chimney at Glasgow is given on plate i., and the fine chimney Broad-street Station of the North-West Railway, and Mr. Curry's chimney at Eastbourne Water Works, are represented only by the caps. Descriptions are given of lofty chimneys at Crossness and Abbey Mills belonging to the Metropolitan Board of Works, but these are not illustrated, and several notable chimneys within the metropolitan area, such as Messrs. Doulton's on the Albert Embankment which is 200 ft. high; Messrs. Pontifex Wood's shaft, Isle of Dogs, 180 ft. high; Messrs. Nobles & Hoare's shaft, Lambeth 150 ft. high, are unrepresented, drawings which might have been readily obtained.

The recommendation that the brickwork chimneys should be laid in mortar for the most part because cement is destroyed by strong heat (p. 11) is erroneous, it is universally acknowledged by engineers that Portland cement is the best material for the purpose. The proviso that 4½-in. work may be constructed in cement is misleading; portion of the enclosure of a furnace chimney shaft should be less than 9 in. thick, and less thickness is not permitted within the metropolitan area.

The rule given by Hurst to find the size of a furnace-flue at the top is as follows:—

Let A represent the area of flue at top in sq. feet;  
F Fuel in lb. consumed per hour;  
H Height of shaft above furnace-bars in feet;  
Then

$$A = 10 \frac{F}{\sqrt{H}}$$

The size of the flue at the top being determined, if the shaft be given a batter of 48, it will ensure the requisite stability.

As regards the pressure of the wind, which forms an important element in calculating the strength of chimney-shafts, very little is said.

\* Since writing the above, we learn that many of the objects recently discovered by Mr. Flinders Petrie are now at the rooms of the Royal Archaeological Institute, Oxford Mansions, each Tuesday, Thursday, and Saturday, till the end of September.

† A Practical Treatise on the Construction of Chimney-shafts. By Robert M. Bancroft and Francis Bancroft. Manchester: John Calvert. 1885.



able information is given. It appears that the highest pressure registered in this country is 35 lb. to the square foot. This was on the pressure-board at the Forth, by Mr. B. Ker. This board is placed at a height of not 100 ft. above the sea-level, on an island in the middle of the Forth, and is subject to gusts which it is probable would not occur elsewhere in the British Islands. It is stated that in 1863 a pressure of 43 lb. to the square foot was registered at Liverpool, which would represent a velocity of about 90 miles; but the records of anemometers are utterly valueless for all practical purposes, and it may be safely assumed that the wind pressure in London will not exceed a force of 30 lb. to the square foot. Professor Rankine calculated that the St. Rollox chimney would resist a pressure of 90 lb. to the foot at a height of 1 ft. above the ground.

An unusual type of shaft is that built in 1842, at the South Metropolitan Gas works, Kent-road, Mr. G. Livezey, engineer (figs. 18, plate 8). This shaft is 108 ft. high from ground to the top of the cap. The flue is square and is enclosed throughout with brickwork 14 in. thick, the shaft being stiffened at the angles by buttresses 1 ft. 10½ in. on the face and projecting 2 ft. 4 in. at the base and running off to nothing at the top. The shaft is 12 ft. square, measured over the buttresses at the base; it diminishes to 7 ft. 2 in. at the top. The cap is of cast-iron and weighs 10 tons. It is claimed for this system of construction that the buttressed section is stronger than a plain square with an increasing thickness towards the base. A similar section was adopted for one of the loftiest viaducts in this country, the Hownes Gill viaduct, on the London and Darlington Railway. This viaduct is 165 ft. high, and is constructed of brick only 2 ft. thick, strengthened by buttresses at the angles. The cost of this chimney is estimated as having been 530l. complete. A shaft of nearly similar size at the Saracen Works, Glasgow (Mr. Boucher, engineer), was built in the ordinary manner in 1862, cost only 100l. (p. 99).

A chimney of a similar character built in 1842, the engineer to the Gas Company carried out the 14-inch work to a height of 50 ft., he reduced the thickness of the brickwork to 12 in., making the flue of larger dimensions at the top than at the base.

The story of the Newlands Mill Chimney at Bedford, as given by our authors, is instructive, and shows how a chimney should not be built. The chimney was an octagonal stone tower, 240 ft. high, and 24 ft. wide at the base. It was built for the late Sir Henry Ripley in 1823, by Messrs. Moulson & Sons. There were no drawings or specifications prepared; the following formed the basis of the estimate:—The chimney was to be 80 yards high, 24 ft. diameter, base 24 ft. square, and have two courses of footings, each 12 in. thick, the first course 28 ft. square, the second 24 ft. square, on a good bed of concrete. The contractors undertook to execute the work for the sum of 942l. 5s. 10d., the foundation was to be extras. The site was to be a local shaft, which was filled up with concrete, forming a central pillar 8 ft. 6 in. in diameter; round this central pillar were constructed four other shafts, also of concrete, and of 12 ft. diameter. Upon the top of these shafts was laid a layer of concrete, 32 ft. 6 in. square, and 6 in. thick, upon which the chimney was to be built.

When the shaft had been carried to a height of 210 ft., it was found to have bulged at the side, and a course of stone 7 in. thick was put out, and the space filled in with stone 1½ in. less in thickness. This was continued in half-way round, with the exception of the angles. The first cut did not have the desired effect, and a second cut was made about 100 ft. above the first, and the chimney was then ordered to be perpendicular. About three years after the chimney was completed, it was found to be cracked on the opposite side to the one which was repaired at a cost of about 100l. In October, 1883, further cracks occurred, and on the 28th of December the upper portion of the chimney fell killing fifty-four persons, and doing property to the extent of 20,000l.

## NOTES.

THE correspondence which has been going on for the last few days in the *Times*, in regard to the state of the river Lea, is somewhat painful reading: a series mostly of recriminations, in which each disputant throws the blame on the other. Mr. Corbie, the clerk of the Lea Conservancy Board, does seem to make out a case for his Board, in that they are hampered by legal formulae, by which their supposed power over local authorities polluting the river with sewage is reduced to a nominal form, by the existence of special "saving clauses" ("ruination clauses" they should be called), which empower certain towns to turn their sewage into the Lea after treating it "by the best known chemical process." The clerk of the Tottenham Board writes a long letter to show that his Board have been very active in suggesting schemes, none of which they have had energy enough to carry out. Of their real amount of energy, and the direction which it takes, we may judge by the statement of Mr. Corbie, that after the year's notice required had been served against them for polluting the river, which expired in July last, they had done nothing, and on the Conservancy Board taking steps to enforce the penalty, the Tottenham Board availed themselves of a clause in the Act to remove the case into the Court of Queen's Bench, where nothing can be done till after vacation,—a bit of tactics which had no doubt been kept in readiness for an emergency. The East London Water Company, it appears, expended some of their water in flushing the river last Sunday,—a partial amelioration which has involved the cutting short of the water supply in the district, some residents having been absolutely without water for half a day. Between that and the pollution of the stream, a more hospitable invitation to cholera could hardly be imagined. Sir J. Bazalgette states that a plan for intercepting the whole sewage of the Lea valley, and the proper purification of the sewage, has been prepared by Messrs. Law & Chatterton and himself, which could be carried out at a moderate cost, if the towns draining into the Lea would combine. This appears to be just what they will not do. It is every one for himself, and in any case the scheme would take years to carry out. A suggestion has been made that the Lea sewage might be connected to the Metropolitan drainage system in a brief space and at moderate outlay, but Sir J. Bazalgette says they can accommodate no more sewage at Barking: *sat prata liberunt*. The only tolerably immediate means of amelioration seems to lie in compelling the Tottenham Board to adopt more extensive and efficient processes of purification. The combined intercepting scheme should be carried out in the long run, and forced, if necessary, on the unwilling townships, who cannot agree for their own good. But it would be as well to know exactly what is to be done with the sewage in its ultimate destination before taking it there. We do not want another Barking in miniature.

THE melancholy occurrence at Dawlish this week is one of those events which the average British jurymen likes to return as "accidental death," but which has no right to be included in the chapter of accidents at all. There may be difficulty in bringing the responsibility home legally to any one, but morally the local authorities, who neglected urgent warnings and allowed unsuspecting visitors to stroll under cliffs in a dangerous state, without any warning or notice of their danger, are under a very heavy responsibility for the loss of life in so painful a manner this week.

THE Report of the Metropolitan District Railway is the most gloomy of the railway revelations of the half-year. An increase of 11,800l. in working expenses, and of 12,703l. in interest and rentals, comes upon a diminished revenue; and the divisible balance for the half-year is reduced from 39,800l. to 15,000l.

It is all very well to urge a fusion with the Metropolitan line as a remedy. The present, however, would be a bad time for attempting to open such a negotiation, and although cost might, to some extent, be diminished, and unity of action might be attained by such a measure, the cause of the depression of value of the property lies deeper, and has to be looked in the face. This is the competition of the omnibus traffic. Passengers are taken by omnibus from Liverpool-street to Charing Cross for 1d., and to Kensington or to Hammersmith for 6d. For such charges they can not, the Chairman of the District Company says, be carried by rail. It is but too probable that such is the case. The actual cost of transport on the Metropolitan Railway, including maintenance of way and all the charges, is only one-third of that by omnibus. But while a profit of one-seventh of a penny per passenger is enough to give a 10 per cent. dividend on the small capital of the Omnibus Company, ten times that amount is required to pay 5 per cent. on the large capital of the Railway. This is an acute form of the danger which the Belgian economist, M. Le Hardy de Beaulieu, has pointed out as intimately connected with the growth of railway capital. The cost of 680,700l. per mile, at which the District Line stood in the last number of the "Index to our Railway System," is a terrible item to look in the face. Something of the same kind is going on over nearly all our railways; but the District Railway, as substantially a one-speeded line, avoids one of the chief causes of unprofitable working. On the other hand, the frequent stoppages are very costly. If alternate trains stopped only at alternate stations the expense might be sensibly reduced, but any such expedients would interfere with the convenience of the travelling public.

WE referred the other day to the spirited suggestion of two engineers to take Canvey Island in hand as a depot for the London sewage, but among the "summary of reasons" in favour of the scheme, just published, some question must be made about Nos. 13 and 14, at all events. The island, we are told, while retaining the solid portion of the sewage in earthen basins, will afford an opportunity of its conversion into a saleable manure for the benefit of the ratepayers of the metropolis, whenever advancing science shall develop the means of doing so with profit. That we should be asked to go on building up an immense dung-hill until some brilliant discovery shall enable us to utilise it, would be more comfortable advice if science were not obstinately pointing in the opposite direction. Dr. Voelcker, whose authority on the subject is classical, reported on the experience of Bolton, Bradford, Leeds, Coventry, Rochdale, and Halifax, that "the production of one ton of dried sewage deposits, apart from the costs of the precipitation agents which are used, entails an expense of about 30s. for each ton of portable dried sewage manure." "The market value of one ton of the treated sludge," the same writer estimates at from 4s. 6d. to 6s. 6d.; and, in 1873, Sir Joseph Bazalgette reported to the Metropolitan Board of Works, as the result of experiment on 11,672,737 gallons of sewage at Crossness, that "the cost of manufacture, taking the dried and wet residues as perfect 'guano,' was 6l. 16s. 6d. per ton, exclusive of rent, interest on capital, depreciation of plant, and other items"; and that "the value of the manure, as judged of by its chemical composition, does not exceed 20s. per ton."

THE Railway Report of the Board of Trade for 1884, just issued, loses most of the practical value that it might otherwise have from the unaccountable delay attending its preparation. Not only has all the information that it contains been in the hands of the public, in the form of the January reports of the various companies, for some months, but the like information as to the results of the working of half of the present year has also been communicated, in detail, to the shareholders. Thus, when Messrs. Calcraft and Giffen speak of the results of 1884 as being "less satis-



factory than for the last two or three previous years," their readers are in a position to add that the results of 1885 are less satisfactory than those of 1884. The main items of the report are but too familiar. Increase in cost per mile adds 2 per cent. to the capital, while only 1 per cent. has been added to the mileage. A decline in bulk of merchandise transported of 1½ per cent. contrasts with an annual increase of 2¼ per cent. from 1873 to 1883. More passenger-traffic has been conducted for less income. A falling off of 509,000*l.* in receipts has only been lightened to the extent of 132,000*l.*, by economy in working expenses; the loss of 377,000*l.* thus indicated, together with the fresh charges on 16,543,000*l.* more capital, falling on the holders of the 299,000,000*l.* of ordinary stock. In face of all this proof both of decline of business and of decline of price, it is small comfort to be told that "real business has not decreased so much as the figures of the nominal business expressed by money values have decreased."

HOWEVER conflicting may be the various opinions as to the architectural features of those portions of London now undergoing reconstruction, there can be no room for divergence as to the vast improvement from a social and sanitary point of view. Londoners of even very few years' standing may well be surprised at the wholesale demolition of certain populous districts, like Soho and St. Giles, while those who have not seen them for a decade or so, would be agast at the transmutation going on all round, and the disappearance of so many old, if somewhat shabby, landmarks. The steeple of St. Anne's, Soho, at present overlooks a desert of empty building ground between Leicester-square and Holborn, so bewildering in its monotony that even residents may be pardoned for losing their way. Newport Market, one of the dirtiest and most disreputable neighbourhoods, has almost vanished, and its place is taken by respectable, if not very ornamental, blocks of model dwellings, while similar changes are going on in Whitechapel, Gray's Inn-road, Drury-lane, and several other quarters. Slums, of course, are still existing, and will always exist in every large city; but they are now rendered more manageable and less active for harm than they were before, their continuity, so to speak, being broken, and supervision rendered much more easy. Moreover, it is impossible that the mere contiguity of clean and decent houses, such as the industrial dwellings in Great and Little Wild streets, should not exercise a wholesome influence on their neighbours, both morally and physically; and in this respect the embellished churchyards and open spaces are all assisting in a very desirable object. Nor do we think that any real or sentimental injustice is perpetuated by the driving away of the rookery inhabitants, who are seldom *bona-fide* work-people. They will naturally migrate to other sympathetic spots, but, perhaps, in course of time, the Ethiopian may change his skin, and the slum-dwellers become comparatively respectable from the difficulty of finding house-room suitable to their old condition.

THE difficulties of that section of sanitarians who believe in sewage farms as the best way of solving the ever-present drainage questions, will not be lessened by a decision given the other day at Birmingham Assizes. A farmer occupying some fields at Ipsley, on the banks of the Arrow, sued the Redditch Local Board for 72*l.* damages for the loss of a colt alleged to have been poisoned by the polluted effluent water from the Board's sewage farm. The charge against the farm was, that it was too small for practical purposes, being only four acres for a population of 8,000, and that it was badly managed, the crude sewage running away unfiltered. The defendants, on the other hand, contended that, if the colt really died from drinking bad water, it was due to a mess of "potage" or refuse from the needle and paper works that are so numerous in that neighbourhood; that the farm was laid

down in strict accordance with the plan recommended by the Royal Commissioners, and that the water, as evidenced by many samples, was fairly pure and harmless. In addition to the action for damages, the plaintiff applied for an injunction to prevent the Redditch sewage being allowed to flow into the Arrow. Practically both cases were given in his favour, although, fortunately for the Board, he was debarred obtaining the 72*l.* in consequence of his having failed to bring his action within the specified six months after the damage was committed. He was, however, successful, as a riparian owner, in his application for an injunction, and he was also allowed the costs of the action. It certainly seems hard that a sewage farm, confessedly dealing with a great public evil, and not established for a profit, should be punished, while other manufacturing pollutions, which, in the majority of cases, are far more injurious, are permitted to go unchecked. When the difficulties that attend the sewage disposal of a population under 10,000 are so great, how infinitely more perplexing must they be when the population is counted by millions.

WE have had occasion before (*Builder*, April 13, "Smaller Classical Museums of Central Italy") to call attention to the valuable and but too little-known collection of ancient pottery in the possession of Count Faina at Orvieto. We are glad to see that one of the most curious bits of work in his possession is now made public property by its publication in the *Annali* (Tav. diagg. C) of the German Archaeological Institute at Rome. The interest of this specimen is that it seems to be a sort of meeting-point between the rudest possible hand-turned Italic pottery and the system of decorative motives we are accustomed to associate with the Etruscan. The centre design of the vase (a rough amphora) consists of a succession of winged female figures stamped on the pottery. A glance shows that this female winged figure is own cousin to the Asiatic winged Artemis. Below a frieze of animals is stamped, but, so awkward was the workman, that he has stamped them upside down. With this vase is published a similar specimen, but of more advanced workmanship from Chiusi. We all go to Orvieto to study Luca Signorelli; if we are wise we shall cross the cathedral court and visit the Faina collection, and that soon, for with a private collection it is often now or never.

THE Museo Greco-Etrusco in the Via Colonna at Florence holds a high place among the Museums of Europe, not only for the great riches of its contents, but also more especially for the perfection of its scientific arrangement. To label a monument Etruscan has been too often considered as sufficient attempt at classification. Professor Luigi Milani, the director of this museum, thinks otherwise. He is at work on the chronology of the quaint black ware, "bucchero nero," which fills three large rooms of the museum, and he has just published, in the "Museo-Italiano di Antichità Classica," i. 3a, 1885, under the title of "Monumenti Etruschi Iconici," a very interesting monograph, which can be heartily recommended to all students of ancient portrait art. In Etruria as in Egypt, sepulchral monuments were largely prompted by the desire to produce a vivid likeness of the dead. In Etruria, as in Egypt, the tendency to realism inherent in the nature of the people, and fostered by religious conviction, for ever stifled any promptings to idealism. The subject has been, as regards Egypt, almost written to death of late, but the classification of Etruscan portraits is virgin soil. The monograph is beautifully illustrated by thirteen prototype plates, and is clearly the forerunner of a larger work.

SINCE the irruption on the 11th of October, 1883, of the water into the Severn Tunnel, the works have been conducted in so silent and undemonstrative a manner that the announcement of the opening of this great work for traffic will come upon most readers as a very pleasant surprise. We conclude that a history

and description of the work is in course of preparation for the Institution of Civil Engineers, and that the desire not to anticipate this paper has led to a reticence which is unusual as to works of so much magnitude. Although every half-year that passes adds fresh proof that the shareholder too often suffers when the engineer is glorified, we cannot withhold the admiration due to the accomplishment of a bold and dangerous work, regarded as a piece of engineering, whatever be its financial wisdom. In fact, in a case of this kind a company may be said to be serving the public at their own cost. Where, as in the case of the South Wales traffic, there is little or no railway competition, it would seem but a shortsighted policy for a company to diminish their income, and increase their capital, by cutting off a loop or working line. That the extra trade to be brought on the line by an increase of facility will pay for the increase of capital, is, we think, more than doubtful. But that for the military defence, and probably for the commercial convenience, of the West of England and of Wales, the under-bridging of the Severn is an important step, is very manifest.

THREE very useful processes have been set forth in *La Nature*, one of which, by M. Prischer, of Nuremberg, is for applying black coating to iron resembling enamel, by more adhesive and elastic. Powdered coal, put into a box, sufficient to cover the bottom to about three-quarters of an inch, and on this is a grating for the reception of the material to be coated. The box is then hermetically fastened and placed over a fire, when the moisture in the coal evaporates, giving off the bituminous vapours. After keeping the box at a dull red heat, it is opened, when the coal found converted into coke, and the iron article coated with great regularity. They have the advantage of being able to be bent or exposed to great variations of temperature without the coating being in any way affected. The second process is for bonising wood by immersing for a certain time in a solution of permanganate of potash. When dried, a beautiful tint is obtained, which becomes quite brilliant after a little friction, while a weak solution gives a violet colour. A cheap artificial ivory is now obtainable by a method which should supersede the old system of injecting white wax with chloride of lime under strong pressure. Under the present plan, bones and waste pieces of deer and kid skins are macerated and then bleached for a fortnight in chloride of lime. After this, they are heated by steam, so as to form a fluid mass, to which is added a certain proportion of alum. The mass is then filtered, dried in the air, and hardened in an alum bath, the result being white, tough plates, extremely workable, and economical to produce.

SOME time since we commented on a triangular circular, which was sent us almost simultaneously by several architects, from a firm who offered commissions for placing work in their hands. An Associate of the Institute of Architects has just sent us another document of the same kind, headed "The Lancashire Telford Cement Co.," and containing the sentences, "You can influence business among your clients, or specify for its use in your specifications, and shall be pleased to allow commission." The correspondent, who encloses this obliging observance, "It is intolerable that the professional should be insulted in this way." It is intolerable; and if architects who receive these offers of bribes for the use of special materials forward them to us, we will make public the names of those who attempt to bribe, and we will perhaps put a stop to the practice. The position of an architect, we may explain to the "Co." in question, is that of an independent adviser in the interests of his client, and not that of a tradesman; and he has no right to have any interest in view except that of his client. To send round a circular of the kind alluded to is simply to invite professional men to do a dishonourable thing; and if the tradesmen who make such offers do not know that, the sooner they learn it the better.



## LETTER FROM PARIS.

SINCE our last letter, the Government has officially laid the first stone of the monument destined to replace the ancient Sorbonne. This ceremony afforded the opportunity to confer a decoration on M. Nenot, and every one has applauded this honour to a man of talent still young, and whose ability has been already established. The immense constructions which the State, sharing the cost with the town, is raising here, will completely modify this corner of old Paris; and if the archaeologists regret this change in the physiognomy of the "rive gauche," the professors and students, on the other hand, see with satisfaction the carrying out of a metamorphosis long denied, and which will give to the University of France a home worthy of it.

Paris is, besides, on the eve of witnessing other important improvements. Without mentioning the Metropolitan Railway, the realisation of which is too long delayed, the Municipal Council has at last perceived that the only way to put an end to the labour crisis which presses so heavily on Paris is to take in hand large works, and itself to give the necessary impulse. Accordingly, before separating for the annual vacation, it has voted extra supplies which will permit both the completion of the system of sewers and the improvement of roadways, the creation of new scholastic establishments (*lycées and écoles*), the completion of the Palais de Justice, the Ecole de Médecine, and the Hôtel de Ville, the reconstruction of the Mairies of the 8th, 10th, 17th, and 18th arrondissements (which have become notoriously inadequate), the rebuilding of the morgue, with freezing apparatus for the preservation of the bodies; and lastly, the setting apart, for the Exhibition of 1889, and the Centenary (*fêtes*), of a sum of about twenty-six million (francs). Here is a plan of campaign which, as will be seen, architecture plays a considerable part, and to which, on that account, we shall have occasion to return from time to time.

In the matter of inaugurations we may mention that of the monument erected at Marseilles to the memory of Chanzy. In our notes on the *Salon*, we spoke of the sculptures which are to decorate it, and return to the subject only to remark that nothing can be worse, in such a case, than to divide the work and entrust the sculpture to artists of diverse temperament, whatever may be their individual talent. M. Crank has been in the figure of Chanzy no more than that of a general officer meditating, in the leisure of aarrison depot, his rounds of annual inspection, while M. Croisy (who, by the way, is also a receiver of decoration) is inspired by the memories of battles and of the heroic resistance of the Army of the Loire. The result is a disagreeable contrast, an absurd anomaly, between the fury of the figures on the pedestal and the placid aspect of the statue which surmounts it.

Among the new members of the Legion of Honour are not only M. Croisy, but also two architects of ability, MM. Lucien Magne and Paul Deslinières. M. Leon Parville, the able learned ceramic artist, who, for twenty-five years has been engaged in advancing the art of ceramic falence, was also to have received a cross, as a sequel to the exhibition of the Union Centrale, when a painful disease had long threatened him carried off this scientific artist, whose name will not be often in connexion with the application of ceramic decoration in modern buildings. It is to him that we owed the decoration of the pavilion in the Exhibition of 1878. His nomination which public opinion has rewarded is the election of M. Daumet to the Académie des Beaux Arts, in place of the late Ballu. Thanks to M. Charles Yriarte, one of the *Builder* have been made acquainted with M. Daumet's admirable work in restoration of the Chateau of Chantilly. In connexion with the Académie des Beaux Arts we may mention the architectural competition for the *Prix de Rome*. The subject, as mentioned, was the design for an Academy of Medical Science, and the prize has been carried off by M. François André, pupil of Berthet. The first second-grade prize has been awarded to M. Albert Devienne, pupil of Coquart & Guerhard, and the second to Louis Louvet, pupil of his father and of

The Antwerp Exhibition has also brought to the young French architects its harvest of prizes. The *médaille d'honneur* has been adjudged to M. Louis Bernier. M. Albert Ballu has obtained a medal of the first class; MM. Courtois-Suffit & Calinand medals of the second and third class. M. Courtois-Suffit, who has gained many successes in the Ecole des Beaux Arts, obtained also two years ago a "bourse de mérite" from the Department of the Seine.

After Voltaire, Jean Jacques Rousseau; the thing was inevitable, and Paris will have statues of both these celebrities. The decision will shortly be given on an open competition for a monument to the latter. From the sixty-four competitors the jury, among whom are MM. Mercier, Chapu, Captier, Guillaume, Louis Noel, and Etienne Leroux, have selected three sketches by MM. Berthet, Larche, and Steiner. These three artists will produce a second set of competitions, to be submitted on December the 15th, modelled in clay, one-fourth the scale of the intended work, and only then will the final selection be made and the commission placed in the hands of the chosen competitor. M. Berthet has already obtained the prize in an open competition last year for the statue of Etienne-Dolet; and M. Steiner is the author of the statue of Ledru-Rollin, erected in the Place Voltaire, and which was also the subject of a public competition.

We hope these gentlemen will not have eventually to encounter the administrative and financial difficulties against which M. Dalou is obliged to contend in completing his fine work the "République," of which the *Builder* has given more than one illustration. It appears that this artist requires for the proper accomplishment of his work in detail the method of casting *à cire perdue*, the superiority of which has been long recognised, and which, as is well known, was employed with great success by the artists of the Renaissance. Unhappily this will raise the cost 110,000 francs beyond the sum originally allowed for the work,\* and as the estimated expenditure has been already considerably exceeded, and the execution of the models has cost more than 100,000 francs, the Administration hesitates, the Municipal Council is silent, M. Dalou is very positive, and *adieu sub judice lis est*: a serious delay very prejudicial to the completion of this remarkable work, intended, as we have said, for the Place de la Nation.

In spite of the temporary stoppage, M. Dalou is more fortunate than Messrs. Contan and Formigé, the authors of the design for the commemorative monument to be erected at Versailles; it is nearly four years since that competition was decided, and the two chosen competitors have not yet been able to obtain the authority of the State to commence their work: more fortunate, too, than M. Marqué de Vasselot, who, the day after the death of Lamartine, was commissioned to execute the statue of the poet, and who is now obliged to demand in the law courts the payment of the amount promised him by the Subscription Committee.

Whilst at the Musée de Cluny the workmen are putting the last touches to the orangery, now transformed into a permanent museum of painting and sculpture, the Ministère des Beaux Arts is preparing to take over the curious collection of antiquities,—Greek, Egyptian, Gallo-Roman, and Indo-Chinese,—which M. Guimet has presented to the nation. The new museum will be near the Trocadéro, in a palace which M. Guimet has engaged, on conditions to be approved by Parliament, to complete within three years. We do not know who is to be the architect.

The comparative stagnation in this holiday season does not give occasion for much artistic news. We may notice, however, certain works of sculpture which the Council have commissioned for the interior decoration of the Hôtel de Ville.

Among these may be numbered the complete decoration of the vault of the large "Galerie des Fêtes," for which the bas-relief, caryatides, garlands, and other ornaments are to be entrusted to thirteen sculptors of repute,—MM. Berthet, Boisseau, Boucher, Croisy, Dobrie, Dumaige, Germain, Mariston, Moreau-Vanthier, Michel, Perrin, and Sobre. The expense is estimated at 85,000 francs, not including, be it understood, the pictorial decoration of the ceilings, which the Commission des Beaux Arts proposes to confide to MM. Hébert, Delaunay, and Ferrier.

\* It ought to be done, whatever the cost.—Ed.

M. Ernest Barrias, who is just completing for the decoration of the "Escalier des Fêtes" two beautiful statues in marble symbolising "Le Chant" and "L'Accompagnement" (a very charming and spiritual idea), has been also commissioned to execute the bust of the lamented Ballu, which will be placed in the vestibule of the "Escalier d'Honneur," on a pedestal to be designed by M. Formigé.

Lastly, M. Marqueste, who, on the death of Idrac, was commissioned to complete the statue of Etienne Marcel, commenced by the late sculptor, has finished the model, which has been accepted by the Commission des Beaux Arts, and will be shortly cast in bronze, to be placed in the garden of the Hôtel de Ville.

We may hope now that the winter will not pass without the Municipal Council settling the important question of the historical paintings for the Hôtel de Ville. It has great interest for French artists, and a prompt settlement of the matter is an absolute necessity if the Hôtel de Ville is to be completely ready for the grand *fêtes* of the centenary of 1789.

Though the works left by Bastien Lepage were sufficient to keep alive the name of the painter of "Les Foins" and "Jeanne d'Arc," we hear with great pleasure that a subscription is to be opened among artists for the erection of a monument to him in his native village, Dampvilliers. The friends of Bastien Lepage have enlisted the well-known talent of M. Rodin, the sculptor, for the execution of the cenotaph, and M. Cazin, the painter, has offered to give the design for a commemorative plaque in bronze, to be placed on the house where he was born.

Paris, which has given to one of its streets the name of Bastien-Lepage, is equally desirous to do posthumous honour to the memory of Berlioz, whose statue is to be erected in the square Vintemille. M. A. Lenoir, from whom the Administration bought last year, out of the *Salon*, a pretty figure entitled "Uno Mare," is putting the finishing touches to a statue representing Berlioz in an attitude which was frequent with him, standing with his elbow on a desk and his head leaning on his hand. The work is full of life and spirit, and M. Lenoir has well rendered the mobile and nervous physiognomy of the musician. The young sculptor, we may add, is a grandson of the celebrated Albert Lenoir, to whom we owe the preservation, in the Musée des Grands Augustins, of so many of the historical monuments which had been scattered far and wide in the revolutionary tempest of 1793.

We may mention that in 1886,—that is to say, in a few months,—the Académie des Beaux Arts will adjudge the biennial prize founded by the late M. Duc, who in instituting this competition wished, according to the words of his will, "that the young French architects should make a fitting application of architecture to our modern manners and customs, endeavouring to discover the essential elements, the various special qualities, which in many former epochs of the art had given rise to works which command universal admiration."

## THE BRIGHTON CONGRESS OF THE BRITISH ARCHEOLOGICAL ASSOCIATION.\*

WE brought the narrative of the proceedings of the Brighton Congress to the close of the first week's proceedings in our last. Two additional days of the following week, Monday, the 24th, and Tuesday, the 25th, were devoted to interesting excursions, and were largely attended, fine weather being experienced on each of the days.

On Monday the party proceeded to Lewes, to inspect some of the objects of interest in the quaint old town, the first being the parish church of Southover, erected beside the entrance gateway of the great Cluniac Priory founded by Earl de Warenne and his wife, Gundrada, in 1077.

The church has a nave and aisles, a chancel, just completed, and a heavily-built brick tower, erected at the beginning of the eighteenth century. The modern memorial chapel to the Earl and Lady De Warenne is on the south side of the church, and it contains the elaborately-wrought slab which covered their remains in the chapter-house of the adjoining priory, and also the leaden cists in which their remains were found in 1845, when the railway to

\* See pp. 252, 285, ante.



Brighton was formed. These were inspected, and a move was then made to the site of the famous priory, now traversed by the line of railway. Masses of walling are to be seen in all directions, having the peculiarity of one period of Norman work being built into a later period, while there is a good deal of still later work. Without a clue the remains are difficult to make out, from the fact that while the large priory church was on high ground, the monastic buildings were in a lower position, and raised on a basement up to the level of the church, or nearly so. The clue has been rendered by the plan prepared by Mr. St. John Hope, giving the result of the recent excavations made under his direction. This plan was exhibited by Mr. Loftus Brock, who bore testimony to the value of the researches carried out by that gentleman. The work presents some valuable and curious features, the most remarkable being the evident signs of enlargement in Norman times. The wall arcs of a large western tower is laid bare in a private garden, where there is also the terrible subterranean prison for refractory monks known as the "lantern," approached by a narrow passage. After partaking of light refreshments at Southover Grange, a house of sixteenth-century date, erected out of the remains of the priory, and now the residence of Mr. Thorne, the mayor of Lewes, the party proceeded to the ancient castle of the town, a ruined shell keep, like so many other of the Sussex castles, and standing upon a conical mound. There is another mound within the castle area, both being entire, wholly artificial or natural hills scarped and shaped by human agency. This occurrence of two mounds in one building is very remarkable, and the more so since they are both, probably, of ancient British date. A third mound, Mount Calvary originally, in the Priory grounds, is doubtless of sepulchral origin. The castle is now occupied by the Sussex Antiquarian Society, and the party being assembled the history of the building was related by the Rev. Mr. De Patron, an active member of that Society. Sir James Picton, F.S.A., then proposed a hearty vote of thanks to the Sussex Society for their having courteously thrown open the castle for inspection, which had existed for so long a period between the two societies. He was followed by Mr. Geo. R. Wright, F.S.A., the Congress secretary, who stated that the short visit to the house, so to speak, of the Sussex Society was rendered as a compliment to them, and as some sort of recognition of the Association's value of the cordial feeling between the two societies. The Mayor of Lewes responded, expressing the thanks of the sister society.

After passing down some of the steep lanes of the town, the station and train were reached, and after alighting at Berwick Station carriages in readiness took the party to Alfriston, where the church and the ancient parsonage-house were inspected, luncheon being partaken of in the quaint old hostelry, the Star, a building of the sixteenth century, adorned with singular carving. The picturesque group which this building makes, with the old village cross in the distance, tempted many a sketcher to linger over its beauties long after the horn of the Congress Secretary had sounded. Wilmington Church was next visited, together with the remains of the small alien Priory, to which it had been attached, the church being probably an example, of a double use, one portion being parochial, the other monastic. The church has been recently well restored by Messrs. Paley. The gateway, now in ruins, is of later date than the monastic use of the building, and is part of an Elizabethan house erected on the site.

Tea was offered to the party by the Rev. W. St. John Densley.

The celebrated Wilmington Giant, a huge figure, having each hand resting on a pole, was only partially visible cut in the side of the chalk hill, about a mile from the church, the growth of grass having obliterated it in the comparatively short space of time since it was last cleared. One of the poles and one arm alone were visible.

Proceeding to Polegate Station, the train took the party to Pevensey, where the remains of the ancient Roman fortress were described by Mr. Round, who read a paper on the spot.

The excavations made a few years ago by Mr. Roach Smith, assisted by Mr. M. A. Lower, were described, and the way in which the builders of the Edvardian Castle engrained their building on to the old Roman walls was

dwelt upon. The return journey to Brighton was made at a late hour.

On Tuesday a long journey was made to Worth Church, where the fine Saxon church was inspected by a large party, and described by Mr. Loftus Brock, F.S.A., who called attention to the details of the building in support of his theory that it was added to in Saxon times rather than being built at one period. The whole of the walls are Saxon, pilaster strip projections appearing in all of them. The transepts are of lower height than either nave or apse. The appearance of the old timbered spire is shown by a view in the loan collection at Brighton, but the present tower and spire are of stone of recent date. The pulpit is a very fine piece of Flemish carving, dated 1577, and the continuous communion rails are also elaborately carved. The Rev. Mr. Banks explained the recent restoration of the church, when the Saxon apse was rebuilt, and Sir James Picton thanked him for his reception of the party. Resuming the carriages, Crawley Church was visited. It has a very characteristic square tower of Perpendicular date, and there is a fine roof of the same style to the earlier nave, one of the beams being inscribed with the following inscription in large old Gothic lettering:—

"Man in wele be whar, for wardly good maykyt man bynde \* be whar be for what comyth be hynde."

(Beware before what cometh behind.)

A long drive was then taken across what was once a portion of the great Forest of Tilgate, the country being still well wooded, and Cuckfield was reached in due course, where the fine church was inspected. It is a large building with a nave and side aisles of varying dates, a chancel, and a bold western tower, having a tall well-proportioned wooden spire. There is a clearstory to the nave, but it is hidden by a roof which covers alike the side aisles and nave. The charming old Jacobean House, Cuckfield-place, was thrown open for the inspection of the visitors and greatly admired, not only for its artistic appearance but for its being the house so graphically described in Harrison Ainsworth's "Rookwood." It is approached by an avenue of trees and has a singular little gateway flanked by four octagonal turrets at the angles at the end of the avenue. A visit was then paid to Ockenden, another old house of a later period, one portion being dated 1652. It is now the seat of Mr. Boord, M.P., and is a stone-built front, with mullioned windows, presents a remarkable example of the use of Jacobean or Elizabethan forms at a later age. By invitation of Mr. and Mrs. Boord, the party partook of tea and refreshments.

The carriages were then resumed for the last time, and Brighton was reached in due course. This has ended one of the most pleasant of congresses. The weather was everything that could be desired, the programme included places of considerable interest, and the papers were lucid and good. These attractions resulted in the daily meetings being well attended, while the arrangements for carriages and express trains passed off without impediment. One result was certainly attained by many of the visitors, who were agreeably shown what a great variety of objects of study there are at our doors, so to speak. Many of the *habitués* of Brighton appeared to be unaware of the existence of the remarkable fortified hills so close to that fashionable watering-place, or of the great number of interesting churches close at hand or within easy distance.

**Deep Well Boring in London.**—A bored tube well, 300 ft. deep, lined with extra strong wrought-iron tube, from the surface to the chalk, has recently been completed by Messrs. Isler & Co., on the premises of the Belfast and London Aerated Water Company, on Bankside. The chalk was reached at 204 ft. from the surface, after passing through 36 ft. of peat and gravel, 75 ft. of London blue clay, 93 ft. of mottled clay, and light and brown sands, with pebbles (Woolwich and Reading beds). Many objectionable springs were met, especially in the gravel bed overlying the London blue clay. These have been safely excluded from the well by means of the tubes, which are of even size, driven some distance into the chalk, preventing, therefore, any percolation from above. The supply is pumped direct from the chalk springs, and at the rate of 72,000 gallons per day. The same engineers have a contract for a 400 ft. or 500 ft. bored tube well for the Ealing Local Board.

#### PROVISIONAL ORDERS UNDER THE PUBLIC HEALTH ACT, 1875.

THE Local Government Board, deeming it desirable to follow a course similar to that adopted by them for several years past, and to fix a day before which all applications for Provisional Orders under the Public Health Act, 1875, or the Artisans' and Labourers' Dwellings Improvement Act, 1875, must be received, have issued the following instructions, which have been forwarded to the Clerk of each Sanitary Authority in the country, accompanied by a circular, in which it is stated that the dates mentioned are only fixed as the latest at which applications for Provisional Orders can be received. "It is not the intention of the Board," says the circular, "to interpose any obstacle in the way of those applications being made at earlier periods. On the contrary, where any Sanitary Authority propose to apply for a Provisional Order, the Board would wish them to make their application as soon as they are in a position to furnish the requisite particulars. It is particularly important that applications for Provisional Orders to alter Local Acts should be made at the earliest date practicable. These applications often require much consideration, and the Board are able to give more attention to them in the autumn than is possible during the earlier part of the year. It would prove a material assistance to the Board if all applications for Provisional Orders of this kind were sent in before the 15th of October."

#### Applications for Provisional Orders to put in force the Compulsory Powers of the Lands Clauses Consolidation Acts.

1. The application must be made by a petitioner under the seal of the Sanitary Authority, containing the particulars required by Section 176 (3) of the Public Health Act, 1875. The lands proposed to be purchased should be specified in a schedule to the petition, which should correspond in all respects with the book of reference mentioned in instruction 2. The petition must be presented not later than the 15th December, if the advertisements of the proposal were published in September or October, and not later than the 31st of December, if they were published in November.

3. The petition should be accompanied by a plan of the proposed undertaking, by a book of reference in duplicate, and by a statutory declaration showing that the requirements of Section 176 of the Public Health Act, with respect to advertisements and notices, have been duly complied with. The declaration must be stamped with a half-crown stamp, a copy of the newspapers containing the advertisements, and also of the form of notice, should be annexed to it as exhibits. It should specify in what manner in which the notices were served upon the owners, lessees, and occupiers, and, so far as relates to these notices, it should be made by the person who served them. The service must be effected strictly in accordance with one of the modes prescribed by Section 267 of the Act. The plan should be coloured so as to distinguish the land proposed to be actually purchased, and the several portions should be numbered so as to correspond with the schedule to the petition and the book of reference. Where it is only intended to carry sewers or water mains through lands, such lands should not be included in the petition, as the Sanitary Authority are empowered by Sections 16 and 64 of the Public Health Act to carry sewers or mains through lands without purchasing the lands.

4. The Standing Orders of both Houses of Parliament require that, at the same time as the plan of the undertaking and the book of reference are deposited with the Board, duplicates thereof shall be deposited with the Clerk of the Parliament at the Private Bill Office, unless the deposit with the Board is made after the prorogation of Parliament, and before the 30th of November, in which case the deposit with the Clerk of the Parliament and at the Private Bill Office, must be made on day later mentioned.

In order that compliance with these requirements may be proved before the Examiners of Statutory Orders, the Board should, immediately after the deposits have been made, be furnished with affidavit, stamped with a half-crown stamp, sworn before a Justice of the Peace or a Commissioner for taking affidavits, by the person by whom the deposits have been made.

5. The Standing Orders of both Houses of Parliament also require that, in any case where it is proposed by Provisional Order to authorise the compulsory taking, in any urban sanitary district, or in a parish or part of a parish in a rural sanitary district, of ten or more houses occupied, either wholly or partially, by persons belonging to the labouring class as tenants or lodgers, the Sanitary Authority shall deposit with the Board, and also with the Clerk of the Parliaments and at the Private Bill Office, on or before the 31st day of December, a statement of the number, description, and situation of such houses, and of the number, so far as the



certained, of the persons residing in such houses, and a copy of so much of the plan (if any) as relates thereto.

For the purpose of proving compliance with these requirements, an affidavit must be furnished to the Board, as in the case of Instruction 4, and if ten or more of such houses are not to be taken, this affidavit is to be stated in the affidavit.

The Board have been advised that two more Sanitary Authorities cannot jointly petition for a Provisional Order to enable them to put in force the compulsory powers of the Sanitary Authorities Consolidation Acts. Either such Authority must present a separate petition in respect of the particular lands which they require, or the several Sanitary Authorities must combine under Section 285 of the Public Health Act, 1875, for the purpose of carrying the proposed scheme into execution, and a petition must be presented by one of them with regard to all the land required. If this course is taken, an agreement for the section should be entered into before a Provisional Order is made for the Provisional Order.

Applications for Provisional Orders to alter the Areas of Sanitary Districts.

The application should be made by a resolution of the Sanitary Authority, a copy of which should be forwarded to the Board.

The application must be made not later than the 15th of December, and it is very desirable it should be made before.

The application should be accompanied by (a) a statement giving the names of the Sanitary Authorities whose districts are proposed to be altered, and the grounds upon which the application is made; and (b) a map showing the present and proposed boundaries of the Urban Sanitary Districts concerned. Where part of a rural sanitary district is concerned, the name of each contributory place affected should be given. The map should, where possible, be on an Ordnance map, on the scale of one inch to a mile. The Urban Sanitary Districts should be shown as bounded by a line, and the areas to be added thereto, or taken therefrom, should, as far as possible, be distinguished by separate colours, with well-defined verge lines so shown as to show clearly whether the boundary is the centre or side of any street, river, railway, &c. as shown on the map. In the case of a Rural Sanitary District the area of each contributory place affected should be clearly shown.

Where it is desired that the area of a Sanitary District should be altered and there is a Local Act in force, relating to the same subject matters as the Public Health Act, application should be made for alteration of the Local Act at the same time that the application is sent in for an alteration of the Sanitary District, if it is wished that the area to which the Local Act applies should be modified, and Sections 11 and 13 should be complied with.

Applications for Provisional Orders to repeal, alter, or amend Local Acts.

The application should be made by a resolution of the Sanitary Authority, asking the Board in general terms to repeal, alter, or amend the Local Act, wholly or partially, as the case may require. A copy of the resolution should be forwarded to the Board.

The application must be made not later than the 15th of December, and it is very desirable that it should be sent in before the 15th of October.

The application should be accompanied by a copy of the Local Act, and by a statement showing the particular sections which it is proposed should be repealed, altered, or amended, and the precise alterations desired, and in the event of the Local Act having been previously altered by Provisional Order, a reference to such Order should be given. The statement should also show the grounds upon which the application is made.

Where the effect of the proposed repeal or alteration of the Local Act will be to extend or diminish the area of a sanitary district, the particulars referred to in Instruction 9 should also be furnished.

It is particularly requested that all petitions, statutory declarations, and other such documents may be written on foolscap paper of the usual size.

HUGH OWEN, Secretary.

Local Government Board, Whitehall, August 25th, 1885.

**Blisshill-on-Sea.**—The Local Board having failed for borrowing powers to carry out a drainage scheme, Major Tilloch, R.E., of the Local Government Board, held an inquiry on Wednesday, the 26th ult., at the surveyor's office. Mr. H. B. Nichols (of the firm of Messrs. Hols & Sons, Birmingham), the engineers appointed to carry out the works) attended and explained the details of the scheme, and Major Tilloch, accompanied by the chairman (Colonel), the surveyor, and several members of the Board, afterwards inspected the lines of the proposed scheme. It is expected that the works will be proceeded with at once, at a cost (including compensation) of not less than 7,500*l.*, Major Tilloch having expressed himself favourable to the scheme proposed.

# THE CAMBRIAN ARCHÆOLOGICAL ASSOCIATION AT NEWPORT, MONMOUTHSHIRE.\*

CONTINUING our account of this Congress, we have to record that on Wednesday, August 26, a pleasant drive brought the members to Caerleon, where they were met by Mr. Mitchell, who took them over the church, in which there was not much to be seen worthy of notice. They then went to the Museum, in which there is a priceless treasure of Roman relics found in Caerleon and the neighbourhood. This collection, containing all articles in daily use among the Roman occupants, from the child's toy to the veteran's tombstone, includes nothing that would lead us to believe that Christianity was the faith either of the conqueror or the conquered. On one tombstone the palm branch indeed is introduced, but this seems slight evidence. Sacred symbols are conspicuous by their absence. This, however, was not the impression of Dr. Woolfit, who kindly took the visitors into his beautiful grounds, and read a paper in which he stated his belief that Joseph of Arimathea and Paul the Apostle of the Gentiles had in days gone by trodden the streets of Caerleon. Without endorsing the romance written by Geoffrey of Monmouth, and dedicated to Robert Consul, Earl of Gloucester (founder of Newport), we may indeed look on Caerleon as one of the most interesting spots in Great Britain. Whether Belimawr established himself here, in the third or fourth century before Christ, we cannot say, probably not; but we do find absolute proof that Caerleon existed in the first century after Christ, and that through a chief town of the Silures (the descendants of the Non-Arian, stone-age folk), it was called by the Cymric name of Caer Wyse, that it was in all probability the home of that Caradawg whom the Britons elected as their commander-in-chief, whom the Romans called Caratacus, and concerning whom every English child has prattled time out of mind. When Caradawg had been demolished, the Romans rebuilt his town, called it Silurnia Ica, made it the capital of the second division of Britain, a "colony," and the headquarters of the second or August Legion. Ica was Romanised under Vespasian about B.C. 50, when he commanded the second legion, and it was the head-quarters of that legion, until it removed to Richborough in the year 368. With the departure of the second legion we may suppose actual Roman supremacy faded away from Ica, but it remained a populous, strongly-fortified city, and the English were still a long way off. When it ceased to be called Ica, and took the name of Caerleon, we do not know; when it perished we do not know; but Gerald de Barri, writing in the twelfth century, declared that ruins of "great palaces, a tower of prodigious strength, remarkable hot baths, remnants of temples, and theatres, inclosed within high walls, part of which remain standing," existed in his time. Gerald, it must be admitted, was at times given to drawing the long bow, but in this case he probably did not much over-state his case. And it was round these ruins (so mysterious to the half-savage Celts) that the Arthurian myth entwined itself. The second legion was forgotten: Arthur, Guinevere, Lancelot, Gawain, and the rest took their place. Now with regard to Christianity, that it was established in South Wales during the Roman period is doubtless true, but that it gained any strong hold on the minds of the people seems improbable. At all events, when the Irish and Cumbrian missionaries arrived in the fifth and sixth centuries, the gentle native delighted in providing them with the martyr's fiery crown. Perhaps we may say that Christianity in Caerleon during the latter days of the second legion, had numerous adherents among the upper classes and their imitators, and in all probability it continued to be the creed of a lessening minority until the advent of the missionaries, unless, indeed, the town was destroyed before their time. If, then, there were Christians, in all human probability there were churches. According to Welsh tradition, Dewi ab Sandde (subsequently known as Saint David) was primate of the district which we now call South Wales in the sixth century; he removed the archbishopric from Caerleon to Menavia or St. David's, in Pembrokeshire, because the former was too much frequented by wicked men; perhaps the real reason may have been that these wicked men

destroyed the town in his time. According to Geoffrey of Monmouth, an indifferent authority, the old cathedral was dedicated to St. Aaron the Martyr; it has utterly vanished. The present church commemorates a Welsh saint known as Catwg the Wise, who was contemporary with St. David; if, indeed, the modern church stands on the site of the original structure: the site alone is left.

From Caerleon a lovely drive brought the party to Usk. In the church an impossible Welsh brass led to an animated discussion; from which many of the party escaped into the Priory, an interesting building opened to the Society by the kindness of Gen. Bernard, and then to the castle, a grand old shell. Then the whistle sounded and the visitors were again on the road to Raglan. Search England through and it will be difficult to find a fairer ruin than Raglan Castle. This should be sacred ground to the readers of the *Builder*, for within these walls the earliest steam-engine puffed its baby blast. The tower in which the Marquis of Worcester conducted his experiments still stands, and a number of strange channels still exist in the walls through which he conducted auxiliary water-power from a great tank on the roof. The story goes that when the Roundhead party entered the castle he set a primitive hooter going, and his enemies fled in terror, availing that "The lions were let loose." Through this beautiful ruin the party was conducted by Mr. Somerset, the warden. The old ruin was particularly gay, as a tennis tournament was going on.

From Raglan the party returned by train, and an evening meeting was held, at which the President, Lord Tredegar, took the chair, and several papers were read.

On Thursday morning the windows of heaven were opened, and an inch of rain was projected thence on the town of Newport and its neighbourhood. The rivers of Monmouthshire had been so low that it was rumoured if the drought continued in the course of a week there would not be sufficient water to fill the dock basins, so that this little deluge was grateful to all but archaeologists. As may be supposed, some of the faces at the breakfast-table were somewhat prolonged. However, when that meal had been disposed of, and the general secretary's ear-piercing whistle was heard, a little band of members assembled in the porch of the King's Head, equipped with waterproofs and umbrellas.

The first point of attack was Newport Castle, which is about 150 yards from head-quarters. Little more than the shell of this castle remains, and that is used as a brewery. The proprietors thereof met the archaeologists, and were conducting them over the castle, when Mr. Mitchell arrived with a paper written by Mr. Octavius Morgan. With the assistance of this paper and a large plan, he gave the party a pretty clear idea of what the structure had originally been. There seems to have been a Welsh fortification on the site of the present castle, known as Castell Newydd, or Newcastle. Then the Normans over-built this with a stone fortress; apparently none of the Norman work is left, though a bit of herring-bone masonry between the western and central towers was deemed by some present to date back to Roman times. The castle passed successively through the hands of De Clares, Le Despencers, Beauchamps, Nevilles, and Herberts. Mr. Mitchell pointed out the remains of a passage which once existed between the outer and inner walls. The chapel was in the central tower, and its very handsome groined roof still remains in a fair state of preservation. The cellar and water-gate below were inspected, and notice was drawn to a traditionary passage which was reported to lead to Caerleon. It is curious how frequently the myth of subterranean passages occurs.

The party then returned, and took train for Tintern. By the time we arrived, our party had been considerably recruited from Chepstow and elsewhere.

On arriving in the castle the visitors found that the warden (Mr. Lorraine Baldwin), though an invalid, was present to receive them, and had invited Mr. Blisshill to explain the details of this extremely beautiful ruin. The rain continued to fall in a sulky dogged fashion.

Mr. Blisshill, after some remarks on the order of Cistercians who founded the abbey, said that the existing structure was built by Bigod, of Norfolk, in 1268, and traced the architectural history of the edifice in a masterly fashion

\* See p. 308, ante.



almost stone by stone, and then exhibited a portion of the original pavement in the chapter-house, which was uncovered last autumn, and which will be again covered with sods to preserve it from the weather.

The Rev. Canon Thomas, chairman of the committee of the Cambrian Archaeological Association, returned thanks to Mr. Blashill for his extremely able paper, and in the name of the Association asked permission to publish it in their journal, a request which was readily acceded to by the author.

Mr. Laws, the general secretary, proposed a vote of thanks to Mr. Loraine Baldwin for the kind way he had received the Association, and for his thoughtful care in asking his friend, Mr. Blashill, to explain the many difficulties which occur in the Tintern ruins. Then to lunch, and on to Monmouth by train.

The first object which attracted attention was the Monnow Gate, the last of the four city gates which once existed. This is built on the bridge which spans the river Monnow; it consists of a gateway formerly containing a portcullis, with a staircase on one side. Above there was a guard-room, and on the left-hand side a garderobe; above were some other small apartments. The requirements of the day have led to a widening of the bridge and the formation of a passage for foot traffic on each side: these have been made in a fashion which is most creditable to the town surveyor, for they offer the requisite accommodation to the public, without causing offense to the archaeologist. Having examined the churches, in which there was not much to be seen; the visitors proceeded to the Castle, which is now used by the Militia as a barracks, and has few points worthy of attention. The window in which Geoffrey of Monmouth is supposed to have sat while inditing "Historia Britonum" (alas! the date of the window and the work do not agree) was shown us in the almshouse. Then for the station, and back to headquarters at Newport.

In the evening there was a meeting for members only, the secrets of which far be it from us to disclose.

On Friday morning the rain had blown off, and the members assembled at the station in the bright sunshine to proceed to Caerphilly Castle in a special train. Caerphilly, as is well known, is a giant among ruins. It contains no fewer than thirty acres of land within its walls, and, with the doubtful exception of Windsor, was the largest castle in Great Britain. When Caerphilly was in its glory it must have looked like an adaptation from the lacustrine period, for round the castle was a great artificial lake. This and the immense walls rendered the castle practically impregnable, and it is to be feared that the inhabitants, relying on the strength of their stronghold, robbed their Welsh neighbours cruelly. Hence arose the popular proverb: "It's gone to Caerphilly." This was equivalent to saying that a thing was irrevocably lost. How Despencher defended Caerphilly, in which was King Edward II., how they fled and were captured, is it not to be found in the annals of English history?

The Rev. J. W. Evans, of St. Mellon's, by way of explaining the topography of Caerphilly Castle, read an extract from Mr. G. T. Clark's admirable work on Mediaeval Military Architecture, the entrance-gate tower approached by a double drawbridge. The platform, the curtain, the inner moat, the lake, the redoubt (an earthen mound not unlike that at Caerleon), and the great hall, were all described from Mr. Clark's work.

The keen autumnal wind whistling through the ruins and across the short sward began to turn the thoughts of the party to luncheon, so the signal for retreat on Tredegar Park was most welcome. One member managed to miss the train, but he was observed running in the distance, and the special pulled up and awaited his arrival. When we arrived at Bassaleg we found our noble President, who, through an unfortunate mistake, had missed us at Caerphilly. The ladies of the party were accommodated in a break, Lord Tredegar taking others in his carriage, while the gentlemen found their way on foot to the old home of the Morgans.

Here the host had provided luncheon for the party and afterwards conducted them over the house.

Tredegar is a fine house of Charles II. period, built round an older house. The

Mediaeval hall is now used as the servants' hall.

Having inspected the mansion, Lord Tredegar led the way across the park to the great Gaer or camp. This is evidently the remains of a huge Celtic fortress; in it flint implements have been found. From its ramparts a lovely view lies before the visitor, on the one side Severn Sea with the opposite coast of Somerset, on the other the Welsh Hills stretching away in endless succession.

From the Gaer to St. Woolo's Church, in Newport, was but a short walk. Mr. Morgan met the party at this point and went carefully through the history of the church, which, as so frequently happens, may be read from its alterations. What will future ages make of our restored churches?

In the evening the closing meeting was held, the President in the chair. As is usual on such occasions, votes of thanks were passed to the many kind friends who had in different ways made the time so pleasant for the visitors. Never did entertainers better deserve thanks, for the President, the Local Committee, and the Local Secretary had done their work right well, and the meeting was with one consent voted a success.

Chester was chosen as the scene of next year's campaign.

#### ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS.

A MEETING of the Lancashire and Cheshire district was held at Blackburn on the 28th ult. The president, Mr. R. Vawser, M. Inst. C.E., of Manchester, presided, and there was a fair attendance of members. Mr. J. B. McCallum, Borough Engineer, read a paper, giving a description of the municipal and sanitary work of Blackburn. The population has doubled since 1861. The death-rate in 1884 was 23.4 per 1,000. The general district rate is 3s. 2d., the borough rate 1s. 4d., the poor rate 9d., and the county rate 4d. in the pound. One feature of the sewerage is that a portion of the area added to the borough in 1876 is too low for the drainage to flow by gravitation into the existing main outfall sewer. This difficulty was met by fixing a pair of hydraulic engines in a chamber under the roadway, worked by a 6-in. water-main. These pumps are capable of lifting together a million gallons per day to the height of 20 ft. No attention is required, except oiling, and the estimated cost for water is 20l. per annum. The sewage is disposed of by irrigation, and the land was acquired by compulsory purchase, and the total cost has been 114,000l. One farm entails a cost of about 600l., and the income from Samsbury Farm is about 900l. per annum, or a little more than 1 per cent. on the 69,000l. expended. The tub system resulted in the abolition of 5,000 offensive middens; but in all new premises water-closets are made compulsory. The waterworks were purchased by the Corporation in 1875, at a cost of nearly 342,000l., but 337,600l. have since been spent on extensions. The consumption is 2½ to 3 million gallons per day, and there is a considerable surplus. The gasworks were purchased by the Corporation in 1877. The present capital is 602,000l., and the production 408,000,000 cubic feet per annum. The sewage has to be conveyed to Samsbury sewage farm across two ravines. In crossing the first the sewer, which is constructed of wrought-iron, takes a leap down from 80 ft. to 90 ft. in a shaft. From the bottom of this shaft a tunnel has been driven out of the hill side at a height of about 40 ft. above the river. A wrought-iron tube bridge, of three spans of 40 ft. each, crosses the ravine (the sewage being at this point under very great pressure) and the conduit is continued under pressure for a considerable distance up the hill, the summit of which is tunnelled through. The next ravine is crossed by an embankment containing some 13,000 cubic yards of earth, and the two next by means of wrought-iron tubes, each of 40 ft. span, the stream passing underneath these siphons. The Corporation farm the Higher Park farm themselves, but the Samsbury farms are let to tenants, who have the privilege of using just as much sewage as they please. Mr. McCallum also described the various public buildings of the borough, and gave details of the working of the highways department.

A discussion followed, in the course of which it was stated that the sewage siphons were

kept free by the sewage being first strained, and it was explained that the charges made for constructing private streets were regulated by private Act. After lunch the various public works described were visited and inspected, and in the evening the members dined together at the White Bull Hotel.

#### OBITUARY.

Mr. Thomas Thornycroft.—The death is announced of Mr. Thomas Thornycroft, sculptor of Moreton House, Melbury-road, Kensington. He died on the 30th ult. at Breckley, in Kent, at the residence of his son-in-law, after a relapse from rheumatic fever.

Herr Anton Widmann.—German papers announce with expressions of deep regret the death of Anton Widmann, of cholera, Granada, after nine hours' illness. He was only in his twenty-ninth year, but had given promise of a most brilliant future in the high departments of architecture. He was an excellent draughtsman, possessing an immense fund of information even on subjects remotely connected with his profession, and, at the same time, he had a great facility of original design, and a singularly ripe judgment. He had just completed a great work on the "Architecture of the Renaissance in Tuscany," having spent some years in Italy studying the subject in its details. His last eighteen months were passed in Spain, also in architectural study, which, no doubt, would in time have borne good fruit.—Times, August 28.

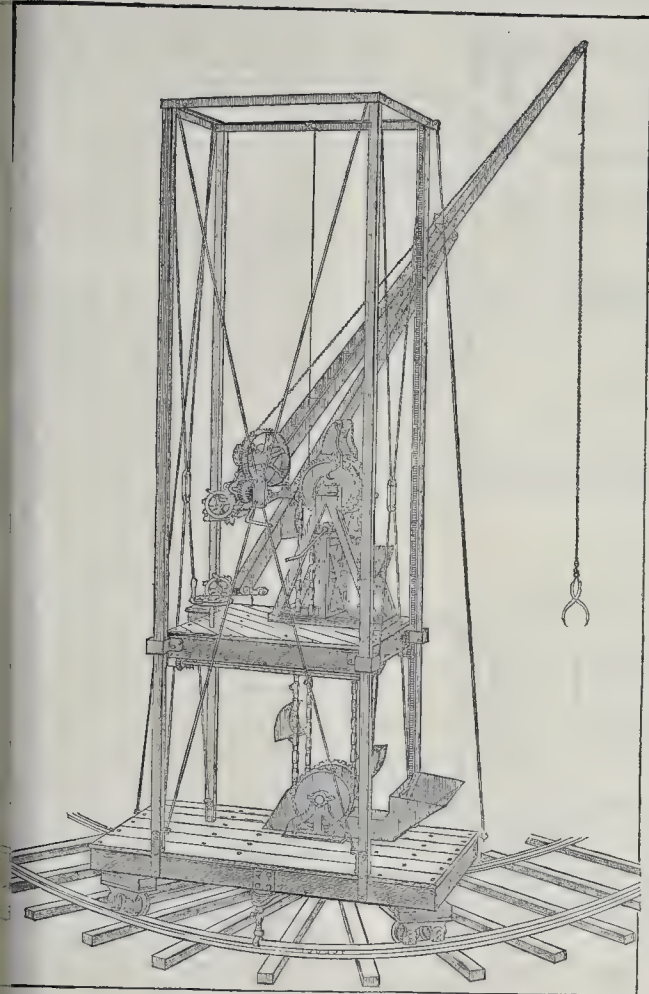
#### WEST'S INDEPENDENT SCAFFOLD.

West's independent portable travelling machine-scaffold is intended to supersede the present system of scaffolding. The inventor designed it mainly with the idea of carrying out concrete work, but it aims at being used on any structure that requires an independent scaffold, as well as on those where ordinary scaffolding is employed. It may be wherever a light tramway of contract rails can be laid, which in crowded thoroughfares would of necessity be upon a stage erected over the footway. These rails are laid upon light sleepers, the outer ends of which are fastened down to the earth by means of concrete screw-shaped iron (or they may be staked ballasted down). At the quoins of the structure the curves of the rails are made very quick, a guide-plate is fixed concentric with, and close to, the inner rail. Upon two bogie frames running upon these rails is carried an underframe to which is secured four (or any suitable number of) vertical posts, each of which has a nut attached to one of its faces, and which is secured by steel rods to resist rackstrains. The scaffold itself consists of a climbing platform made to travel up and down the posts, a suitable worm-gearing actuated by a wheel on the upper side of the scaffold, giving motion to the pinions gearing into the vertical racks, and thereby causing the platform to ascend or descend, or to become secured at any height. A rail-grip (made to act at the curve as well as on the straight portions of the rails) being attached to a radial arm fixed to the underframe assists the stability of the scaffold in cases where required, but the gauge of the rails is altered to render the scaffold more or less stable according to its height, and, to further secure it, the ends of the underframe outside the posts may also be ballasted down by means of bags of earth, &c.

Combined with the same machine, travelling up and down one of the same posts used for the scaffold, is an improved platform crane. Its action depends upon the proposition in geometry, that "if the length of the base of a triangle be altered, its angles, and therefore its altitude, are altered." A portion of vertical post up and down which the crane climbs, forms the base of a triangle, and the portion of the jib, together with the stay, forms the remaining two sides. Hence, by causing the foot of one or the other to travel upward by means of the worm-gearing provided, that purpose, the upper end of the jib is either elevated or depressed.

The concrete elevator, which is also combined with the scaffold, consists of a series of buckets carried upon two parallel endless chains passing over two pairs of wheels. On the under-frame is fixed a hopper, into which





West's Independent Scaffold.

own, either by hand or from a concrete-er running upon the same rails as the shute, the material to be hoisted, and from which it gravitates into a narrow channel, through which pass the buckets attached to the shute, with a shovel-like action. A motor being fixed to one pair of wheels, the buckets thus automatically fill themselves, and on arriving at the top are made to jar themselves, and to their contents automatically into a hopper, means of a small pinion (friction gearing lever may also be used) keyed to the shaft, which they are attached to the endless screw, becoming engaged in a small radial rack for that purpose. From the upper hopper material is taken away to the required destination by means of a worm working in a tube through, which may be lengthened or shortened to suit varying distances. For varying heights, extra length of chain and buckets are added, and secured by a bolt passed through the end link, and secured by a nut. The motor, as well as being used for raising any material besides concrete, may also be employed as a chain pump or noria.

Among the many advantages claimed for this form of scaffolding we may mention (1) its extreme lightness compared with that ordinarily used, and, therefore, the great saving to be effected in the cost of cartage; (2) its portability, each part having been specially designed

to be taken to pieces, and to be packed into as small a compass as possible; (3) its cheapness and saving in the unnecessary use of material compared with ordinary scaffolding, as this scaffold exists only at the point of operation, and only during the time that it is actually required there; (4) its non-interference with the work, as no putlog or bolt-holes, and such like, are required, the scaffold being entirely independent of the work, as well as self-supporting; (5) the great saving in the labour usually expended in erecting and removing scaffolding; and (6) that it is a necessary auxiliary to overcome the obstacles in concrete construction.

The inventor and patentee is Mr. Frank West; and a model of the machine to one-eighth scale is shown at Stand 278, Group III., in the South Gallery (North Court) of the Inventions Exhibition.

**Fire at a Timber-Yard.**—Early on Saturday last a fire broke out at the extensive timber-yard of Mr. T. Forman, 148, Kennington-road. The yard occupies an area of about three-quarters of an acre, and in it were stored twelve stacks of valuable timber. The fire attacked nearly all the stacks, three of which were almost completely destroyed, while the others were very severely damaged. We are asked to state that Mr. Forman has made arrangements to carry on his business as usual.

### Illustrations.

#### THE SHAKESPEARE MEMORIAL.

OUR illustration represents the Shakespeare Memorial Theatre at Stratford-on-Avon, which has been for some little time completed,—at least, so far as the external architecture is concerned,—excepting the statuary and bas-relief carvings.

We also give a view of the entrance-hall and principal staircase.

The building facing the road comprises the library and picture-galleries. The semicircular building is the end of the auditorium, which building is connected by a covered bridge with the main or library entrance. The theatre is, however, complete in itself, with very efficient entrances and exits. This portion of the building, which has been completed some few years, was carried out by Mr. W. H. Lascelles, Bunhill-row, from the designs of the late firm of Doggahun & Unsworth. We commented on the design at the time of the competition some years ago, and drew attention to the manner in which the curve of the auditorium was shown as a portion of the external design,—a piece of architectural truthfulness unfortunately very unusual in theatre designing.

In the tower are large tanks, automatically supplied with water from the river Avon, for protection in case of fire. From the lantern in the roof most extensive views may be enjoyed of the surrounding country and picturesque town. The tower was built by Messrs. W. H. Lascelles & Co., from designs by Mr. W. E. Unsworth.

Some special interest has been attached to the theatre and its surroundings during the present week, owing to the presence of Miss Anderson there as an interpreter of Shakespeare, and the concourse of a considerable circle of visitors from London and elsewhere.

#### ST. MICHAEL'S CHURCH, FARNLEY.

THE site occupied by this building has carried a church for many centuries, although all traces of the first erection have been lost. In excavating for the foundations of the present structure some fifteenth-century remains were unearthed, portions, probably, of the second church erected. The third one, which stood on the ground prior to the commencement of the erection of the present building, was an eighteenth-century church of no special interest, and which had become inadequate in area for the accommodation of the parishioners.

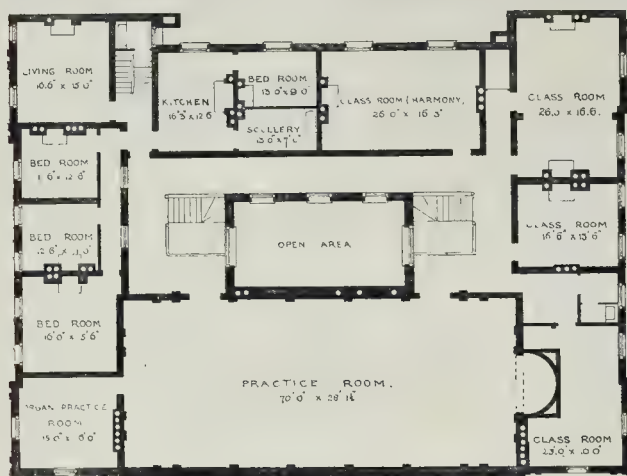
The parish is a poor one, so as to necessitate the use of economy in the erection of the new church, which has, consequently, been designed in a simple manner, but with the use of sound durable materials. The interior, shown in the view, is lined entirely with buff terra cotta, the dressings being of red stone, and the woodwork of unvarnished pitch pine. The intention has been to employ only such material as would be of a permanent character, and would not entail constant expense and repairs.

The architects for the building are Messrs. Chorley & Connon, of Leeds.

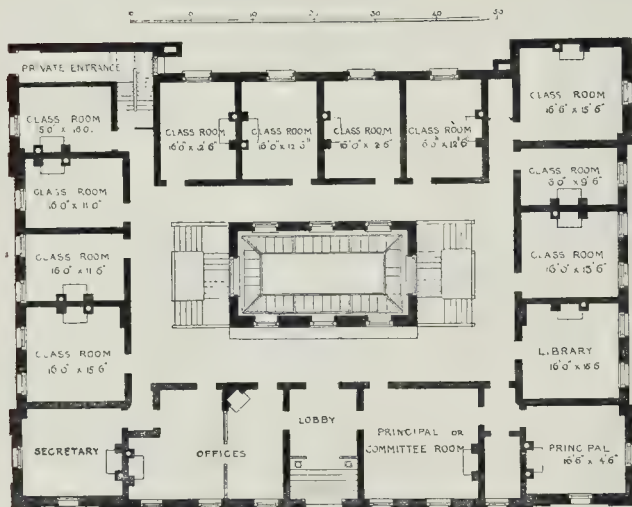
#### THE GUILDHALL SCHOOL OF MUSIC.

OF this important building, now being erected at the cost of the Corporation of London on the Victoria Embankment, we give the elevation and plans of two of the principal floors.

The site comprises an area of 8,000 square feet. It is situated on the Embankment, near Tudor-street, Blackfriars, and has return frontages to new roads recently formed on that land. The building, of which Mr. Horace Jones (past-President of the Royal Institute of British Architects) is the architect, will consist of four floors, and will contain forty-two classrooms in all. In the basement there will be a common room for the professors, two refreshment-rooms, two cloak-rooms, stores, &c. The ground-floor will be approached by a spacious vestibule and lobby, on the right of which will be two rooms for the principal or committee, and a library, while on the left will be the secretary's offices, all the other rooms being class-rooms. The rooms on the first floor, except one which is to be devoted to the Lady Superintendent, are all for class-rooms. The second floor will contain a practice-room, 70 ft. by 28 ft., designed somewhat on the lines of the large concert-hall of the Surrey Gardens, now removed, and of which Mr. Horace Jones was also the architect. There will also be on



SECOND FLOOR.



GROUND FLOOR

The Guildhall School of Music.—Plans.

this floor two large class-rooms for harmony classes, an organ practice-room, and secretary's residence. The building is to be constructed on a granite plinth. Two staircases are to be provided, one for ladies and the other for gentlemen. Each class-room is to have separate ventilating apparatus, while double doors and double sashes are also to be provided so that the corridors may be kept quiet. The estimated cost of the building will, it is stated, be 20,000l.

#### REMINISCENCES OF THE ARCHITECTURAL ASSOCIATION EXCURSION.

WE give this week various sketches, specially prepared, of places visited by the Architectural Association in their recent annual excursion, and will give some further ones in our next. The sketches, we may observe, only represent

places actually visited, not those which it may have been supposed the party might, could, or should have visited.

#### Banbury.

In Banbury there are numberless old houses, most of them of but little value but for their picturesque, but there are a few more notable, and perhaps typical, examples which are deserving of more than a general glance at, and some of them have been taken from different quarters of the town, and are grouped together in the illustration, as a kind of general reminiscence of the features of the place.

In the left-hand top corner is a view of the Vicarage, a house with mullioned windows, built of a rich brown-coloured stone, though almost hidden up with creepers; as seen from just above the noted "Banbury Cross," the tower of the church (which for convenience is

shown in another position) rises well up at the Vicarage, embosomed in fine trees.

In the top right-hand corner is a sketch of a house on the west side of the market-place, noticeable for the circular bays on the first floor, and its three gables, with rather poor coarse barge-boards. The gateway shown on the right of the shops has a fine pair of doors with two rude figures carved upon them, it forms the entrance to an irregularly-shaped yard surrounded with picturesque nooks and gables.

We have the same feature again in the sketch of a hand house (in the High-street) shown at the bottom, but more carefully and elaborately worked out, and in a better state of preservation: this is one of the "original" cake-shops.

Next it, on the right, is shown a good old stone house, in South Bar-street, now the Swan. It has two canted bays, on the ground and first floors, finished with square dormered gables. The old stone slates have been replaced by ordinary blue slates, and the stonework has been colour-washed, so that it loses much of its original colour.

Next it is a curious old gabled house of dormers situated at the west end of the market-place, in a very similar position to the one occupies in the sketch. The dormers have lights in them, but that portion of the house retains its old stone covering; the upper part is plastered and much mutilated.

The two houses shown on the right of the picture are both in Parsons-street, the one really on opposite sides. The stone one is at the end of the street adjacent to the market-place, and opposite the gabled house described. The piece of timber-work is only a bit of uncovered black-and-white in the town, and it has but comparatively recently been relieved of its coating of plaster, showing the timber framing and fleurs-de-lys in the panels. The gateway beneath is the entrance to the yard of the Reindeer Inn, in which the gable and window illustrated in a recent issue. This room has fine panelling in oak, with delicate mouldings, and a rich plaster ceiling with elaborately raised bands and devices,—a very complete bit of work. The gates at the entrance to the yard are original and have the date A.D. 1571 carved on them.

#### Compton Winyates.

A description of Compton Winyates was found in the report of the first portion of the Architectural Association Excursion, published in our issue of August 15. We now give sketches of this most picturesque building, though no pen-and-ink drawing can possibly show the beauty and gorgeousness of colour when lighted up by a bright sun at mid-day.

The view at top shows the entrance-front, which will be noticed the porch specially referred to in the report above referred to, as a timbered gables, with their pretty little windows.

The quadrangle, of which a sketch is given, is reached by passing directly through



Banbury  
Centre City  
"Banbury Cross"  
Street

porch, and the comparatively unimportant door opposite to it leads into the hall; the window in the angle is the one said to have been brought from the destroyed castle of





# Sketches



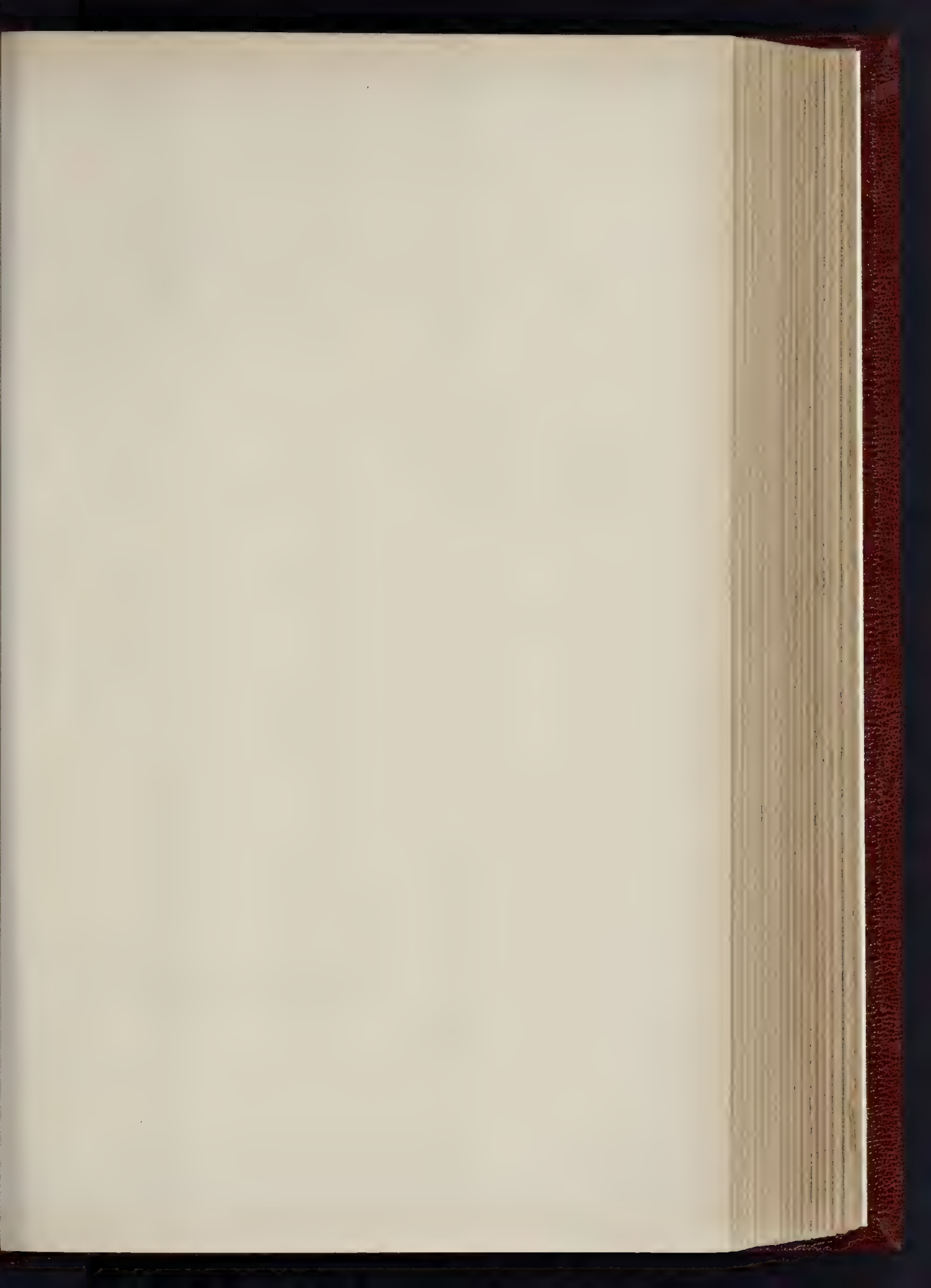


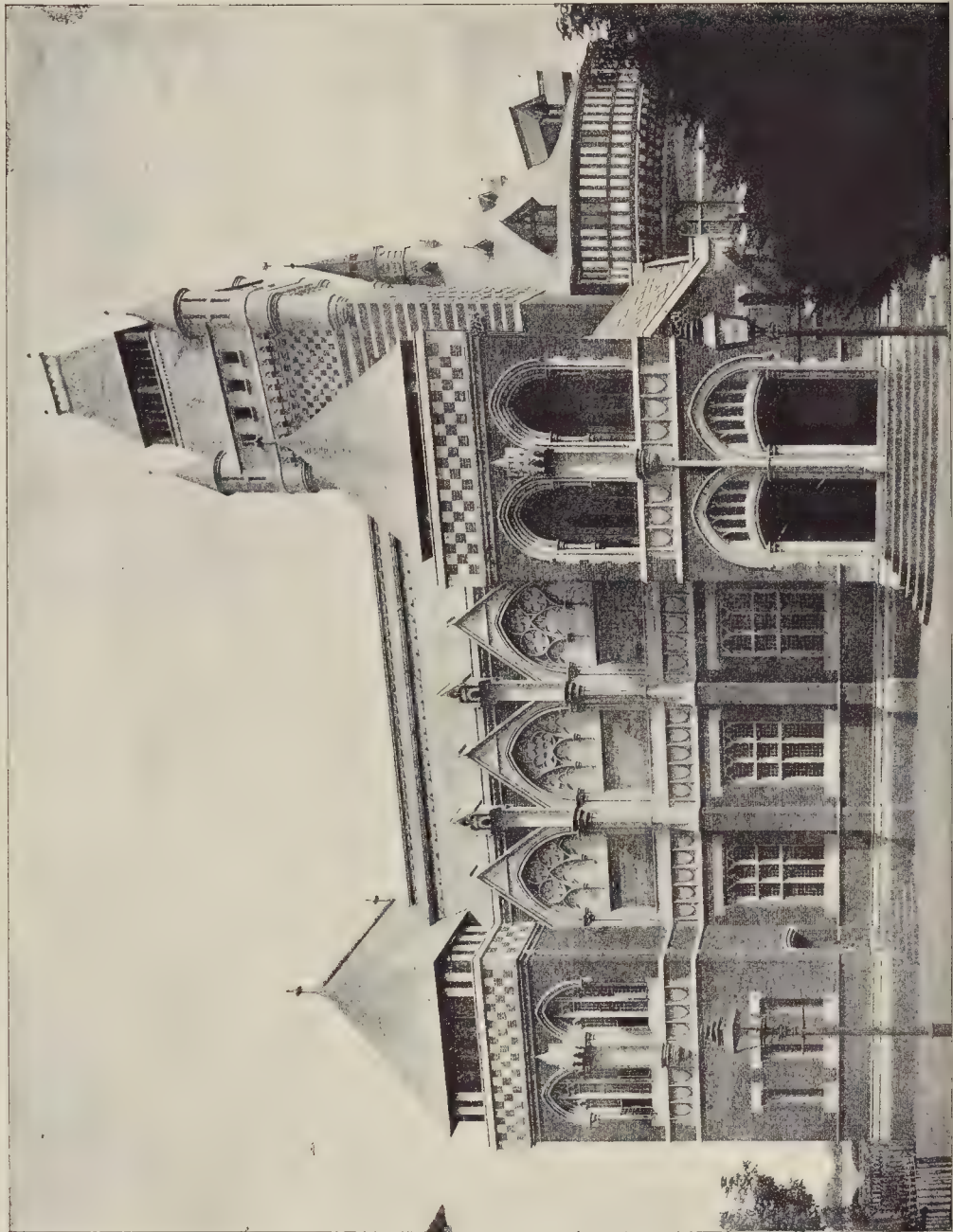


PHOTO LITHO SPRAGUE & CO. - DUNDON

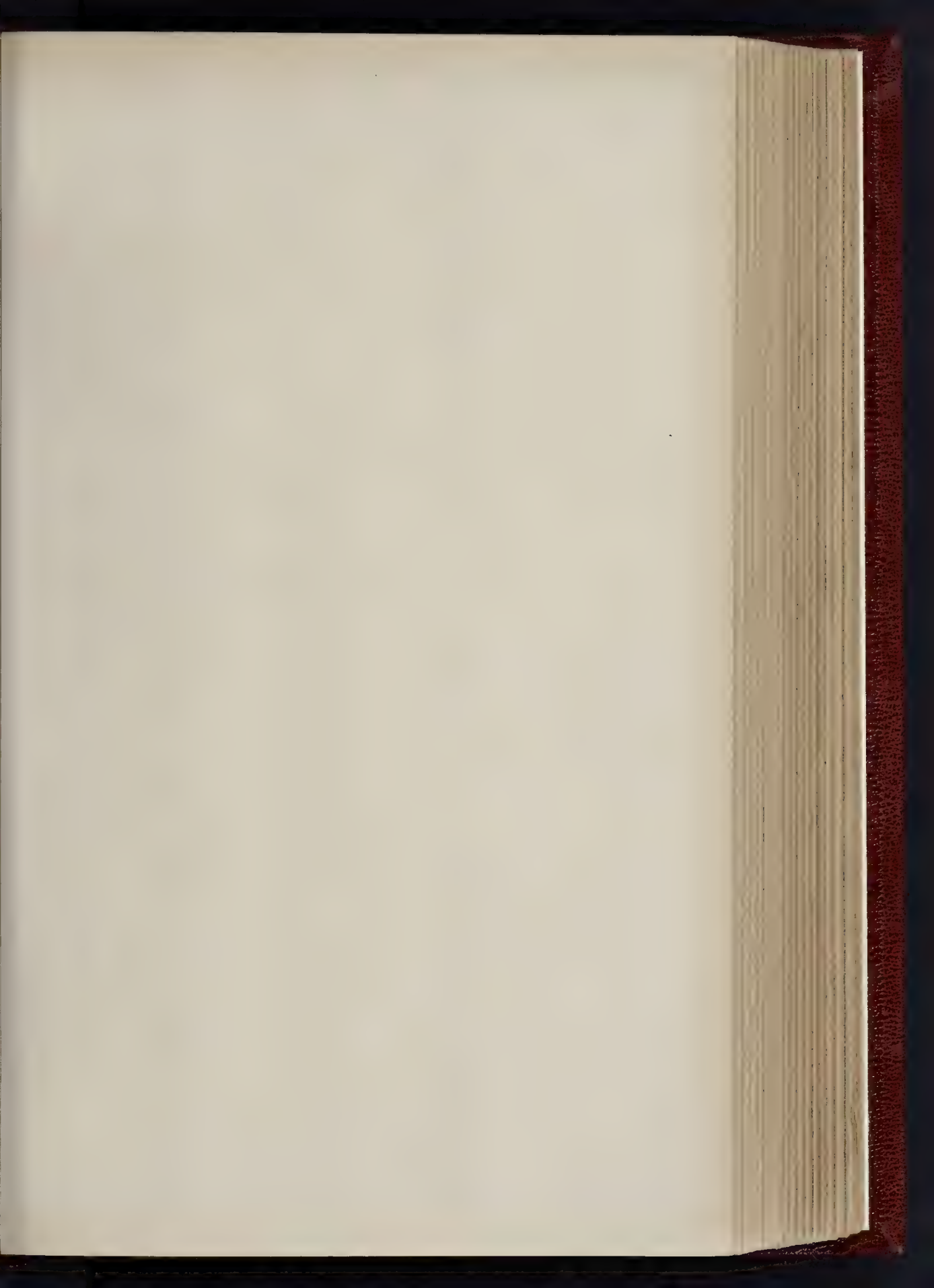






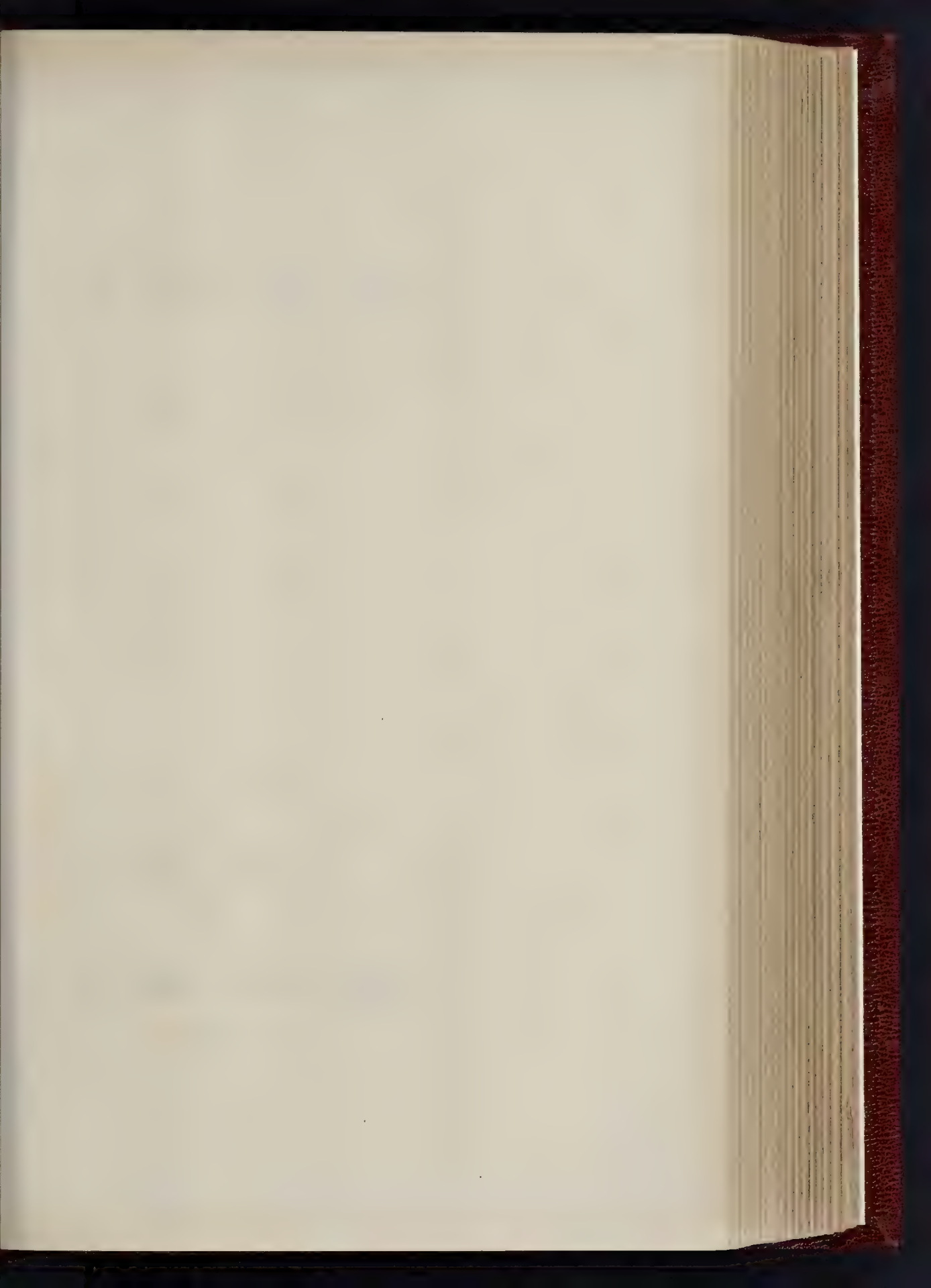




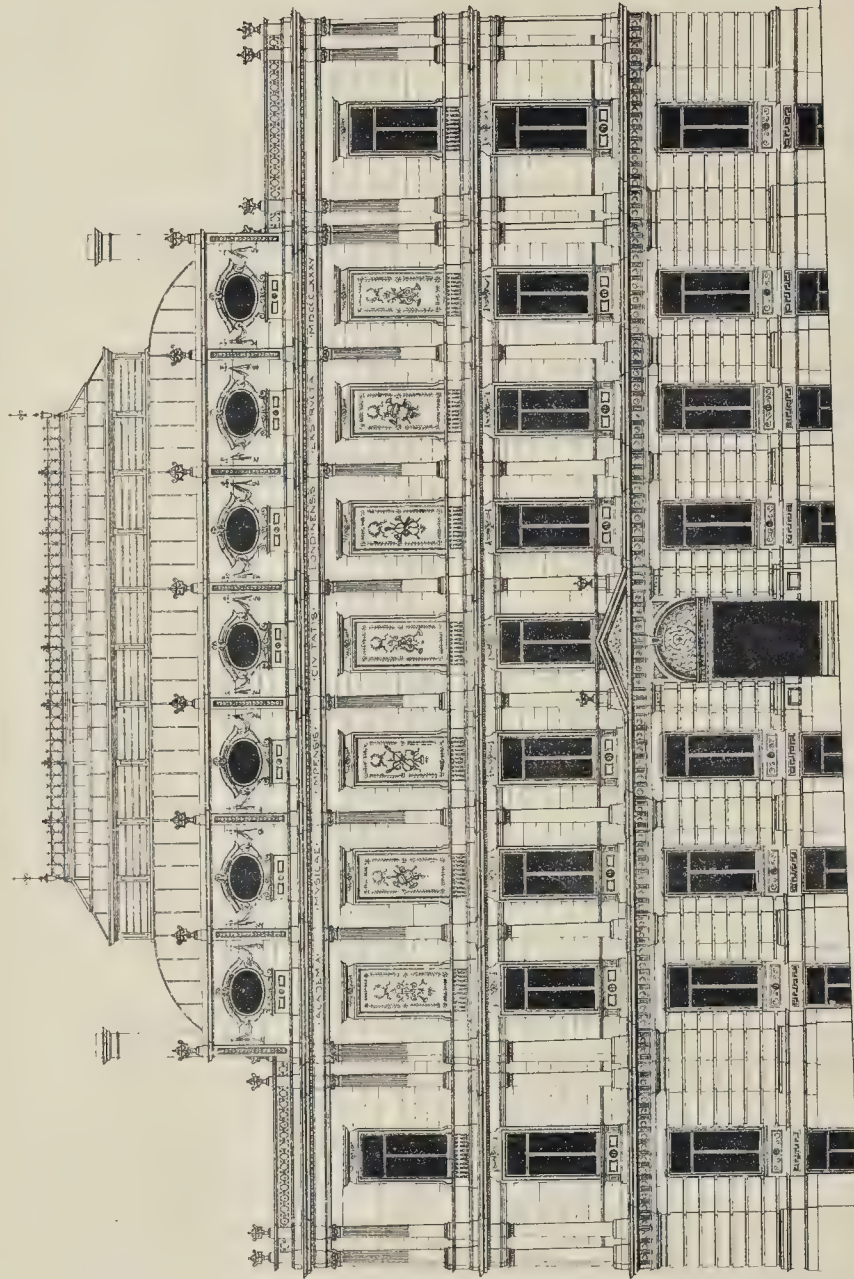








THE BUILDER, SEPTEMBER 5, 1895.



SCALE OF FEET  
0 10 20 30 40 50 60





Wyman & Sons Photo-litho

MESSES. CHORLEY & CONNOR, ARCHITECTS.

Chorley & Connor, London W.C.







PHOTO. BY T. SPRAGUE & CO. LONDON







THE PHOTO SPRAGUE & CO. LONDON

THE SHAKESPEARE MEMORIAL THEATRE, STRATFORD-ON-AVON

MR. W. F. UNSWORTH, A.R.I.B.A., ARCHITECT.

ENTRANCE HALL AND STAIRCASE





cooke: whether or no this be true, it is the principal feature of the quadrangle, and fits into its position with admirable effect.

The general view at bottom was taken from about half-way down the hill, approaching the mansion by a footpath from the road.

The sketch on page 322 of some of the chimneys is reproduced from a pen sketch in Mr. J. A. Gutch's sketch-book.

#### Deddington Parsonage House.

There are several examples of fine old houses existing in Deddington, but the "Parsonage House," or "Manor Farm House" or "Pilgrim's House" whichever it be called, is the most noticeable for its balustraded tower. It is situated near the church and was built in 1554. Inside it contains a great deal of interesting woodwork in panelling chimney-pieces, and a very fine and unusual treatment of staircase, sketches of which we hope to give in a future number.

#### Hanwell Castle.

All that remains of the once famous Castle of Hanwell, the seat of the Cope family, is shown in the sketch of the brick tower, with octagonal angle turrets. The string-courses, windows, quoins, and plinths are of stone, but beyond that there is no detail, though it is bold and effective in mass and delightful in colour. The sketch shows it one story short, as it is built in a hollow and nearly surrounded by farm buildings, being itself now used as a farmhouse.

#### Shutford Manor House.

The manor-house at Shutford stands high up above and beyond the church, its principal front facing south, the long range of low stone battlemented windows, both on the ground and upper floors, giving it a decided air of comfort. It has also a Jacobean porch, of considerable merit, on this front. The north-east view shown in the sketch is of a much less dignified character, but is interesting for its quaint grouping, the staircase block adding considerably to this effect. The six-light window on the ground-floor, as seen in the sketch at the end of the building, lights a room in which there is some well-moulded oak panelling, with enriched frieze and cornice, and the original stone chimney-piece.

King's Sutton is a very good example of an old English manor-house, without any "special" features, and owing much of its picturesque effect, no doubt, to its wealth of creepers and abundance of foliage, but a sight of its simple treatment and restfulness affords a vast amount of pleasure to those who do not appreciate the elaborate attempts at "singularity" in some modern buildings; apparently it suits well nineteenth-century requirements, it is evidently well cared for and valued by the present inmates. Most of the stone detail may be found in any house of the same type in the neighbourhood and adjoining counties, but the woodwork of the staircase and other interior details are somewhat unusual.

[The sketches in this number, and others that will be given in the following number, are mostly drawn for this journal by Mr. T. Garratt from sketches made *in situ* by himself and by other members who have kindly lent their sketch-books, among whom we are indebted to Messrs. S. F. Clarkson, J. Johnson, J. Bilson, and J. A. Gutch.]

#### MEETING OF ASSOCIATES, R.I.B.A.

SIR,—Will you grant me a small space in your columns to call the attention of all Associates of the Royal Institute of British Architects to the notice,—headed "General Meeting of Associates in October,"—which appears in the last number of the "Proceedings," on p. 242.

I shall be much obliged if all communications relating to the business of that meeting be sent to me, at 8, Delahay-street, Westminster, S.W., before the 24th inst., on which date the Associates' Committee holds its next meeting.

G. RICHARDS JULIAN

Hon. Sec. Associates' Committee.

**The Students' Home, Kensington Gore.**  
We are informed that over twenty of Banner's ventilators are to be used in connexion with Sir Frederick Bramwell's scheme for the ventilation of the Students' Home, Kensington Gore.

#### "EXPERIMENTAL BUILDING: ARCAÇON VILLA, MOOR ALLERTON, NEAR LEEDS."

SIR,—Seven years ago (October 19th, 1878) you did me the honour to illustrate and describe in your valuable journal the above villa, under the title here repeated. After the appearance of the article in question, it is needless to add the novelties introduced received very severe criticism, and many of the remarks made by professionals and others were anything but of a flattering character. Everything, of course, was wrong. "The position of the doors was a very grave blunder,—would cause all the chimneys to smoke, and make the rooms so draughty that no one could comfortably exist in them; the ventilation was an absurdity, and would require continual attention, and could only be opened and shut by either going outside the house, or keeping a pair of steps handy inside; the drainage system was another blunder, which I should soon find out to my cost. The construction of the earth-closet was also a mistake, and could never answer satisfactorily, and would eventually become a nuisance; whilst the storage reservoir of rain water under the house brought on my devoted head a torrent of abuse. Of all possible things, only a very belated individual would construct such a tank: the water would decompose, the house would be made damp, the germs would breed in the water, the exhalations from it would spread disease in the house, and not only should I have a heavy doctor's bill to pay for my 'fat' but should sow disease in the neighbourhood, and thus become a public nuisance." On these grounds it was said the authorities ought to cause it to be done away with. Fortunately, however, being out of the borough, they had not the power to abolish it.

Now, after seven years' trial, I beg to submit to you the results arrived at, and if you think the remarks interesting to your readers, you are at liberty to publish the same.

The facts I have demonstrated practically are, in my opinion, of vital importance in all country districts, especially where water supply and a proper drainage system do not exist. Of course, in large towns, with all the necessary adjuncts of civilisation, the experiments I have made would not be of much use.

In view, however, of the ravages of cholera, and where drainage is not extensively in use, these experiments become very interesting, and I venture to say, of some practical use. If I said they could not be improved upon I should be as stupidly ignorant as when I say they have answered every purpose for which they were made, then I think I have a right to let you know, from having laid before the public in your journal what was thought at the time a series of stupid mistakes, or, as one person put it, "a conglomeration of fads."

Results arrived at.—1. The position of doors does not cause draughts, but enables more space in the room to be utilised with comfort than the usual plan, which often causes an unpleasant draught from door to fireplace when opened, especially in cold weather, and when the passages are not also heated.

The ventilators are self-regulating, and never need the slightest attention, but have been wide open summer and winter alike for seven years and act so well that although the current of air coming in in large or small quantities, as required (self-regulating), can be tested by applying a flame of candle, &c., yet when the volume of fresh air is largest no draught can be detected in the body of the room, a foot below the ceiling. The earth-closet has been fairly tested.

To do this I determined it should not be emptied until the pit was full, this took three years, and was in every way a most satisfactory experiment; then the sump, which I believe was not described, has only just been emptied, has worked for seven years without either nuisance or offence. In proof of which, having let the house, the new tenant was anxious and nervous on this point and requested all to be made right before I left, so I startled him by saying I would take him close past it three times and he should try to find out where it was. He did his best to discover it but was bound to admit that it did not indicate its presence. Such things often do so very forcibly.

It consists of two well-cemented tanks, 5 ft. diameter and 5 ft. deep, so constructed that there is very little room for gas to accumulate, and what does form passes downwards through a pipe by gravitation. There is no ventilating shaft, and those who make one commit a grave error. Carbonic acid gas does not rise. All that is needed is to hermetically seal the tank by lime or cement and keep a foot or 18 in. of earth on the top of it; the downcast pipe then takes the carbonic acid gas away in small quantities as it forms and no mischief or nuisance is caused by accumulation. This is not theory, but a practical demonstration. The tank would have worked well for another three years; but seven years is a reasonable time and I should not advise longer.

Now for that last abomination, the rain water-tank. It has never yet been emptied, but is so constructed that it can be at any time. The water is sweet, bright, and clear, and astonishes every one that sees it.

Doctors' bills for the last seven years (except on occasions of increase of population) have been unknown; unfortunately, in previous years they came in as regularly as the taxes.

I should not have troubled you with this, but have let the house and am going to Australia; therefore I thought I would just let you know how the experiment succeeded.

If you have any agent in these parts who would like to see for your own satisfaction, I could, this next week, let him look round; but I give up possession on the 1st of September, so could not guarantee after that date to do so.

JOHN SMITH.

#### PROVINCIAL NEWS.

**Workington.**—The foundation-stone of the new infirmary buildings, to be erected on a site given by Mr. H. F. Curwen, of Workington Hall, has just been laid by Mr. Edward D'Arcy Curwen, in the presence of about 15,000 persons. The plan is arranged on the pavilion principle, and, when completed, will consist of a central administrative block, two stories in height; the kitchens in the rear approached by a covered way; and the male and female wings respectively on either side. The buildings are to be carried out in local stone; and the sanitary arrangements are all of the highest and most complete character. The whole of the works have been let to Messrs. Gibson & Kinnear, of Workington. The architect is Mr. George Dale Oliver, of Carlisle, whose plans were selected in open competition.

**Cranleigh (Surrey).**—The Hambleton (Surrey) Union Sanitary Authority have instructed Mr. Ellice-Clark to prepare a scheme of drainage for Cranleigh, in which place is situated the large Surrey County School.

**Hersham (Surrey).**—The memorial-stone of the Village Hall and Working Men's Club at Hersham has just been laid. The building, which is being erected under the auspices of a company formed for the purpose, is designed to hold about 300 persons, and will be fitted with a stage and ante-rooms, &c., so that there will be facilities for dramatic representations as well as for other entertainments. Messrs. W. & A. Brown, of Oatlands and Hersham, are the contractors, and Mr. George Vigers is the honorary architect. The external walls of the hall are already erected, and it will soon be roofed in.

#### CHURCH-BUILDING NEWS.

**Dipton (Co. Durham).**—The foundation-stone of a new church now in course of erection at Dipton has been laid by Mr. Joseph Dodds, M.P. for Stockton. It will be built from designs by Messrs. Oliver & Leeson, architects, Newcastle-on-Tyne, cruciform on plan, with central tower, in the Early English style of architecture.

**Folegate.**—Folegate Church has just received two additions to its interior. A memorial window, of three lights, represents the "Ascension," and is executed in antique glass of gem-like lustre. The window is dedicated to the memory of the late Mr. Caleb and Mrs. S. M. Diplock, by their daughter and sons. The other addition is a reredos, executed principally in Caen stone, enriched with marble panels and columns. Above the Communion-table are five Jeanne Fleury marble panels, richly inlaid, the centre one being a Maltese cross in Blanc Pistre, inlaid with Irish green marble, with jewels of Mexican onyx and Rosso Antico; the other four panels have religious emblems inlaid within double triangles of Rosso Antico and green marble. At each end of the reredos are the Commandments, &c., inscribed in gold letters on dove marble. The marble panels are divided by green marble and alabaster cluster shafts, surmounted with richly-carved cornice and cusping, supported by carved caps and arches. The work is returned some distance on the north and south walls of the chancel, with dove marble panels, &c., to match. On a plinth is the inscription:—"To the glory of God, and in loving memory of Caleb Diplock. Died July 26th, 1884. 'A man greatly beloved.'—Dan. x. 2. This reredos was erected by his affectionate widow." The window was designed and executed by Messrs. Cox, Sons, Buckley, & Co., of Southampton-street; and the reredos by Messrs. John Underwood & Sons, of Duke-street, Grosvenor-square, W.

**North Molton (Devon).**—The parish church of All Saints, North Molton, was re-opened on the 27th ult., after re-seating, and general repairs and alterations from plans by Mr. Ashworth,



architect, Exeter. The works, which have been in hand for the last five months, consist of newly flooring the church, and re-seating the nave and aisles with open seats of pitch pine, having tracery in the fronts. The walls have been re-plastered and pillars and arches repaired. The re-seating the chancel in oak with improved seats formed part of the plan, but, as yet, this portion has not been carried out, nor has the pulpit been completed, which is to have figures of the Apostles placed in the niches. The outlay has been over 500*l.* for the internal work. The contractor is Mr. John Davey, of Barnstaple, and Mr. Pickard has done the wood-carving.

**Pyworthy.**—The Church of St. Swithin, Pyworthy, Devon, has been re-opened, after restoration. The architect was Mr. R. M. Fulford, of Exeter, and the contractor, Mr. Blowey, of Plymouth. Mr. Philip Shoebrook, of Northlew, was the foreman mason. The old pillars and arches of polyphant stone, which had been covered for years with plaster and whitewash, now present an admirable appearance. On the south side, near the priest's door, leading into the chancel, the builders found the remains of an old lepers' window, and by contrivance this has been left open. Missing and decayed portions of the stone-work of the south windows have been replaced by Hatherleigh stone, which has also been used for the new windows and repairs of the sedilium and copings. Messrs. Peterick, of Hatherleigh, carried out this work.

**Longridge.**—The new church at Longridge, dedicated to St. Paul, has been commenced. The architect is Mr. Ewan Christian, of London. At present only the nave will be built, and the foundation work for chancel and tower carried out. The cost of this work will be about 6,000*l.* The tenders have been let to Mr. Harrison, of Preston, for stonework; and Mr. Bell, of Longridge, and Mr. Robinson, of Longridge, have obtained the joiner's and plumber's work.

**Pontardawe.**—A mission church is about to be erected at Pontardawe in memory of the late Mr. William Gilbertson, by his son, Mr. Arthur Gilbertson, of Glamryd. The contract has been given to Mr. John Griffiths, builder, of Pontardawe, the plans having been prepared by Mr. Arthur Gilbertson and himself. The church is to seat 300 people.

### Books.

*The Works Manager's Handbook of Modern Rules, Tables, and Data, for Civil and Mechanical Engineers, &c.* By WALTER S. HUTTON. Second edition, carefully revised with additions. London: Crosby Lockwood & Co.

**M**R. HUTTON has produced a book full of information on most varied subjects, and, as a matter of course, has not escaped the common fault of all works of the kind. In taking up the volume one is struck by the scope and minuteness of the information supplied, and it is not until information on some definite point is required that one realises how much too much, and how much too little, there is in the 300 odd pages that go to make up the book. However, this is a defect common to all books of reference of this nature that we have ever met, and Mr. Hutton has done what he could to minimise the evil by dividing the work into six sections. If we only asked for more information, the author might retort that he has given as much as could be got in the space, but what an ordinary works' manager would ask for would not be larger quantity, but the substitution of more generally useful information for, say, the specifications of six locomotives, which occupy one-eighth of the whole book.

The language used throughout is simple and easily understood, being neither unnecessarily abbreviated nor too prolix, Mr. Hutton never sacrificing clearness of meaning to considerations of space. The use of technicalities and symbols has also been eschewed as far as possible, thus rendering the book pleasant to read, an unusual virtue in works of this kind. In some instances, however, the principle of avoiding technicalities has been carried to an extreme; for example, when the author hesitates to use the word "traverse," a term understood by every one who has had to do with machine tools, and in preference devotes a couple of lines to describing the motion of the tool.

The following are the headings of the six sections into which the volume is divided:—1. Stationary and locomotive steam engines, gas engines, &c. 2. Hydraulic memoranda: pipes, pumps, water-power, &c. 3. Millwork: shafting, gearing, pulleys, &c. 4. Steam boilers, safety-valves, factory chimneys, &c. 5. Heat, warming, and ventilating, metal cutting, and finishing metals, alloys and casting, wheel-cutting, screw-cutting, &c. 6. Strength and weight of materials, workshop data, &c.

A good deal of information is given in the first part as to the action of steam in an engine cylinder, after which proportions of engines are set forth. We presume "works' managers" will not attempt to design steam engines upon the data given or the result may not be in every case satisfactory. For instance, the rule "Area of steam-port=area of cylinder in square inches divided by 12," may possess the merit of simplicity, but is rather a sweeping generalisation considering the different types of engine, and variations in length of stroke and piston speed they are subject to. The diameter of the cylinder is also taken as the sole factor by which the capacity of the feed-pump is arrived at.

Mr. Hutton also gives what he describes as a diagram of the Joy valve-gear. This is certainly a very different arrangement to the ingenious device introduced by Mr. Joy, and is, in fact, a collection of links and connecting-rods that could not possibly work. The author, however, is not to blame for originating this wonderful device, as he has copied it from the pages of an engineering journal, but he might be expected to exercise closer supervision in the matter he selects even when quoting from an ordinarily reliable source. Further on (p. 22) we are told that "the piston speed in compound engines is usually 420 ft. a minute," a generalisation about as instructive as saying that the height of a tree is usually 40 ft., or the length of a street is usually a quarter of a mile.

The remarks on gas-engines might well have been extended beyond the four or five pages they occupy. The "Instructions for Fixing the Otto Engine" no doubt afforded the compiler an easy page of "copy." They are, however, hardly necessary, as they are invariably supplied by the makers when one of these engines has to be fitted.

In Section II. the hydraulic data are fairly complete so far as they go, but as this section only occupies twenty-two pages, it is naturally not very exhaustive. The few remarks on pumps contain sound advice, that might with advantage be taken to heart by some makers of engines in the present day.

Section III. opens with some brief particulars of spur and bevel gearing, in which the speed and power of toothed wheels are treated of. Crane gearing is noticed, and some particulars of driving by ropes are given. The longest table in the book is in this section, treats of "the weight and horse-power of cast-iron spur-wheels." Following this are some notes on shafting, in which a good deal of space is devoted to their "power," by which the author means the power they will transmit.

Section IV. opens with some general remarks on the effect of heat upon water, and the expansive force of steam, after which various details of boiler construction are dealt with in a somewhat disjointed manner. The proportions of different types of boilers in terms of their nominal power are given in five tables, but how this power is calculated is not stated. The few paragraphs which refer to riveting are quite inadequate to treat of this important subject. Mr. Hutton has missed a rare chance by not incorporating in his book an epitome of the recent researches of the special committee of the Institution of Mechanical Engineers on this subject. A few particulars of factory chimneys are given, amongst them directions for finding their "horse-power."

"Heat, Warming, and Ventilating," treated of in Section V., should prove one of the most useful divisions of the book for works' managers. There are tables of the specific heat of various substances, on the expansion of liquids and gases, on the heat, conducting power and expansion of metals, and on the radiation, absorption, and reflection of heat. The table which gives the length of 4-in. pipe required to heat a room of a given size to the desired temperature, is a valuable feature in this section; whilst the remarks on ventilation are to the point, although too brief to be of great practical use, and might well have been extended to the

exclusion of the subject which follows,—the "Wind-pressure on Railway Structures," which has been copied from a current report.

The table of speeds of cutting-tools for metals is a useful feature, although we think the figures given for turning cast iron are somewhat above general practice for ordinary mixtures, with a moderately deep cut, but doubtless they could be undertaken with a good modern lathe. The next table, which gives the time required to do a given quantity of work by planing, shaping, slotting, drilling, and boring machines and lathes, should prove of greatest use to those having machine-tool workers under their supervision, but who have no data of their own on which to form an estimate. The conclusions appear to be the result of experience with high-class tools, and we doubt if many engineering contractors would care to have their bills checked by the figures quoted. This is a branch of the work to which Mr. Hutton might well devote special attention in a future edition. If the description of work and type of machine were stated it would add to the value of the information. The table well merits the greater space these details would require, especially in view of the great advance that has taken place within recent years in the efficiency of machine tools.

A table is given of mixtures of cast-iron for various purposes. This is a subject on which every foundryman has special and positive opinions, which no tables are very likely to effect. Brassfounders, as a rule, are more open to new ideas, but there is nothing very substantive of established practice in the full information on this point in Mr. Hutton's book. Section VI. opens with data on the strength and weight of materials of various kinds and in various forms. A table of multipliers for converting the weight of one metal into that of another is a useful feature, as also is a list in which the various names by which some often-used substances are known are grouped together, such, for instance, as sulphate of alumina and monoxide of lead, which every engineer would not at once recognise as simply alum and litharge. Six pages are devoted to various cements, ranging between cobbler's wax and boiler coverings. Workshop receipts are followed by remedies for workshop accidents. Following this is a short treatise on the new patent law, then some weights and measures, and a vocabulary of about twenty pages giving the French equivalents of a large number of engineering terms,—a very useful feature. "A table of 'Properties of Air,'" from Mr. Glaisher's observations, and a page setting forth the "mean annual rainfall at various places" are the last evidences of a weakness for paste and scissors to which the compiler too often succumbs.

*School Hygiene and Diseases Incidental to School Life.* By ROBT. FARQUHARSON, M.P., M.D., Edin., &c. London: Smith, Elder, & Co. 1885. This work is partly a compilation from English and foreign books on the same subject, and partly a record of inferences drawn from the author's personal experience as the responsible medical adviser to Rugby and other public schools. It treats of school buildings, diet, work, play, diseases and doctoring, and on all the subjects the author has something to say, and says it with considerable literary skill. The first chapter, that on school buildings, is naturally the one most interesting to us. We cannot, however, see why the writer should go out of his way to gird at the architectural profession *en masse*. In his eyes, the architect is one who is either quite ignorant of his duties or so obstinate as to persist in wrongdoing out of mere perversity. "When you are about to build a school, select an architect who has had some experience in school design." Certainly,—most architects in fair practice have had such experience. "And one who is not too independent to adopt the suggestions of those whose opinions are entitled to consideration." We affirm that, as a rule, architects are too ready to give consideration to the opinions of others; and that their fault is rather an undue pliancy than the obstinacy they are charged withal.

Our predecessors of "centuries ago"—how many?—"paid little attention to convenience or sanitary arrangement"; and in consequence a "new school sprang up which enunciated the remarkable dogma that comfort was incompatible with outside beauty." What school? Where, and when, and by whom was



this "dogma," "enunciated"? Still, architects and builders "have gone with the times, and are vying with each other in the perfection of all sanitary arrangements, and in combining a perfectly well-arranged plan with a picturesque elevation." (What more could be said?) Nevertheless, "we must look sharp after our architects," &c., &c. "All the details of drainage, ventilation, and water-supply, should be placed under the direct responsibility of the medical officer"; and we must be "on the alert to see that we do not sacrifice our health or risk our lives to gratify the ignorance or obstinacy of an architect." There is an almost spiteful force in the words we have italicised.

We accept without demur all that our author has to tell us on diet, exercise, training, on the physical and moral uses of manly games, and on the treatment of those special diseases which are incident to youth. In these subjects he is evidently at home, and we accept his utterances as *ex cathedra*. In the chapter on building, water supply, drainage (which is a difficulty, he says, in the country, "if there is no river at hand") (!) and most of all when he touches on the artistic side of architecture, it is easy to see that he is all abroad. The plan of his work required a chapter on school architecture, and, by the aid of quoted works,—from which Mr. Robson's is curiously omitted (an omission which in itself indicates Dr. Farquharson's entire ignorance of what architects have done in school work),—a chapter of the required length has been written; but it throws no new light on school planning and arrangement, and does not even attempt to treat of the *rationale* of the science.

*History of the Corporation of Birmingham.*  
Vol. II. By JOHN THACKRAY BUNCE, F.R.S.  
Birmingham: Cornish Bros.

"There's no art to find the book's construction" in its outward look. Mr. Bunce's portentous volume,—168 cubic inches of literature,—has been lying, reproachfully, before us, unopened, for some time. What is the Birmingham Corporation to us, or we to it, that we should follow its fortunes through 600 closely-printed pages? But duty calls. We bend up each corporal agent to the terrible feat, when, lo! we find the dreaded book as entertaining as a novel.

It is not so much a history of the corporation as of their corporate doings. The author takes us pleasantly through the daily duties of the great social machine which the Corporation of Birmingham has invented and set in motion; and we cannot but admire with him the regularity and efficiency with which it behaves. At daybreak, 12,000,000 gallons of water,—pure beyond suspicion,—are pumped into reservoirs, and sent trickling in tiny streams through 400 miles of pipes, until every house in the borough is supplied with this essential of healthy life, unstinted in quantity, and always available. Two hundred miles of sewers carry their daily burden of 15,000,000 gallons of miscellaneous refuse to remote districts, where the solid elements are used to fertilise the land, and the liquid is purified, and poured—innocuous (so we are assured)—into the rivers.

An army of scavengers clear the streets of casual impurities, and convey them to destruction in the public furnaces; while another army of vigilant functionaries keep constant watch on doubtful neighbourhoods, and with one eye on suspected wells, and another on the belching factory chimneys, guard the general good of the community.

As the day wears on, the public markets are busy, and the long converging lines of multifarious produce arriving thither are ordered and controlled in the public interest.

By day and night the firemen,—those modern trained bands,—stand, like the wardens in "Marmion," for ready need prepared. The poor child are tended in well-appointed hospitals, always open for their reception. Parks, gardens, baths, free libraries, galleries of art foster the intellectual tastes of the people, or afford them wholesome recreation. Two thousand grimy rollers combine to illumine nightly 200 miles of streets and countless houses and factories; and when the shades of night fall upon this happy borough 500 policemen patrol the silent thoroughfares and protect the lives and property of the sleeping citizens.

Of course so much wise legislation for the public good does not go unrewarded. The

death-rate,—that crucial test,—has declined from 24.96 per 1,000 in 1851 to 21.1 in 1884. The abnormally high rate of infant mortality, due for the most part to neglect, raises the general rate and depreciates unduly the general healthiness of the town. It is satisfactory to learn that the labouring classes are well and decently housed, and that overcrowding does not exist to an appreciable extent.

The Surveyor to the Corporation we are told has filled his onerous post for thirty years, and has seen all the great schemes for the improvement of the borough carried out. His office is by no means a sinecure,—31 millions of money have been expended on public works during his administration, and an annual average of 1,700 plans for new buildings or additions to existing ones require his examination and approval.

But we have no space to devote to even a bare enumeration of the subjects which are treated of at length in the book before us. We congratulate the author on having by his skill invested a subject which in ordinary hands would be the dryest of the dry with a real and living interest.

*Illustrated Lectures on Ambulance Work.* By R. LAWTON ROBERTS, M.D., Member of the Royal College of Surgeons, &c. London: H. K. Lewis.

In these days when "Nursery" and "Ambulance" have become household words in so many families, the title of this book will be enough in itself to ensure it many readers, and, from another point of view, such a book should be of interest to workmen in the building trades, who are so often exposed to sudden accidents and injuries; as well as to those who employ or overlook them.

It is written in plain and simple language, the writer wisely avoiding all technical names, which, in truth, only tend to confuse the minds of the uninitiated, and are of no avail in helping them to render aid in cases of emergency.

The first part of the work is devoted to the explanation of the structure and mechanism of the human frame, and there are several good illustrations showing the bones, arteries, and plan of the circulation.

The treatment of wounds, fractures, and burns is described most thoroughly, and the numerous diagrams illustrating the methods of applying splints and bandages cannot fail to be of great use to those who are unable to have personal instruction.

The last chapter in the book deals with the conveyance of sick and injured persons, and gives the stretcher exercises advocated by the St. John Ambulance Association. To our mind, the book would have been more complete had a few pages been given to the common laws of hygiene, and the treatment and tending of patients during the weeks of sickness which necessarily follow any severe injury.

The writer evidently wishes to impress upon his readers the importance of immediate action, and carries out to the letter the advice we once heard a doctor give to a class of ambulance pupils,—"In the case of any sudden emergency or accident make up your mind at once what you will do, and do it."

*French-Polishing, &c.* By A. PRACTICAL MAN.  
London: Wyman & Sons.

This excellent little work gives much more information than a hasty glance at the title leads one to expect, for the author deals clearly and concisely with graining, marbling, jappanning, inlaying, wax-polishing, and many other matters which every one at some time may wish to have explained; and he has discharged his task in a style which shows that he is testifying to that which he does know. Numerous useful recipes for stains, varnishes, &c., add to the value of the book, and a careful index supplies the finishing touch.

*Our Dwellings, Healthy and Unhealthy.* By CATHERINE M. BUCKTON. London: Longmans, Green, & Co.

It is a curious sign of the times that a work of this kind should have been written by a woman. It comprises fourteen essays, reaching from such feminine subjects as the choice of curtains and carpets to the trapping of house-drains and the application of the water-test. Nor is the subject treated in a superficial or second-hand manner. The essays were originally delivered as lectures to the girls in the Leeds School Board schools. They were illustrated by models contrived for the purpose, and they one and all

show a somewhat surprising acquaintance with the technicalities of the subject. The professional reader will not meet with anything that is new. But the essays were not written for him: they are appropriately dedicated to the housewives of England, and every housewife would be the better for taking to heart the lessons so clearly and accurately given in this little book.

*Tables for Setting out Curves from 101 ft. to 5,000 ft. radius; useful for Setting out Roads, Sewers, Walls, Fences, and general Engineering Work.* By H. A. CUTLER and F. J. ENOK. London and New York: E. & F. N. Spon. 1885.

This is intended to supply a handy guide for setting out curves for general work, the authors observing that the methods for which tables of this kind have been hitherto published are only applicable to railway work. The setting-out is given in offsets from a tangent, at regular distances. The tables are intelligible even to a workman who may not follow the formula on which they are based. The book is very small, though clearly printed, and convenient to carry about.

## RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

Aug. 25.

|                                                                                          |      |
|------------------------------------------------------------------------------------------|------|
| By FLEWANT & SON.                                                                        |      |
| Wood-green, Naas-road—A plot of freehold land ...                                        | 2145 |
| By W. H. MOORE.                                                                          |      |
| Euston-square—75, Drummond-street, 38 years, ground-rent 18 <i>l.</i> 18 <i>s.</i> ..... | 410  |
| By J. H. GREEN & SON.                                                                    |      |
| Hammersmith—45, Southerton-road, 82 years, ground-rent 6 <i>l.</i> .....                 | 285  |
| Barnes—13, Castelnau-gardens, 54 years, ground-rent 1 <i>l.</i> .....                    | 750  |
| Hammersmith—25, Black Lion-lane, 36 years, ground-rent 3 <i>l.</i> .....                 | 275  |
| By DEBENHAM, TAWSON, & CO.                                                               |      |
| Pimlico—24, Westmoreland-place, 48 years, ground-rent 8 <i>l.</i> .....                  | 470  |

Aug. 26.

|                                                                                                                                                |     |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| By H. J. BLISS & SON.                                                                                                                          |     |
| Bethnal-green—2 and 4, White-street, freehold.....                                                                                             | 800 |
| By FRED. STOCKER.                                                                                                                              |     |
| Ladywell—"Vine" and "Gentry" Cottages, freehold .....                                                                                          | 280 |
| Aug. 27.                                                                                                                                       |     |
| By C. & H. WHITE.                                                                                                                              |     |
| Caledonian-road—65, Remerton-street, 59 years, 6 <i>l.</i> Brixton—176, Shakespeare-road, 57 years, ground-rent 5 <i>l.</i> 10 <i>s.</i> ..... | 350 |
| Kenington—268, Kenington-road, 48 years, ground-rent 3 <i>l.</i> .....                                                                         | 220 |
| No. 10, Wynyard-terrace, 16 years, ground-rent 2 <i>l.</i> .....                                                                               | 200 |
| By HERRING, SON, & DAW.                                                                                                                        |     |
| Upper Tulse-hill—88, term 38 years, ground-rent 12 <i>l.</i> .....                                                                             | 135 |

|                                                                                                    |       |
|----------------------------------------------------------------------------------------------------|-------|
| By R. BRIDSON.                                                                                     |       |
| Peckham—57 to 71 odd, Ansdall-road, 87 years, ground-rent 34 <i>l.</i> .....                       | 1,910 |
| Battersea—25 to 31, Bollingbroke-road, 38 years, ground-rent 18 <i>l.</i> .....                    | 1,850 |
| New Kent-road—116, Falmouth-road, 8 years, ground-rent 5 <i>l.</i> .....                           | 680   |
| Hackney, Well-street—"The Star Inn," freehold .....                                                | 520   |
| By NEWSON & HARRING.                                                                               |       |
| Islington—30 and 31, Cloudeley-place, 31 years, ground-rent 26 <i>l.</i> .....                     | 440   |
| Wapping—21 to 25, Star-street, and 1 to 4, Scores-alley, 20 years, ground-rent 30 <i>l.</i> .....  | 260   |
| Seven Sisters-road—77 to 81, Devonshire-road, 67 years, ground-rent 26 <i>l.</i> 6 <i>s.</i> ..... | 1,470 |
| Mile-end—8 and 55, Moody-street, freehold .....                                                    | 770   |
| Woodford—Two plots of freehold land .....                                                          | 145   |

By G. B. SMALLPRICE.

|                                                                                                                              |       |
|------------------------------------------------------------------------------------------------------------------------------|-------|
| Haslemere Station, near—The residence called "Dickhurst," and 103 <i>s.</i> 3 <i>r.</i> 4 <i>p.</i> .....                    | 5,160 |
| Enclosures of heath land, 53 <i>s.</i> 2 <i>r.</i> 10 <i>p.</i> copyhold.....                                                | 2,530 |
| By THOMAS GROVER.                                                                                                            |       |
| Brixton-road—A piece of land, called the Oval, 20 years, ground-rent 10 <i>l.</i> .....                                      | 155   |
| No. 6, the Oval, 20 years, ground-rent 25 <i>l.</i> .....                                                                    | 505   |
| No. 408, Coldharbour-lane, with paddock, 20 years, no ground-rent .....                                                      | 500   |
| No. 411, Coldharbour-lane, 20 years, no ground-rent .....                                                                    | 200   |
| No. 435 and 436, Coldharbour-lane, 20 years, no ground-rent .....                                                            | 305   |
| No. 435 and 447, Coldharbour-lane, 20 years, no ground-rent .....                                                            | 800   |
| Leasehold Ground-rents of 98 <i>l.</i> 10 <i>s.</i> per annum, 20 years .....                                                | 1,012 |
| No. 408 and 410, Coldharbour-lane, 17 years, ground-rent 5 <i>l.</i> .....                                                   | 180   |
| A Ground-rent of 18 <i>l.</i> per annum, together with three cottages, 17 years, ground-rent 23 <i>l.</i> 10 <i>s.</i> ..... | 220   |

**Builders' Benevolent Institution.**—The next annual dinner in aid of the funds of this excellent trade charity will be held, as has already been mentioned in the *Builder*, in Carpenters' Hall, London Wall, on November 5, Mr. Arthur Charles Lucas in the chair. As the number of seats available is strictly limited to 200, early application must be made for tickets. An advertisement in reference to the matter will be found on our front page.

## The Student's Column.

## DESCRIPTIVE GEOMETRY.—PART II.

Find a plane,  $P$ , tangent to a surface of revolution, and passing through a point,  $x$ , in space, also mark the point of contact,  $m$ , where the plane,  $P$ , touches the surface.

**X** We have already seen, in fig. 145, that there are also an infinite number of planes which satisfy this question; we must, therefore, as in the preceding case, limit the problem to finding the plane tangent to the surface, either on a given meridian or on a given parallel thereof. If we determine the curve on which all the points of contact,  $m$ , are to be found, we shall have the limit of the shade of the surface of revolution when lighted

by a candle, and also, what is perhaps of more practical importance to us, the outline of the surface seen in perspective by a spectator with his eye placed in the point  $x$ .

Find the point of contact,  $m$ , along the meridian,  $o y$ .

If from all the points of the given meridian,  $o y$ , we carry a series of lines perpendicular to the plane of that meridian, we shall have formed a horizontal cylinder; and it is evident that any plane tangent to the surface of revolution along that meridian will be also tangent to the horizontal cylinder, of which the meridian is the base. The problem is, therefore, reduced to find the plane  $P$  passing through the given point  $x$ , and tangent to a cylinder, a problem solved in fig. 100.

We take through the point  $x$  a parallel to

the generators of the cylinder, find its foot,  $p$ , on the plane of the cylinder's base, and the trace of the plane,  $P$ , will pass through the point  $p$ , and be tangent to the base. All this is applicable to our case, only we must remember that the base of the cylinder is the meridian  $o y$ . We can readily draw the projections of the line  $x p$ , for they are perpendicular to the plane of the meridian,  $o y$ . To get the trace of the plane,  $P$ , on the plane of the meridian,  $o y$ , we rotate the plane of this meridian round the axis of the surface of revolution until it be parallel to the elevation; then the point  $p$  comes to  $p'$ , and the tangent,  $p' m'$  is the trace  $P'$  of the tangent plane  $P$ . When we rotate back the plane of the meridian to its former position,  $m'$  comes to  $m$ , the position of the point of contact, and  $P'$  comes to  $P$ , the horizontal trace of the tangent plane,  $P$ . (See fig. 154.)

## Special Points.

The points  $a$  situated on the equator are found at once; as the tangent planes are in that case vertical, we have only to make  $x^a a'$  tangent to the plan of the equator.

The points  $b$ , situated on the meridian which forms the outline of the elevation, are also readily found by making  $x^b b'$  tangent to the meridian.

The points  $d$ , which are situated on the meridian, the plane of which contains also the point  $x$ , are, of course, the highest and the lowest points of the curve of contact. To find them, we need only rotate the point  $x$  round the axis of the surface, draw the tangents to the elevation from  $x''$  and then rotate back.

As the meridian plane which contains  $x$  divides the curve on the plan in two symmetrical parts, so the line  $d^h d^v$  is, in our case, a minor axis of the ellipse. On the elevation, the points  $d^v$  form the ends of a diameter of the ellipse of contact, we need only find the other conjugate diameter to draw the curve of contact without the help of any other points. (See Gwill's "Encyclopedia of Conic Sections.")

In fig. 154 we have shown the various operations described above; in fig. 155 we have shown the surface shaded, and left out all lines of construction.

Find the point of contact,  $m$ , along the parallel  $c$ .—This is a much more expeditious operation than the one on the meridian, and is based on the fact that the plane tangent to the surface along the parallel  $c$  is also tangent to a cone which touches the surface of revolution along the parallel  $c$ .

The problem is, therefore, reduced to producing a plane tangent to a cone and passing through a point outside the cone, a problem we have solved before in fig. 103. We should join the point  $x$  with the apex of the cone, find the foot of that line on the base of the cone, and then from that foot carry parallels to the base; but all this complicated operation is done away with by simply selecting as the base of our cone that which is in the same horizontal plane as the point  $x$  itself, and then, of course, the tangents from the point  $x$  to that base will be the traces of the tangent planes. To find the foot of the generators of the cone along which the planes are tangent we need only have the points of contact  $a$ , which we find on the circle of diameter  $o^h x^h$ ; we then draw the generators of the cone, and at their intersection with the plan of the parallel  $C$  we get points, such as  $m$ , belonging to the limit of the shade. Whatever parallel we select, the same circle of diameter,  $o^h x^h$ , will serve to find the generators,  $G$ , of the enveloping cone, so that the operation is practically very simple.

In our figure there is another parallel of the same size as the parallel  $C$ ; but, beyond the fact that both parallels have the same hori-

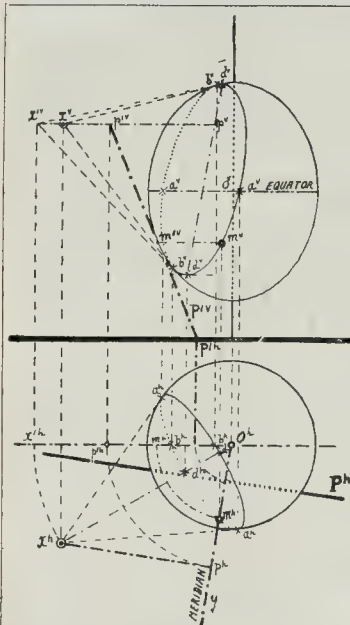


Fig. 154.

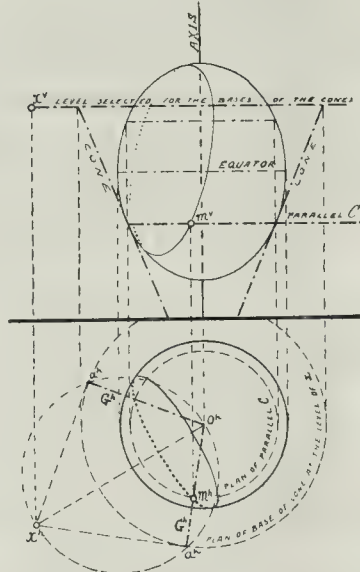


Fig. 156.

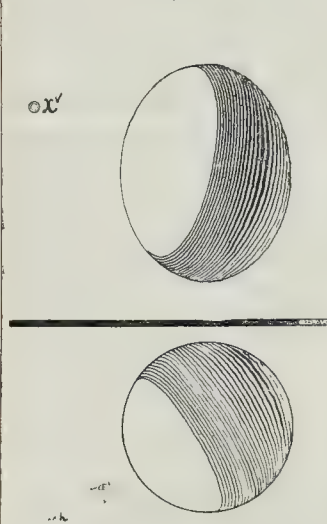


Fig. 155.

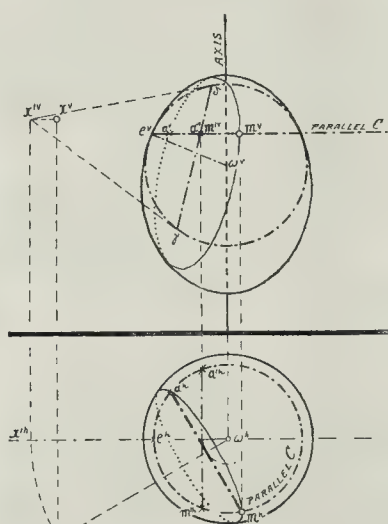


Fig. 157.



al circle for their plans, there is no special argument, as was the case in fig. 152. (See 156.)

**d Method.**—Find the point of contact,  $m$ , on a parallel,  $C$ , by the help of a sphere, which touches the surface of revolution all along the parallel,  $C$ .

We make  $e^w$  normal to the outline of the surface of revolution, and with  $e^w$  as radius describe a circle, it is evident that, when that circle revolves round the axis of revolution, it produces a sphere which will touch the surface of revolution all along the parallel,  $C$ . We see that the curve of contact of a cone, with apex in a circumscribing the sphere will be a circle; now, if we rotate the apex  $x$  to  $x^1$ , so as to give the axis of the cone parallel to the elevation, the plane of the circle of contact will be perpendicular to the elevation, and the whole of the circle will be projected on the straight line. The planes of the circle of contact and the parallel will cut one another along the cord  $n$ , the plan of which is  $a^1 m^1$ . Revolving backwards, we then get the points  $a$  and  $m$ , which belong both to the sphere and the surface of revolution, and are, therefore, points of the surface of contact to both surfaces. (See 157.)

We have given here the theory of the construction of the shades of surfaces of revolution; later on, we shall apply our methods to finding the shades of various architectural features, bases, caps, arches, arches, details of ironwork, &c., and, therefore, a student should diligently study the eight preceding figures.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

4,420, Mitre Cramp. T. J. Syer. The bed-plate and hinged sides are made of metal, the latter being lined with wood. The sides are moved inward by means of lugs which are pressed by cones on a screw-spindle, the return movement being caused by a spring. A triangular piece is moved up by a screw, the work being held between and the sides.

5,889, Window. W. Meakin. The sashes, instead of running between beads on the stiles of the ordinary fixed frame, run on the stiles of an interior frame pivoted to a fixed frame at the top. The pulleys carrying the cords and counterpoise weights are fixed in the usual manner. The inner frame with the sashes can be swung into the room for cleaning or other purposes, it is secured then shut by bolts or other fastenings, and may be provided with a strut to keep it open when required.

7,490, Ceilings. W. Clark. Bearers, the length of which may be adjusted to any sized room, are fixed between the walls, or suspended from the joists. They are adapted to support boarding of sufficient strength to carry without sagging the weight of the material used to form the ceiling. A seismic line is used in combination with other materials, and the mixture is placed in from the top before the flooring is laid. Netting or separate wires may be nailed to the joists instead of the common lathing. In fireproof doors the joists are strutted by cramps driven into the sides of the joists, and an additional layer of elastic lime and sawdust is applied; the lower edges of the joists are grooved so as to form a key to support the fireproof material. A second layer of fireproof material may be laid on the top of the joists. Walls and partitions may be plastered in a similar manner, and by employing suitable moulds the method may be made applicable to ornamental ceilings.

8,415, Chimney-top. J. Brierley. Two or more concentric screens of wire-netting rack, with a double loose or hinged lid are supported on the chimney-top by brackets.

8,468, Lavatory Basin. H. Sutcliffe. The brush and soap trays drain into the basin by passages moulded on. The supply-cocks are also moulded on blocks made solid with the basin. A ring also is soldered in the basin, to which is attached a chain carrying the plug.

8, 875, Slating Iron Roofs. W. Middleton. A piece is cut out of the centre at the head of each slate, leaving pieces projecting on each side to rest on the angle-irons without interfering with the ap.

15,334, Lead Glazing. F. Hobbs. The space between the lead and glass is filled in with plaster of Paris mixed with any material to retard setting, and afterwards mixed with oil.

8,817, Cements and Pavements. J. Fottrell, Dublin. The cements employed for paving and other purposes are mixed with a powerful disinfecting agent,

either in a solid or liquid form in order to neutralise exhalations from the litter, &c., in the roadway. Fresh disinfectant is exposed as the surface is worn away. In the case of wood pavements the mixture may form a layer below the wood, and be pierced here and there for the escape of rain-water.

8,297, Adjusting Door Knobs to Spindles. C. Tighe.

The knob has a hole or slot made in it, through which a pin is inserted engaging on the notches on the spindle. The pin is kept in place by the rose which is screwed on the knob; or in another form the rose may be attached to the door by screws.

##### APPLICATIONS FOR LETTERS PATENT.

Aug. 21.—9,914, B. Cartwright, Sew Fasteners for Corrugated and other Iron Sheets.—9,917, C. Longbottom, Securing Door Knobs or Handles.—9,936, R. Wain, Lavatory Basins and Appliances.—9,942, G. Beadon, Doors and Door-fastenings.—9,954, R. Thomas, Improved Ball-cock.

Aug. 22.—9,972, J. Royle, Improvements in Suspended Gas-lights from existing Gas-fittings.—9,985, T. Bell and others, Rock-drilling Apparatus.—9,987, J. Castelle, Joining or Coupling together Lead Pipes.

Aug. 24.—9,998, C. Wharton, Self-acting Window Sash-fasteners.—10,021, W. Lake, Improvements in Revolving Shutters.

Aug. 25.—10,026, A. Bell, Car Ventilators.—10,033, S. Sutcliffe, Tile Hearts and Fenders.—10,036, D. Doyen, Door Checks or Closers and Annunciators.—10,038, W. Lake, Improvements in Sashes.—10,048, M. Shirraw, Securing Sliding Sashes of Windows.

Aug. 26.—10,082, J. Storer, Preparing Materials for Roofing.—10,087, J. Johnson, Window-sash Fastener.—10,091, C. Newton, Socketed Drain and other Pipes.—10,115, A. Martin, Covering Roofs and other Structures with Sheet Metal.

Aug. 27.—10,158, W. Duffy, Wood-block Flooring.—10,159, J. Armstrong, Application and Adaptation of Terra-cotta for the purposes of Electric Lighting.—10,183, W. Lake, Automatic Fire-extinguishing Apparatus.—10,184, W. Gittins, Portable Cranes.

##### PROVISIONAL SPECIFICATIONS ACCEPTED.

13,738, J. Carruthers, Folding Shutters for Shop-windows, Doors, &c.—8,508, R. Stanley, Machinery for Pressing and Moulding Bricks, Tiles, &c.—8,748, A. Reddie, Rock-drills.—9,147, W. Ward and others, Opening, Closing, Regulating, and Securing Fanlights, Windows, Ventilators, &c.—9,239, B. Stockman, Improvements in Water-meters.—9,289, F. Higgins, Connexions of Speaking Tubes, &c.—4,084, G. Redfern, Improvements in Bakers' Ovens.—8,339, A. Edmondson and Others, Safety-step Ladder-hinge.—8,485, A. Emery, Eye Links or Bars for Bridges, Buildings, &c.—8,558, W. Maconne, Appliances for Checking Workmen's Time.—9,171, W. Walker and others, Fluid-tight Joints for Pipes.—9,211, H. Gibbs, Flushing Water-closets.—9,370, J. Wallis, Apparatus for Cutting or Excavating Drains, Trenches, &c.

##### COMPLETE SPECIFICATIONS ACCEPTED.

###### Open to opposition for two months.

11,541, J. Keyser, Improvements in Stoves.—13,314, W. & W. R. Lawler, Glazing Bars or Astragals for Roof-lights and Windows.—13,692, A. Dennison, Machinery for Cutting Wood for Marquetry and Parquetry Work, &c.—13,719, T. Helliwell, Securing and Fixing to Roofs, Flats, or Sides of Buildings, Sheets of Zinc, Copper, Iron, &c.—13,779, J. Walker, Attaching Door-knobs to Spindles.—13,824, E. Grand, Manufacture of Mossie, &c.—14,417, J. Ball and Others, Combined Ferrule and Bolster for Chisels and Gouges.—8,983, O. Hertrampf, Brick Kilns.—14,567, G. Connell, Improvements in Roof Windows.—15,953, J. Stevens and C. Major, Hydraulic Lifts.

**Erratum.**—In the column of "Abstracts of Specifications of Patents" in the *Builder* for Aug. 29, "No. 5,256, W. Tupper, an improved coping tile," &c., should have been "No. 5,255, W. Tuffee."

#### Miscellaneous.

**Ravenna.**—A *Times* telegram from Rome states that King Humbert has signed a decree authorising the establishment of a Byzantine Museum at Ravenna. The Board of Public Works has approved a scheme of extensive works for the preservation of the celebrated Church of San Giovanni Battista at that place.

**Trade Union Congress.**—The eighteenth Annual Congress of Trade Unionists will commence on Monday next at Southampton.

**The British Association for the Advancement of Science** will commence its Aberdeen meeting on the 9th inst.

**Honour to a Civil Engineer.**—The Queen has been graciously pleased to confer the distinction of Knight Commander of St. Michael and St. George on Mr. John Fowler, C.E.

#### Glasgow Iron Pipes for the Colonies.

It was reported in Glasgow yesterday that Messrs. Macfarlane, Strong, & Co., of the Lochburn Iron Foundry, had received a contract for 1,000 tons of iron gas-pipes for the gas corporation of Adelaide. Some time ago the South Australian Government resolved to confine their contracts for water-pipes to the Colonial founders, but it seems the gas companies are determined to buy in the cheapest market, and it is reported that on this small contract alone there was a difference of something like 1,000*l.*, including freights, &c., to Adelaide, from the lowest Colonial offer. It is expected that a contract for 20,000 tons of iron pipes will be closed shortly, and a firm in the Clyde district is expected to secure the contract. Several orders for water and drainage pipes have been booked during the last few weeks, and there is every prospect of the Scottish pipe-founders being well employed throughout the coming winter.—*Scotman*, Aug. 28.

**Temple Bar.**—According to the *Metropolitan*, "Old Temple Bar is at length to be re-erected. It will be remembered that a few years ago the ancient structure was taken down, and the stones as marked were stored in Farringdon-road. It now appears that they are to be utilised for the rebuilding of the historical old structure, the directors of the Albert Palace Company having purchased them from the Corporation, and that in a short time the ancient gateway in Fleet-street which marked the City boundary will re-appear in all its old historic and archaeological proportions as the main entrance to the new palace at Battersea." Whatever may be the proportions which are thus described, the proposal to re-erect the old gateway at Battersea is absurd. Surely a place could be found for it in, or as an entrance to, the Temple; or, at any rate, somewhere in the city.

**A New Magnetic Telephone.**—The Signal Engineering Company, of 181, High Holborn, have introduced a new magnetic telephone. It is put up in vulcanite cases like the Bell receiver, and has a magnet and the usual bobbin of wire round the pole, but there the resemblance to the Bell instrument ceases, for the diaphragm is a membrane prepared in a special manner to protect it from the effects of the atmosphere. To this membrane is attached a piece of hardened steel, and that being attracted by the magnet, puts the diaphragm into vibration, and so transmits or receives the sounds produced by the voice of the speaker, as conveyed by the variations produced in the current.

**The Reconstruction of Aldershot Camp.** The *Army and Navy Gazette* says:—"The reconstruction of Aldershot Camp is proceeding slowly, but surely. A sum of about 40,000*l.* has been already expended in the North Camp during the past four years in the erection of brick huts. About two battalions of infantry can be accommodated in these new buildings. The vote for camp reconstruction for the years 1885-86 is only 10,000*l.*, and this sum is now being expended in the erection of officers' quarters. It is expected that a much larger sum will be allotted under this head next year, when the whole of the North Camp will be completed."

**Proposed Art and Industrial Exhibition, Balham.**—We have received the preliminary prospectus of this Exhibition, which it is intended to open early in 1886. The exhibits are to include, amongst other things, glass work and pottery, metal work, carpentry, drawing, designing, painting, engraving, carving or decorative work in brick, stone, or wood, engineering, plumbing and gasfitting, turnery and fretwork, plasterwork, and models and apparatus. Prizes are to be awarded for merit in the groups and classes. The secretary is Mr. W. Shimell, 23, Alderbrook-road, Balham.

**Awards at the Inventions Exhibition.**—Messrs. Candy & Co. (Limited), of 11, Queen Victoria-street, write:—"Will you kindly correct an error in your reference to our award at the 'Inventions' which was copied from the one in the early official list? We are stated to have received a silver medal for 'enamelled iron' instead of for 'terra-cotta, facing and paving bricks, and architectural terra-cotta and stone-ware goods.'"

**Sanitary Institute of Great Britain.**—An Exhibition of sanitary apparatus and appliances and articles of domestic use and economy is to be held in the Floral Hall, Belgrave Gate, Leicester, from September 22nd to October 10th, in connexion with the eighth autumn congress of the Institute.







COMPETITIONS AND CONTRACTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

| Nature of Work.                                      | By whom required.        | Premium. | Designs to be delivered. | Page. |
|------------------------------------------------------|--------------------------|----------|--------------------------|-------|
| ing-out "Harold Tower" Grounds, Douglas, Isle of Man | Owners of "Harold Tower" | 251      | Sept. 10th               | ii.   |

CONTRACTS.

| Nature of Work, or Materials.                                                                   | By whom required.                  | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page.  |
|-------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------|--------------------------|--------|
| use and Shop, Kilburn                                                                           | Lewisiam Brd. of Wks.              | Official                          | Sept. 8th                | ii.    |
| ching, Tar Paving, &c.                                                                          | Barking Town Locl Bnd              | do.                               | Sept. 10th               | xviii. |
| ter-Meters                                                                                      | Moore, Lucas, & Co.                | Official                          | Sept. 14th               | xviii. |
| uplication and Decoration of Houses, Waldegrave-road, Teddington, and Warrington-road, Richmond | Com. of H.M. Works                 | Official                          | Sept. 15th               | ii.    |
| er Bridge and Subway                                                                            | Brecon and Merthyr Rl.             | Official                          | Sept. 16th               | ii.    |
| pairs to Footbridge                                                                             | Vestry St. Mary Abbots, Kensington | W. Weaver                         | Sept. 21st               | xviii. |
| ring away House Refuse, &c.                                                                     | Greenwich Bd. of Wks.              | A. Ramsden                        | Sept. 21st               | ii.    |
| vering and Making-up Roads                                                                      | Chiswick Local Board               | H. Summers                        | Sept. 21st               | ii.    |
| ick & Wood Work, for Exhibition Buildings                                                       | Liverpl. Exhibition, 1888          | G. B. Carlson                     | Sept. 21st               | xviii. |
| ring and Road-making                                                                            | Beckenham Local Board              | Official                          | Sept. 21st               | ii.    |
| argement, Leicester Post-Office                                                                 | Com. of H.M. Works                 | Potts, Sulman, & Hennings         | Sept. 22nd               | ii.    |
| se Public Library                                                                               | Wimboldon Local Bnd                | H. Robinson                       | Sept. 22nd               | ii.    |
| ter-pipes, Valves, Hydrants, &c.                                                                | Guardians, Petersfield             | De Page                           | Sept. 22nd               | ii.    |
| all-Sinking, Reservoirs, Cast-Iron Mains, Engines, &c.                                          | Tottenham Local Board              | W. Matthews                       | Sept. 24th               | ii.    |
| all-Sinking, Edge Hill                                                                          | Southampton Corporatn              | C. O. Elliott & Son               | Sept. 24th               | ii.    |
| avenger's Depot                                                                                 | Com. of Sewers                     | Official                          | Sept. 24th               | ii.    |
| verage Works                                                                                    | Wembury U. S. A.                   | E. Pritchard                      | Sept. 24th               | ii.    |
| verage Works                                                                                    | Hereford Town Council              | J. Parker                         | Sept. 24th               | ii.    |
| all-making and Paving, Victoria Dock                                                            | Lands Allotment Co. Lim            | Bradshaw Brown                    | Not stated               | xviii. |
| version of Ditch and Culverts                                                                   |                                    |                                   | do.                      | xviii. |

BRENTFORD.—For additions to warehouse and stabling, for Messrs. Carter, Paterson, & Co. under the superintendence of Mr. William Eve, Union-court, Old road-street:—  
Aldridge & Jenvey ..... £2,410 0 0  
Exton ..... 2,387 0 0  
Harris & Wardrop ..... 2,380 0 0  
Higgs, Loughborough Junction ..... 2,280 0 0  
Dorey (error) withdrawn ..... 1,480 0 0  
\* Accepted.

CAMBERWELL.—For additions to schools, Waterloo-road, Chamberwell. Mr. R. H. Hill, architect:—  
O. Craske ..... £1,270 0 0  
Holloway Bros. .... 1,260 0 0  
J. Holland ..... 1,216 0 0  
W. Shurmer ..... 1,216 0 0  
J. C. Arnold & Son ..... 1,204 0 0  
B. E. Nightingale ..... 890 0 0  
Harris & Wardrop ..... 1,143 0 0

OLVERKNELL.—For the erection of new church, or the Trustees. Messrs. Lander & Bedells, architects. Quantities by Mr. S. Young:—  
Dove Bros. .... £2,975 0 0  
Williams Bros. .... 8,960 0 0  
Roberts ..... 8,850 0 0  
Nightingale ..... 8,770 0 0  
Grover ..... 8,749 0 0  
Mattock Bros. .... 8,681 0 0  
Smith & Son ..... 8,660 0 0  
Wall Bros. .... 8,301 0 0  
J. Allen & Sons (accepted) ..... 8,200 0 0  
Wontner Smith & Son ..... 7,900 0 0

CODSALL.—For gardener's lodge to residence, for Mr. Fryer Morson. Mr. J. R. Veal, architect, Wolverhampton:—  
Horsman & Co., \* Wolverhampton ..... £271 0 0  
\* Accepted.

ELTHAM.—For warehouse and stabling, with manager and horsekeeper's houses, for Messrs. Carter, Paterson, & Co., under the superintendence of Mr. William Eve, Union-court, Old Road street:—  
Killingback ..... £3,160 0 0  
Clarke & Bracey ..... 2,914 0 0  
Bras & Son ..... 2,860 0 0  
Aldridge & Jenvey ..... 2,859 0 0  
Adamson ..... 2,783 13 4  
Downs ..... 2,769 0 0  
Perry ..... 2,747 0 0  
Mortier ..... 2,738 0 0  
Harris & Wardrop ..... 2,723 0 0  
Higgs, Loughborough Junction ..... 2,720 0 0  
\* Accepted.

EPSOM.—For the new sewerage works. Mr. J. R. Harding, C.E., Town Surveyor. Quantities by Mr. Howell:—  
Corier ..... £5,317 0 0  
Harris ..... 5,333 0 0  
Williams ..... 5,301 0 0  
Bentley ..... 5,287 0 0  
Munday ..... 5,200 0 0  
Streeter ..... 5,144 0 0  
Cowdery & Sons ..... 5,055 0 0  
W. Way ..... 5,000 0 0  
Peale ..... 4,796 0 0  
Cooke & Co. .... 4,730 0 0  
Nicholls ..... 4,685 0 0  
Woodham & Fry ..... 4,653 0 0  
J. Jackson ..... 4,655 0 0  
Killingback ..... 4,498 0 0  
Bedells Bros. .... 4,450 0 0  
Bottoms Bros. .... 4,400 0 0

HAMPTON WICK.—For proposed new house, Seymour-road, Hampton Wick, for Mr. E. A. Wright. Mr. R. T. Rieam, architect, Hampton Wick. Quantities by the architect:—  
O. Constable, Hampton Wick ..... £1,536 7 0  
J. H. Jarvis, Surbiton ..... 1,485 0 0  
C. Bonell, Teddington ..... 1,495 0 0  
C. E. Oldridge & Sons, Norbiton ..... 1,473 0 0  
J. F. Collinson, Teddington ..... 1,470 0 0  
T. Wootner Smith & Son, Epsom road ..... 1,378 0 0  
W. Hickbotham, Teddington (too late) ..... 1,295 0 0  
F. Piller, Teddington (accepted) ..... 1,280 0 0

KILBURN.—For works at the Brondesbury Arms, Canterbury-road, Kilburn:—  
Stevens ..... £470 0 0  
McGregor ..... 438 0 0  
Mark ..... 348 0 0  
Richardson ..... 344 0 0

LEICESTER.—For first portion of Church of St. Martin, Belgrave, Leicester. Mr. G. Vials, architect, Leicester. Quantities by Mr. E. A. Jackson:—  
Thrall & Payne, Leicester ..... £5,043 0 0  
Law & King, Lutterworth ..... 5,009 0 0  
T. & H. Herbert, Leicester ..... 4,794 2 0  
F. Major ..... 4,411 15 0  
G. Hewitt ..... 4,310 0 0  
H. Bland ..... 3,964 3 1  
\* Accepted in part and conditionally.

LEYTONSTONE.—For alterations and additions to Woodhouse Tavern, Leytonstone. Mr. F. A. Ashton, architect, Forestgate, Leytonstone:—  
Hearle & Son ..... £2,650 0 0  
Buckle ..... 550 0 0  
Nicholls, Leytonstone (accepted) ..... 530 0 0

LLANDUDNO.—For entrance-lodge on the Little Orme's Head, Llandudno, for Mr. John Smith. Mr. Edwin Turner, architect:—  
Jones & Owen ..... £250 0 0  
Thomas Jones ..... 845 8 6  
R. Conway ..... 591 0 0  
Wm. Williams (accepted) ..... 520 6 0

LLANDUDNO.—For offices, Llewelyn-street, Llandudno, for Messrs. Minshull, Parry, Jones, & Pugh. Mr. Edwin Turner, architect:—  
Hughes & Jones (accepted) ..... £1,500 0 0

LLANDUDNO.—For alterations to Bryn Maelgwyn, Llandudno, for Mr. Pugh. Mr. Edwin Turner, architect:—  
R. Conway ..... £435 0 0  
Wm. Williams ..... 421 0 0  
T. Jones (accepted) ..... 386 10 0

LONDON.—For erection of Coach and Horses public-house, and warehouse adjoining, Whitechapel High-street. Mr. Geo. Low, architect:—  
Dove Bros. .... £3,275 0 0  
Patman & Fotheringham ..... 3,473 0 0  
R. Marr ..... 3,198 0 0  
W. Sharnur ..... 3,150 0 0  
R. Conder ..... 3,053 0 0  
Holliday & Greenwood ..... 2,973 0 0

LONDON.—For rebuilding 7, Oxford Market, London, for Mr. G. H. Heinke. Messrs. H. M. & W. Grellier, architects. Quantities by Mr. F. T. W. Miller:—  
S. G. Bird ..... £1,214 0 0  
J. Simpson & Son ..... 1,200 0 0  
T. Little ..... 1,197 0 0  
G. S. Pritchard & Son ..... 1,188 0 0  
C. Manning ..... 1,050 0 0  
J. Outwaite & Son ..... 1,048 0 0

LONDON.—For alterations, &c., to the Old King's Arms, Hoxton-street. Mr. B. J. Capell, architect:—  
G. Keetch ..... £225 0 0  
Jackson & Todd ..... 810 0 0  
W. Sharnur ..... 747 0 0  
J. Ivory ..... 725 0 0

LONDON.—For alterations, painting, decorating, &c., at 8, Hertford-street, Mayfair. Mr. J. Williams, architect:—  
G. Sinclair ..... £1,033 0 0  
Priestley ..... 860 0 0  
Wetherill, Lee, & Martin ..... 595 6 6

LONDON.—For works at Messrs. Oetzmann's premises, Hampstead-road. Messrs. Eales & Son, architects:—  
Simpson & Son ..... £1,800 0 0  
Scriveners & Co. .... 1,874 0 0  
Mark ..... 1,844 0 0  
Downs ..... 1,487 0 0

LONDON.—For alterations at the Portman Arms, Great Quebec-street. Mr. Newton, architect:—  
Bowman & Son ..... £207 0 0  
Mark ..... 277 0 0  
Lamble ..... 259 0 0

LONDON.—For works at 10, New Quebec-street. Messrs. New & Son, architects:—  
Johnson ..... £263 0 0  
Thomas & Buland ..... 234 10 0  
Flowers ..... 225 0 0  
Mark ..... 219 0 0

LOWESTOFT.—For the erection of lodge, mortuary-chapel, high-gate, boundary-walls, and laying out of grounds at Lowestoft Cemetery, for the Burial Board. Mr. William Doubleday, architect, Colmore-row, Birmingham. Quantities by Mr. George Kenwick, Temple-street, Birmingham:—  
Kenney, Ipswich ..... £3,868 0 0  
Bate, Lowestoft ..... 3,452 0 0  
Bray, Yarmouth ..... 3,345 0 0  
Gwynne & Wilkins, Lowestoft ..... 3,285 0 0  
R. Martin, Ditchingham ..... 3,235 16 0  
Brown, Braintree ..... 3,170 0 0  
Swatman, Lowestoft ..... 3,165 0 0  
Young & Son, Norwich ..... 3,081 0 0  
Bedwell, Lowestoft (accepted) ..... 2,970 0 0

MAIDSTONE.—For the erection of boundary-wall at West's Cross Police Station. Quantities supplied by Messrs. Ruck, Son, & Smith, Maidstone:—  
H. J. Smith ..... £335 8 0  
Edmund Vaughan ..... 285 0 0  
Richard & Ward ..... 281 0 0  
Cox Bros. .... 280 0 0  
Wallis & Clements (accepted) ..... 247 10 0  
[All of Maidstone.]

NORTH PETHERWIN.—For farm at North Petherwin, Cornwall (exclusive of stone for all walls, which is to be provided by the owner), for Mr. A. V. Box, Mr. F. W. Lacey, architect, Brentford:—  
W. Burt, Llanecston (accepted) ..... £750 0 0

PLUMSTEAD.—For erection of church and hall in Herbert-road. Mr. J. Kingwell Cole, architect, Mount-street, Grosvenor-square. Messrs. Batam & Co., surveyors:—  
E. Proctor, Woolwich ..... £5,100 0 0  
Priestley & Gurney, Hammersmith ..... 4,523 0 0  
Strickland Bros., Balvedere ..... 3,883 0 0  
C. E. Skinner, Chatham ..... 2,980 0 0  
W. G. Cecil, Woolwich ..... 2,750 0 0  
W. J. Brown, Plumstead ..... 2,698 0 0

RICHMOND (Surrey).—For the supply of 500 super. yards of hard Yorkshire stone paving, 24 in. thick, at per yard super., for the Richmond (Surrey) Select Vestry. Mr. Walter Brooke, Town Surveyor:—

|                                | s. d. | d.   |
|--------------------------------|-------|------|
| J. Munro, Richmond             | 5     | 4    |
| S. Trickett & Son, Millwall    | —     | 5 4  |
| Nowell & Robson, Kensington    | —     | 5 4  |
| E. Webster & Co., Ecclehill    | —     | 5 3  |
| Tomes & Wimpsey, Hammersmith   | 5 4   | 2    |
| T. Aspinall, Brighouse         | —     | 5 2  |
| J. Brooke & Sons, Halifax      | —     | 5 2  |
| C. Fitch, Oxford-street        | 5     | 6    |
| J. G. B. Marshall, Brighton    | 5     | 5    |
| S. H. Watkins & Co., Brentford | 5     | 0    |
| W. Rhodes, Shipley, Yorks      | —     | 4 10 |
| H. J. Jennings, Halifax        | 4     | 11   |
| Comm Bros. & Co., Brighouse    | 4     | 11   |

[One tender received too late (not opened); one not according to instructions.]

\* Accepted.  
At Delivered at the Parish Yard.  
At Delivered at the Richmond Railway Station.

ROTHERHITHE.—For new boundary-wall to Holy Trinity Vicarage, Rotherhithe. Mr. J. Llewellyn Wilson, architect:—  
J. Palmer, Rotherhithe ..... £195 0 0  
G. F. Williams, Pimlico ..... 156 0 0  
Fuzey & Lumley, Long-acre ..... 140 0 0  
Alfred Rooms, Clapton (accepted) ..... 127 0 0

SEVENOAKS.—For house, &c., at Sevenoaks, for Mr. H. Soverby. Mr. E. E. Cronk, architect:—  
Punnett ..... £3,327 0 0  
Darnell ..... 3,323 0 0  
Conatoble ..... 3,345 10 9  
Botterill ..... 3,241 0 0  
Wisher ..... 3,017 0 0  
Duncan (too late) ..... 2,921 12 0

SPIITALFIELDS.—For new rag warehouse, Fashion-street, Spitalfields. Mr. Andrew Edwards, architect:—  
G. Brady, Spitalfields ..... £585 0 0  
J. P. Bargeant, Hackney ..... 668 0 0  
W. W. Epton, King'sland ..... 673 0 0  
J. Howlett, Limehouse (withdrawn) ..... 546 10 0

WINDSOR.—For sanitary improvements at the Royal Infirmary. Mr. Mark H. Judge, architect, London:—  
Crepper, Chelsea ..... £487 0 0  
Totten & Sons, Kensington ..... 430 0 0  
Snider, Southwark ..... 420 0 0  
Herman, Epsall ..... 395 0 0  
Hollis, Windsor ..... 388 0 0  
Reavell, Windsor ..... 330 0 0  
Sevenoaks, Windsor ..... 324 10 0  
Deverill, Slough (accepted) ..... 299 0 0  
Knight, Westminster ..... 267 0 0

RICHMOND (Surrey).—For the supply of road materials, as under, for the Richmond (Surrey) Select Vestry.  
Mr. Walter Brooke, Town Surveyor:—

|                                          | 740 yards Broken<br>Grecian Granite. | 250 yards Broken<br>Flemish Stone from<br>Quarries, Putnam. | 2,000 yards Chalk<br>Fum. | 500 yards Brown or<br>Ft. Flint.                                                                   | 300 yards Broken<br>Granite or<br>Flemish Sillings. |
|------------------------------------------|--------------------------------------|-------------------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------|
|                                          | cubic yd.                            | cubic yd.                                                   | cubic yd.                 | cubic yd.                                                                                          | cubic yd.                                           |
| J. G. B. Marshall, Brighton .....        | 13 6                                 | *13 6                                                       | 6 8                       | 5 8                                                                                                | 10 6                                                |
| Nash & Miller, Battersea .....           | —                                    | —                                                           | 6 2                       | 5 6                                                                                                | —                                                   |
| Craike & Co., Surbiton .....             | —                                    | —                                                           | —                         | —                                                                                                  | —                                                   |
| C. & S. Frere, Cannon-street .....       | 13 11                                | —                                                           | 5 8                       | —                                                                                                  | —                                                   |
| S. Trickett & Sons, Millwall .....       | 13 1                                 | —                                                           | —                         | —                                                                                                  | 10 0 ton                                            |
| A. & F. Maxwell, Leadenhall-street ..... | 13 1                                 | —                                                           | —                         | —                                                                                                  | 10 8                                                |
| J. Mowlem & Co., Westminster .....       | 12 6                                 | —                                                           | —                         | —                                                                                                  | 9 6                                                 |
| Nowell & Robson, Kensington .....        | —                                    | —                                                           | —                         | 5 0                                                                                                | —                                                   |
| J. Neal, Wandsworth .....                | —                                    | —                                                           | —                         | 4 10                                                                                               | —                                                   |
| Wills & Packham, Sittingbourne .....     | —                                    | —                                                           | —                         | 4 9                                                                                                | —                                                   |
| G. Pearce, Brentford .....               | —                                    | —                                                           | 4 9                       | 4 5                                                                                                | —                                                   |
| Downey, Kennedy, & Co., Mark-lane .....  | *12 4                                | —                                                           | *4 8                      | —                                                                                                  | *8 11                                               |
| R. L. & J. Jennings, London Bridge ..... | 12 0                                 | —                                                           | —                         | —                                                                                                  | —                                                   |
| Fredek. Sims, Richmond .....             | —                                    | —                                                           | —                         | (Native Flint)<br>3s. 6d. at the<br>pit, or de-<br>livered to any<br>part of Rich-<br>mond 4s. 8d. | —                                                   |

[Two tenders received too late; two not according to instructions.]

\* Accepted tenders.

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|----------------------|-----------|------------|
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| Hormann & Co. ....   | 724 18 10 | 667 8 1    |
| Bradney & Co. ....   | 676 0 0   | 677 0 0    |

[All of Wolverhampton.]

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|                         |            |
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### The Actual State of the River Lea.

IT is impossible to form any true idea of the actual state of the River Lea, at Tottenham, from the correspondence which has recently occupied so large a portion of the daily papers. No subject deserves, and none receives, more public attention. But contradictory statements abound, as must always be the case when writers, even of unimpeachable faith, write earnestly on a subject as to which they do not possess the technical knowledge necessary to give value to their observations. The first point in dispute is how far the sewage works at Tottenham form the sole, or in the principal, source of the asserted pollution of the river. Edmonton, Ponders End, Waltham Abbey, Chesham, and other places drain into the Lea. Omitting Hornsey, which is nearer the outfall of the Lea than Tottenham, the Registration district contained 1,000 inhabitants in 1881; and the population of Tottenham, which stands for 46,000 of that total, is now estimated to amount to 70,000 persons, so that at least two million gallons of sewage have to be dealt with at the outfall of the Tottenham sewers. At a few chains more than half a mile up the course of the Lea from the Tottenham Lock, just below which the contents of the Catch-water Dyke enter the Lea. This culvert brings down the effluent of the sewage of Edmonton, which is treated by one of the processes of which the use of lime forms an essential part, the supernatant being run through, or over, land provided for that purpose. It should be understood, as far as the Local Government Board can be understood to have arrived at any opinion, the most perplexed question of modern times, it is to the effect that filtration, or chemical precipitation, followed by running through sand or gravel, is the best method now known for the treatment of sewage. Posting, for the present, any remarks upon this of the case, it is enough here to remark that the effluent from the Catch-water Dyke, though not in any way comparable as to its nature to what takes place half a mile lower down, visibly fouls the water of the Lea at the point where it enters. This inflow is into the pound, or level section, of the canalised river, which extends from Tottenham Lock to Old Ford. The current in the pound is very slight, and the action

of the wind brings matter from Tottenham into the upper part of the pound, no doubt, to some extent. Still, above the Tottenham works, and preferably close to the inflow into the Lea, are to be seen daily rows of patient fishermen; although the only fish seen on a recent visit were dead roach and dace,—some of large size,—floating in the Lea. Below Tottenham the fishermen state that there are no fish, but that statement is contradicted; so that we can only say that no fish were seen there on a recent occasion.

The water of the Lea above Tottenham Lock, though somewhat muddy last week, was of a fair purity, as tested by the senses. And the test, if rough, is not to be despised. The water falls over the upper gate of the lock in a little sheet that emits no odour, and that does not render either dirty or offensive the dress of the observer, when blown over it as spray by the wind. The fish in this pound are said by the fishermen to be small. At all events, the water here is as uncontaminated as that of many of our rivers and canals as to which no complaint is made. Chemical analysis is, of course, desirable; but boaters, fishermen, and bathers, are content with a much simpler analysis of their own.

Thus we find that the Lea enters the Tottenham pound in a state that certainly will not excite public reprobation. It is almost immediately fouled by the Catch-water Dyke; but it is difficult to say how far the condition at the head of the pound below the lock is due to this contributory evil, and how far to the working up from below. What occurs at the Tottenham inflow is this:—

Two million gallons of sewage a day, more or less, are pumped up from the low-level sewer that receives the main sewage of the district, into a building, in the upper part of which they are mixed with lime and other ingredients. The liquid then flows into a subsiding tank. Of these there are five, of a capacity of between one-fifth and one-fourth of a million of gallons each,—a capacity arranged for many years ago, when the quantity of sewage to be dealt with was far less than at present. As it is, it is evident that tank-room for little more than half the daily supply is totally inadequate for the application of any process using lime for a precipitant, even apart from other great disadvantages of this mineral. Thus, in point of fact, the sewage flows from the mixing-tanks in at one end of a reservoir some 300 ft. long, from the opposite end of which it escapes in an overflow as a thin sheet of water,—water, however, which the senses declare to be only weak sewage. The colour is a pale-brown, and the odour that escapes, if an observer stand down the wind, is overpowering. Speaking, again, with the

reserve due to a want of chemical analysis, it may be considered probable that two-thirds of the foreign matter of the sewage is the utmost that has been extracted in the works. This effluent runs directly into the Lea, and to the definite amount of pollution thus constantly in operation it is not difficult to ascribe a numeric value.

The nuisance caused to the neighbourhood by the sewage waterfall is, however, but a small part of that caused by the works. Assuming that two-thirds of the impurities are abstracted from the raw sewage, from three to four tons, precipitated by the chemicals employed, and mixed with an equal or larger quantity of lime and other ingredients, form a sludge, containing 80 per cent. of water. To describe the abomination baffles moderate language. Not only is it a concentrated and magnified nuisance,—for precipitation is the reverse of purification, except in so far as the effluent is concerned,—but it is one the daily disposal of which is a constant source of anxiety. And not only is this the case from day to day, but the outlook for the future is still more menacing. From 30 to 40 tons or upwards of this sludge is daily pumped into boats, and it is understood that, although the material is called, with some justice, a drug, it is put somewhere or other on land, for the value of the ammonia and phosphate it contains, as manure. But of the solid contents of sewage from 15 to 16 per cent. consists of common salt,—chloride of sodium. The ammonia is vaporisable, and if not taken up by vegetation will, at all events, do no harm to the land. It is otherwise with the salt, which must, to some extent, accumulate in the soil on which it is continually sown, with the final result of destroying all useful vegetation.

Such, then, is the actual state of things at Tottenham. The Lea, inoffensive (at least a few days since) as it flows over Tottenham Lock, is polluted immediately below by the contents of the Catch-water Dyke, and, half a mile lower, by what is equal approximately to the contents of from 600,000 to 700,000 gallons of raw sewage a day. At the same time the neighbourhood is infected not only by the odours from the overflow of "treated sewage" but still more by the creation of the foul sludge, the daily removal of which is a nuisance, a cost, and a danger; and the ultimate disposal of which is a problem that no one has cared to face.

We desire, on the present occasion, to keep entirely clear of any debatable matter, and now offer no opinion excepting as to the point, hitherto overlooked by all the advocates of sewage farming, of the accumulating salting of the soil on which sewage is placed. It is also a matter beyond the region of controversy, and



of no small importance to bear in mind, that deodorisation is not disinfection; that chemical precipitation stores up putrescible matter; that the admixture of lime, which precipitates as chalk, doubles the quantity and increases the foulness of the sludge; and that lime, though a clarifier, is not a purifier. It has a certain affinity for sulphur, but is generally inert as to the mischievous elements of sewage. In the A B C process, tried at Crossness; in the phosphate of alumina process (tried at Hertford); in the sulphate of alumina process (tried at Coventry and Nuneaton); in Whitbread's process (tried at Romford); in Hillé's process (now in use at Tottenham); in Holden's process, which was found, according to Mr. Burke ("Sewage Utilisation," p. 19), to increase the amount of putrescible matter in solution; in Goodall's process (abandoned at Leeds); in Hanson's process (also tried at Leeds); at Alton, Balsall Heath, Blackburn, Birmingham, Bromley, Burton-on-Trent, Bradford, Chester, Ealing, Harborne, Leicester, Leytonstone, Luton, Ormesby, Banbury, Cheltenham, Clifton, Coventry, Halifax, Hertford, Hitchin, Leamington, Leeds, Newcastle-under-Lyme, Northampton, Over Darwen, Oxtou, St. Marychurch, Southborough, Tottenham (Higg's process), West Ham, and Worksop, processes employing lime for precipitation have been introduced, and either abandoned, as in the last sixteen places, or admitted to act "only as a palliative," yielding an impure effluent, and a nearly valueless manure. Per-salts of iron have been used as precipitants, but "in practice," Messrs. Robinson & Melliss say, "are found to be too expensive." Experiments on a small scale have been made with various processes, such as Higg's, Dale's, and Dimsdale's, at Croydon, and have been reported on unfavourably. Lenk's process, on a small scale, was tried with good sanitary results, but was very costly. Hydrate of lime, chloride of lime, and alum, have been tried at New Shoreham, and "there are many other patent processes for treatment of water-carried sewage by precipitation, but none of them have been put into practical use."

In a word, all the processes above indicated have been liable to the following grave objections. They have entirely failed to disinfect the sewage matter, and, for the most part, have only imperfectly removed it from the effluent water. They have largely increased the quantity of foul deposit, have kept it in an unmanageable form, and have left it loaded with putrescible matter. Their action in producing manure has been chemically very doubtful, and financially, for the most part, disastrous.

In face of the result of the experience of more than a quarter of a century, it can hardly be seriously contended that it is by any process involving the use of lime, or aiming at the precipitation and storing up of the putrescible contents of sewage, that there is the slightest probability of arriving at a solution of the most difficult chemico-engineering problem of the nineteenth century.

#### FOUR MIDDLESEX PRISONS, AND THEIR SITES.

**I**N the *Builder* of 15th August last (page 214, ante), we adverted to the previous Tuesday's debate, upon the proposals for sale of the prison sites in the Housing of the Working Classes Bill. The Bill, as it so happened, became law on the 14th of that month, and stands as 48 and 49 Vict., c. 72. Its disputed third clause now runs thus:—"In the event of the removal from their present sites of Millbank Penitentiary or Pentonville Penitentiary, it shall be lawful for her Majesty, on the recommendation of the Commissioners of her Majesty's Treasury, and subject to such conditions as they may think reasonable, and in the event of the removal from its present site [sic] of Coldbath Fields Prison, or House of Detention, Clerkenwell, it shall be lawful for the justices of the peace for the county of Middlesex if the justices think fit so to do, to sell and convey those respective sites or any part or parts thereof to the Metropolitan

Board of Works, at a fair market price." Having already commented upon the fiscal and economical sides of the question involved by these sales, we may advantageously say a few words concerning the sites themselves. No one hitherto seems to have noticed how ambiguous is the phrase, "The removal from its present site of Coldbath Fields Prison, or House of Detention, Clerkenwell." Here one site only is specified; two distinct prisons are named. The former structure, now officially designated for all official purposes her Majesty's Prison, Coldbath Fields, is still, as its gateway bears witness, the Middlesex House of Correction (1866). The latter serves, and always did serve, for the Middlesex House of Detention: its portal opposite to Short's-buildings and St. James's-walk is thus inscribed: though formally entitled, under the newly-introduced order of things at the Home Office, her Majesty's Prison, Clerkenwell. We are informed that both establishments are designed to come within purview of the Act; in which case it would appear that the words "or House of Detention, Clerkenwell," should be construed in an additional rather than an alternative sense; and that they were inserted in the clause at the last moment without a corresponding change being made in the context.

Clerkenwell Gaol replaces the former New Prison, which had been built at the close of the seventeenth century on a site immediately south-east of the old Bridewell. At that time, and indeed for long afterwards, the gaol, together with the Bridewell, stood remote on the open and higher ground, between Spa, antique Ducking Pond, or Pipe, Fields, and St. James's (Clerkenwell) Church. To the north-west lay Cut-Throat-lane, renamed Corporation-row in 1774, and Bowling-green-lane. The slopes below were watered by the several springs\* which gave a name to the River of Wells, an affluent of the Fleet. But the idyllic picture drawn for us by Fitz Stephen, coupled with the later favourite interludes and mystery-plays of the London skinkers and the parish clerks, and the favour it had found with residents of quality (*teste* Malcolm) suffered a sorry change. To them succeeded the bear and bull batings of the Restoration; to these again the no less robust and brutal encounters sung by Pope and Gay, until a lower stage of vice and dissipation was reached at Hockley-in-the-Hole,† and thereabouts, as portrayed by Fielding and Charles Dickens. The *Newgate Calendar* contains a circumstantial account of Jack Sheppard's escape, together with his sweetheart, Edgeworth Bess, from this New Prison. Harrison Ainsworth gives the morning of Whitsun Monday, May 25, 1724, as the date of that exploit.‡ Both mention the lofty Bridewell wall which had lasted to be surmounted. The old Bridewell remained until 1804; the New Prison was rebuilt 1774-5; and having been enlarged in 1818 was entirely rebuilt in 1845, on Grindsell's tender for 28,684*l.*, after the plan of the Model Penitentiary at Pentonville, by Mosely. That portion of the existing outer wall which faces the opening into St. James's-buildings, between Nos. 52 and 54, Corporation-row, bears traces of reconstruction after the memorable and fatal attempt at rescue, on December 13, 1867, of the Fenians Casey and Burke. So much of Rosoman (or Rosamond) street as, extending from Clerkenwell-close to the junction of Bowling-green-lane with Corporation-row, bounds the south-western wall, was once known as Bridewell-walk; Woodbridge-street, along the north-eastern wall, is a modern continuation of that thoroughfare from Aylesbury-street, Clerkenwell-green.

Until the new thoroughfare § shall be constructed from Gray's Inn-road to the Angel in Clerkenwell (for it is not in Islington), the wayfarer descends Little Gray's Inn-lane by the

\* Such as the Bad, the Tod (or God), the Fagge's, the Skinners', and the Clerks' Wells; to which may be added Black Mary's Hole, *olim* Blessed Mary's Well, near Backgate Wells.

† The now Ray-street; the Coach and Horses Tavern, facing Back-hill, is styled late Hockley-in-the-Hole. Like to many a tavern with similar surroundings, it boasts of associations with Jack Sheppard and Dick Turpin.

‡ Jack Sheppard, Epoch the Third, chap. iv. But the 25th of May of that year fell on a Sunday.

§ See the *Builder*, vol. xlvii, (December 13, 1894), p. 789.

General Wolfe and the Holborn Workhouse or Elm-street, to the foot of Mount Pleasant. Passing the once famed Two Blue Posts and the Old Cheshire Cheese taverns to his right hand, two mural tablets dated respectively 1720 and 1737,—this one against the wall of No. 41, and that against the wall of Nos. 55 and 57, Mount Pleasant,—will remind him that the names of the buildings have been changed. They were lately known as,—in the order given,—Dorington-street, Baynes-row (or street), Coldbath-square, and Cobham-row. Coldbath-square at first consisted of the two rows that stand nearly north and south: in the space between, originally Sir John Oldcastle's field, is the chalybeate spring whose specific virtues one Mr. Walter Baynes, of the Middle Temple, and owner of the property, discovered in 1697. The bath-house occupies its old position, being approached by a passage between Nos. 25 and 26 in the block which was lately placed down the square in alignment with the former houses. These circumstances are confirmed by the order in which the houses in Coldbath-square are yet numbered. Northwards of the square lay a marshy waste, or public laystall (*vide* the neighbouring Laystall-street), covered with rubbish and refuse heaps, known as Gardiner's Fields or Farm. Appertaining to the Jervoise estate, it lay on the confines of St. Pancras parish. Between the two parishes ran the turbulent, ill-used, noisome Fleet, itself traversed by wooden pipes for conveying water to Gray's Inn-lane from the New River Head. The river's course is distinctly marked by the hollow of Mount Pleasant.\* For the freehold of nine acres the county magistrates paid to Thomas Clarke Jervoise 4,350*l.*; and having raised an additional sum of 62,000*l.* by tonnage shares valued at 100*l.* each, on security of the rates, employed Charles Middleton upon the new works (1794). Just as in the parallel instance of Millbank, the soil proved little better than a morass. The fabric cost nearly 66,000*l.* for but 232 cells; a portion, however, of that amount is said to represent illegitimate gains to some or other of the parties engaged, whilst in other respects much of the work done was highly discreditable. Public humanity had been awakened by the voice of John Howard, who had died four years previously. Nevertheless, there lingered many an old abuse whilst the prejudice against solitary confinement inspired one of the five stanzas which Southey contributed to Coleridge's "Devil's Thoughts." Enlarged in 1830 on such a scale as to render it the finest as it is one of the best appointed goals in the kingdom, and conspicuous for its great treadmill, this prison is used for offenders condemned to hard labour for periods generically styled short sentences. It had narrowly escaped material injury in the riots of July, 1800, constituting an especial object of odium by name of the New Bastille. Already have some of the prisoners been removed to Pentonville, and before many weeks have expired its retributive purpose will know it no more.

In speaking of Howard and of a time when Elizabeth Fry, Romilly, and Buxton had begun their labours, we recall Bentham's words:—"Instead of doing what so many could do if they would, what Howard did for the service of mankind was what scarce any man could have done, and no man would do but himself." To Bentham may be fairly ascribed no small share in settling the plan which forms a leading feature of Millbank Penitentiary. He had put forth his scheme for what he called a panopticon or inspection house. His views found favour with the authorities; the separate-confinement system in ranges of cells so situated that each group shall radiate from one commanding centre, since sufficiently familiar. In 1799 James (Cecil), seventh Earl and first Marquess of Salisbury, sold to the Government (for, it is said, 12,000*l.*) a plot of some sixteen acres by the riverside, between Peterborough, latterly Grosvenor, House (north), and the Halfpenny;

\* *Vide* in Hone's Table Book, vol. iii., cols. 76, 78, an interesting woodcut showing the Fleet as it here appeared in 1826: being the first open view thereof nearest London.



itch (south). \* Millbank takes its name from the old mill, which once stood at the foot of the old College-street, being served by the Mill-itch, a channel of the Aye brook or Tyburn. The bridge by which the mill, with the river-works beyond, was approached from St. Margaret's-lane (Abingdon-street) is said to have lain some feet beneath the present road. The Abbot's Garden and Monastery Garden, lying against that walk were identical with part of the site we speak of, and lay in the southern corner of the City of Westminster, as limited by King Eadgar's charter. The west of the ground, now comprised within St. John's Parish,—flowed the Aye brook, from the neighbouring osier-beds and marshes of Pollenstock and Bulunga Fen, into river estuary at Merfleet. The Aye brook formed a boundary, in part, of the original parish of St. Margaret, as defined in that charter. Strype alludes to the low level and consequent unhealthiness of this quarter, natural advantages which all the builder's art has had to overcome. After considerable delay the "Penitentiary House for London and Middlesex" was opened for the custody of convicts, having been erected by Harvey at a large cost of nearly half a million of money. Its capacity, great as it is, is materially enhanced to the eye by the curtains which connect the several terminal towers.

From the North London Railway, as it crosses the Caledonian-road, a good view presents itself of the imposing entrance gateway of Pentonville Penitentiary. That prison is the embodiment of the "silent" and "military" methods of confinement. In 1832 the commission visited America to inquire into the report upon the much-vaunted system of punishing prisoners as practised at Philadelphia. The result, the late Earl Russell passed an Act, in 1839, for legalising this form of punishment. Thereupon a site was chosen just towards Copenhagen House, and on it, in 1842, was constructed the existing Model Prison,—as it long continued to be called,—at a cost of about 90,000*l*. In the days of transportation to the colonies, all convicts sent thereto were sent hither to work out their preliminary probation, and on terms of strictest rigour. Here within the last few years as many as 1,000 criminals at a time have been confined expiating their offences in sentences all exceeding five years in length. Copenhagen House was situated between the river Maiden and Hagbush lanes, close to, and identical with, the position of the Cattle Market clock-tower. The course of Hagbush-lane cannot be easily determined within the limits of this article; albeit, it would seem to have followed that part of Caledonian-road which is overlooked by the Pentonville Prison. The prison, we should add, whilst in the parish of Islington, is some distance from Pentonville, properly so called.

## NOTES.

**N** incident of much more than passing interest to the archaeologist and architect has just taken place, in the signing by King Humbert of a decree to establish a Byzantine Museum in the ancient city of Ravenna, which stands in melancholy grandeur on the western shore of the Adriatic, far from the hurly-burly of the nineteenth century. Ravenna, indeed, the more Byzantine than Byzantium itself, that was once Byzantium, but is now the modern capital of Constantinople; and there is no city in the world which contains so many relics of the later Roman life, when it was the great Augustan port of Classe, commanding the commerce of the Adriatic and Greece, long before Venice was heard of. Its culminating point of prosperity was at the era when the Visigoths and Goths rose to power, and although the latter were considered barbarians, the most beautiful churches in Ravenna were erected by the Gothic Emperor Theodoric in 493. At the death of Justinian, when the Roman Empire began again to be felt, the city was adorned with new churches, and especially the grave House is marked in Herwood's map, 1799.

those of San Vitale, with its glorious mosaics, and San Apollinari. It may, indeed, be said to be the mausoleum of the ecclesiastical architecture of that period, a characteristic which it retains at the present day, and which is partly owing to the fact of the main line from Bologna to Ancona passing at a considerable distance from it (although it possesses a branch), and partly, that it is situated amongst marshes somewhat notorious for their malarious influences. In its way, Ravenna may be said to offer as much interest as Pompeii and Herculaneum, and although it has never been subjected to the sudden catastrophes which overtook these latter places, it has witnessed the gradual sinking of the soil, and the covering of alluvial layers probably conceals quite as many art treasures as are visible above ground. Systematic investigation and excavation would, doubtless, bring to light a vast amount of archaeological treasure, and it is to be desired that the Italian Government should, ere long, set such an undertaking on foot.

**I**T is to be hoped that the various signs which, according to the opinions of practical business men, seem to point to a revival of the iron and steel trades, may not prove fallacious, for, although it is only one out of many staple industries, it is the one which invariably leads the way to either prosperity or depression. If the rumoured treaty between Great Britain and China becomes *un fait accompli*, we may safely look forward to a "boom" in several of our trades, particularly if the political horizon remains as free from dangerous complications as it has been for the last three months or so. China is a vast region, almost totally *inexploité*, as far as foreign arts and manufactures are concerned; and as the Chinese are essentially an imitative race, the throwing open of that country to English influence, and the expressed intention of the Chinese authorities to commence a railway system, instead of resisting it as before, will give our commerce a start such as it has not had for years, and the iron and engineering trades will be the first to feel the impetus. The proceedings of the Iron and Steel Institute, just concluded at Glasgow, show that, whether business is brisk or dull, the scientific element is always on the increase, and that all the efforts of the modern iron-masters are directed towards obtaining a perfect iron and steel, combined with the utmost economy. The most striking example of this is in the recovery of the tar and ammonia from the waste gases,—things which the iron-master of a couple of generations back would never have dreamed of; but its value is illustrated by the fact that it causes a saving of about 1*s*. 6*d*. in the ton of coal consumed, or 3*s*. in the ton of iron produced. Another great fact is, that by regulating the quantity of silicon in pig-iron, an additional strength of something like 10 per cent. can be obtained, with increased softness, for castings. Silicon pig has hitherto been rather a drug at iron-works, and has been always thrown back into the furnace, whereas it now seems that it forms the most valuable kind of iron for foundry purposes. The substitution of steel for iron is greatly on the increase, mild steel having practically displaced iron in boiler-making, ship and bridge building, and it is even being used at the present time in the construction of a block of warehouses in London, requiring a total of over 8,000 tons in the form of castings.

**T**HE number of historical mansions in the market continues to increase, and offers plenty of chances to those purchasers who like to combine the comfort and dignity of a landed estate with the associations of antiquarian conservatism. Such a one is Ankerwycke, a well-wooded property of some 700 acres, below Windsor on the Buckinghamshire side of the Thames, which bounds it for over two miles. Few places, indeed, are identified so conspicuously with the salient landmarks of English history, for, included in the grounds, is the island of Magna Charta, on which King John granted the liberties of the land to his Barons in 1215, or, as Matthew of Paris hath it, "prope Villam de Stanes, juxta flumen

Thamesie, in quadam insulâ." This seems to dispose of the oft-disputed question as to whether the charter was signed on the island or on the adjacent Surrey meadow of Runnymede; but, at all events, a one-time lord of the manor decided it in favour of the former in 1834, and built a room close to the landing-place, in which he deposited a copy of the charter. At the same time he erected the picturesque cottage residence close by, so well known to boating men. This, however, is not the only antiquarian interest attached to Ankerwycke, for near the residence are the remains of a Benedictine nunnery founded *temp.* Henry II. by Sir Gilbert de Montfichet, which met with much gracious favour in a subsequent reign, Henry III. having confirmed by a charter all the donations made to it. At the Dissolution it came into the possession of Lord Windsor. Another object of note is a famous old yew tree, which, according to tradition, witnessed many true love meetings between Anne Boleyn and the royal Blue Beard, Henry VIII.

**A**N interesting discovery has just been made at Bonn. In digging at the foundations of a portion of the Cathedral Church, for purposes of restoration, the workmen came upon an inscribed votive tablet rather more than 6 ft. long and 3 ft. wide. The tablet has been presented to the provincial museum of Bonn. The upper part of the inscription is unhappily not quite complete, as the top of the stone has been broken away. What remains cannot as yet be completely made out, as in places the letters are rendered illegible by a hard coating of mortar. Enough however appears at the first reading to show that the stone is of the highest historical importance. The name of the Emperor Antoninus Pius can be clearly made out. The stone is a votive offering in his honour, dating therefore A.D. 138-161. The name of the Roman governor of the town, Claudius Julianus, by whose order the stone was set up, also appears. Claudius Julianus is already known from monuments and literary sources. In all probability the stone belongs to the last year of the emperor's reign, A.D. 160. Our account is taken from the last issue (Sept. 5) of the *Berliner Philologische Wochenschrift*.

**T**HE Railway and Canal Traders' Association propose a fresh test question for Parliamentary candidates in connexion with the objects of their society. The council considers that candidates should be asked their views upon the unjust preference shown by the railway companies to foreign traders, and the charges for station accommodation levied by the companies in addition to their authorised maximum rates, and is of opinion that no candidate should be supported unless pledged to protect the interests of railway freighters in relation to such subjects. This association has been very energetic in endeavouring to promote the interests of freighters, and the necessity for candidates to inform themselves upon this subject and to interest themselves in it is apparent. But it is, perhaps, doubtful policy to add this to the already long list of test questions. It is pretty certain that a large proportion of the hundred or more members representing the railway interest in the House of Commons would hesitate to give a favourable reply to these questions,—or, at least, to give an unqualified pledge, whether inter-rogated by friends or opponents,—and the result might be a loss to Parliament of some useful and experienced members. By all means let the objects of the Association be constantly kept before the public and Parliament, but persistence in forcing it upon candidates may in some cases be somewhat injudicious.

**A** FINE statue has recently been acquired by the authorities of the Louvre. It represents a god leaning against a tree, and holding in his hand a lyre formed from a tortoise-shell. It has been placed where the famous Artemis of Versailles used to stand, a group which was some time ago removed to the new La Caze Hall. The new statue cost 16,000 francs.



THE proposed International Exhibition in Edinburgh, next year, may now be held as in the way of being fulfilled. The guarantee fund has been subscribed to within 2,000*l.* of the required amount, the committee have received promises for more than the balance, and the Town Council have granted the use of the West Meadows as a site for the building. The site is in all respects a suitable one, within the city bounds, of easy access, surrounded by belts of fine trees, and comprising an extent of twenty acres. The space will not only afford room for the Exhibition buildings, but for those accessories which are now looked for as a necessary accompaniment of such exhibitions, and the clumps of trees and shrubs which diversify the flat surface of the ground are so situated as to be effectively utilised as adjuncts to the appendages to the Exhibition, one of which is to be a bit of Old Edinburgh, after the manner of that of "Old London" at the Kensington exhibitions. Already a number of applications for space have come from various Governments and firms in this country, and it is expected that many of those who may come to the American and the Indian and Colonial Exhibitions to be held in London will find their way to Edinburgh. Should the Exhibition prove a financial success it is hoped that from the surplus funds a permanent site may be obtained for future exhibitions.

FORMER visitors to the city, who renew their acquaintance with it during the Exhibition year, will find new objects of interest. The new City Cross, a replica of that described in Scott's "Marmion," which is now being vigorously carried on, will then be completed; the Museum of Science and Art will also be completed so far as regards the exterior, the operations in connexion with the west wing being now in full swing; and the foundations for Dr. Rowan Anderson's building for the Historical Portrait Gallery and Antiquarian Museum are now laid, and some portion of the façade will doubtless be in such a state as to enable one to conceive the effect of the whole. This will be one of the most striking buildings in the city, not only as regards style, but also as regards the material chosen, which is red sandstone. This material has hitherto been used in Edinburgh merely for shafts and minor details, but where, as in the Hydropathic establishment at Peebles, the whole body of the building is built of it, the effect is rich and striking.

CONSIDERABLE attention has lately been drawn to the supply and consumption of copper, an article of which the production is of the greatest possible interest, not only to the building trades, but to the community at large. Indeed, the latter section of society should be more interested in the question than the wholesale consumer, who, of course, participates in the fall of prices whenever these occur, as at present; but the retail purchasers, for their part, gain no advantage, as everybody knows who wishes to buy copper and brass household goods. As a matter of fact, both the production and consumption of copper have marvelously increased of late years, the former having risen from 149,156 tons in 1879 to 208,313 in 1884. The largest contributor to this increase is the United States, which yielded about 40,000 tons over and above the output of 1879. The richness of America in this respect may be gathered from the figures of last year, which were 63,950 tons, Spain and Portugal coming next with 43,664, and Chili with 41,648. From these the drop is very marked, Germany yielding only 14,782 tons, and Australia 13,300, all the other producing countries being on a very small scale. Japan, however, shows 6,000 tons, which looks as if she might come to the fore in the future the production of 1879 being but 1,900 tons. The consumption of copper in England and France is greatly increased, there having been, in round numbers, 551,000 tons used between the 1st of January, 1881, and the 1st of August, 1884, while the receipts were only 547,000 tons. This, of course, means that stocks have been reduced to make up the deficiency, the average condition of stocks being

from 50,000 to 60,000 tons, while at the end of last year they were estimated at only 40,000. What is more to the point for consumers, is the fact that prices have rapidly gone down between 1881 and 1884 from 62*l.* per ton to 42*l.*, by far the lowest price ever known, and at least 30 per cent. below what the trade has hitherto considered safe and moderate. If stocks again accumulate (as they are beginning to do now), prices will probably rise, for this reason,—there are comparatively few really paying mines, but a great number of small concerns which can only get along when times are good and prices high. If the present low prices continue, many of these will probably go under water, lessening the total production, and throwing it more into the hands of the few large producers. Still, it is very unlikely that the former high prices will ever again prevail, and it will be wise for the retail merchant of copper and brass goods to carefully review the situation, and substitute a more moderate rate for the present high and arbitrary one. If they lower prices in proportion to the value of the material, they will soon find an enormously increased demand on the part of the purchasing public.

THE Archeological Society at Athens is about to undertake the completion of the excavations at Olympia. As is well known, the Germans, owing to failure both of time and funds, were unable to complete the work they had begun; in particular, a large portion of the northwest corner of the plain, containing the foundations of the great gymnasium, had to be left unexplored. All the same, German authorities hold,—and very confidently express their opinion,—that little of importance remains to be discovered. We fear they are right, but still hope they may prove wrong.

WE learn that Mr. P. Kabbadias has been appointed to fill the place of Director of Antiquities at Athens, left vacant by the death of Mr. Stamatakis. Mr. Kabbadias received his archaeological education in Germany, and brings to his work the sound basis of professional training, as well as patriotic enthusiasm. He is already well known to the archaeological world by researches published in the *Athenaion* and *Ephemeris Archaeologica*.

THE Trades' Union Congress seems more than ever disposed to lapse into an organisation for the discussion of party politics and the recommendation of class legislation. This latter charge would, no doubt, astonish the members of the congress, whose notion of "class legislation" is legislation carried out in the interests of any class except the artisan, while legislation in the interest of the artisan is in the interest of the State: for the trade union of to-day ejaculates its "*L'état, c'est moi*," with as much emphasis as any irresponsible monarch. The President's address contained some of the most original recommendations for promoting the national welfare that have been heard of. The main point was the establishment of an eight hours movement, on the ground that many now unemployed would find employment under the more restricted time of productive labour, more hands being employed to do the same work. In what way this is to contribute to the prosperity of "the State" is not very apparent. We are constantly, and even pugnaciously informed that the whole well-being of the country depends upon the artisan and the productive work which he accomplishes. But if the country is in a bad way, let us do less work and all will come right! In a subsequent discussion much fault was found with the Government for their manner of appointing additional inspectors of mines, by compelling them to pass an examination, and stopping out working miners who wished to be inspectors and could not pass the examination. It is fortunate that the Government still retain an old-fashioned prejudice in favour of appointing men of some general culture and scientific acquirements for such important and responsible posts. What sort of logic and impartiality of judgment we should get from pro-

moting the man "from the pick's point" to the post of inspector, we may gather only too well from the tone and temper of much of the speaking at the Congress.

#### LIVERPOOL AUTUMN EXHIBITION.

THE fifteenth annual exhibition under the auspices of the Liverpool Corporation opened to the public on Monday, the 7th inst., and is, on the whole, fully equal to those of preceding years. There may not be any picture of such surpassing merit as to monopolise the attention of visitors, but the class of work is in general of a high order, and it is satisfactory to see that the number of provincial and local exhibitors is on the increase. The number of works of art comprised in the catalogue is 1,462.

The London galleries, as usual, contribute considerably to make up this total, and among those which will prove old acquaintances to the visitors of this year's Royal Academy, may be mentioned the following:—"Music" (a frieze), Sir F. Leighton, P.R.A.; "Enone," P. H. Calderon, R.A.; "The Rapids of Niagara," Colin Hunter, A.R.A.; "Victory," W. H. Overend; "Don Quixote and the Galley Slaves," J. E. Hodgson, R.A.; "When the Children are Asleep," Thos. Faed, R.A.; "Absolution for the Lost at Sea," &c., A. C. Gow, A.R.A.; "Done Work," W. B. Davies, R.A.; "The First Prince of Wales," P. R. Morris, R.A.; "Ulysses," &c., H. Mann; "Queen of the Tournament," F. W. W. Topham; "Cup and Ball," C. E. Perugini; "John Knox at Holyrood," W. P. Frith, R.A.; "Found," H. H. Koser, A.R.A.; "William III. at the Battle of London," Ernest Crofts, A.R.A.; "The Royal Fugitive," D. W. Wynfield; "After the Battle: Arrival of Lord Wolsley and Staff at the Bridge of Tel-el-Kebirat the Close of the Action," Mrs. Elizabeth Butler. Among the leading works from the last Grosvenor Gallery exhibition are Mr. Watts's "Love and Life," and Mr. Mitchell's "Hypatia," and Mr. Walter Crane's fine decorative design, "Freedom," to which we have before referred. As we have already noticed the pictures of the late Royal Academy Exhibition, it is unnecessary to mention them further here, but it will be seen that Liverpool has secured a very large share of the works of the London artists of the year.

Among the more important works are two, Nos. 174 and 175, by Mr. G. F. Watts, "Love and Life," which was recently at the Grosvenor Gallery, and "The Minotaur." These pictures are hung side by side. The latter, which has never before been publicly exhibited, represents a hideous beast with bull's body and head, and lion's claws, under one of which it crushes an unfortunate small bird. These two works are intended to form an allegory which the artist in a note says "explains his idea of the real mission of art, not to amuse, but to illustrate and embody the mental forms of the beautiful and the noble, interpreting them as poetry does, and to hold up to detestation that bestial and brutal." His aim is, no doubt, a very noble one, and in these two works the motif of the contrast is obvious enough, much more so than that of "Love and Life" by itself; but the idea of painting "with a moral" has its artistic dangers, which have already shipwrecked Mr. Watts more than once.

Among other figure and historical pictures, many of them deserving of more special reference than our space can afford, are Mr. E. H. Corbould's "Death of Turcin" (No. 804 in catalogue), an elaborate watercolour, clever in execution, but wanting in power; and "Wycliff on Trial," a work by Mr. Ford Madox Brown, where the scene is laid in the Lady Chapel of Old St. Paul's, London. The style is somewhat hard and realistic, and the architecture rather feebly drawn; there is also throughout an absence of definite light and shadow.

"Motherless," by R. C. Hutchinson (No. 1,007) is a large picture of a family of cottage children. A highly-finished and cleverly-executed work by Mr. Haynes Williams, called "An Interruption in the Dance," may also be noted.

There are not many portraits, but the few are generally good; and among them we were again particularly struck with that by Mr. Stuart Wortley (1,076), of "Maude, Daughter of Chas. Waller, Esq.," which we briefly alluded to in our notice of the Grosvenor Gallery this year. The child is dressed in a buff frock, with dark brown belt, and with a perfectly plain background. This simple and unaffected, but refined, little picture, is one of the most successful portraits



of girlhood we ever saw, and marks a decided step in the work of its artist.

There is also a charming cabinet-sized picture by Mr. J. H. Henshall (which he calls "Thoughts"), of a girl with a book in her hand sitting in a library, and with the most perfect expression of "thought" in her pretty and well-drawn face,—a most fascinating figure.

Besides the landscape called "Found,"—purchased under the Chantry Bequest,—there is a second landscape exhibited by Mr. Herkomer (1,027), "The Fire Wreath of Spring." With very considerable power, especially in the drawing of the rocks in the foreground, it is not, perhaps, as striking as the first named, but it is no doubt a fine picture. We looked round, however, for some of his portraits, and cannot say that we felt their absence entirely compensated for, even by the presence of these undoubted evidences of the artist's ability as a painter of mountain landscape.

No. 1,008, "Wintry March," by W. L. Picknell, is a moor scene with gorse and bushes in foreground and dark firs on the left. The distances are very true in tone, and the blowy grey sky looks as if it was travelling. This is, perhaps, the best landscape in the exhibition, but why all it is "Wintry March"? Sometimes there are snow and ice in that month, whereas here all green, and the gorse showing itself early.

No. 930, "Yon Burn Side," by G. W. Johnson, is a thoroughly good transcript of nature, one of her pleasantest phases. Bright and sunny, and true in tone, it is a much more pleasing picture than many larger and more retentive landscapes. Of this class may be mentioned No. 937, "Morning in Early Spring," J. W. North, R.W.S.; 954, "Summer, Dutch Landscape," W. B. Tholen; 1,101, "The Sea of a Rainy Day," J. Horace Hooper; 992, "Salmon Stream, Perthshire," Wellwood Ratay; and others.

Among the water-colour landscapes which are particularly good, are six drawings "Reinforcements of the Yrway Valley," most of them pretty bright transcripts of Welsh scenes, and one treated as an evening effect. These are by Mr. Peter Ghent (a Liverpool artist), and have been bought by the Liverpool Corporation as possessing a sort of historic interest, illustrating the site of the New Liverpool Water Scheme. Mr. Thomas Huson, also a Liverpool artist, has some good drawings, among them being "The Burning of the Liverpool Landing Stage, July 28th, 1874," a clever effect of light and shadow. This picture (in oil) has been presented to the Corporation by the Rev. J. Miles.

Several other Liverpool artists should be notably mentioned, especially as water-colour painters, among them Messrs. A. Cox, Isaac Cook, Finnie, Pedder, George Cockram, and others.

The Impressionists are strongly represented. No doubt there are in some of their pictures indications of genius, but the evidences of surdity are too often still more apparent. Take, for instance, the picture of Mr. Thomas (the Dow, of "Hudson River," where the upper part of the picture (foreground and middle distance) is simply indicated by colours, and ghostlike forms resembling the first oblong-in of details about to be painted. The public have impressions as well as artists, and believe that the impression of a very large proportion of intelligent spectators in these cases would be that if the artist would kindly cease the trouble to finish his picture the effect would be greatly improved. One peculiarity of these half-finished works of art is that they are generally very sumptuously got up as to their mounting, &c.:

"And if their picture we are forced to blame,  
We'll say most handsome things about the frame."

With respect to the architectural drawings in this exhibition, they are neither very numerous, nor very important, though there appear to be some good designs and drawings among them. We do not give them the amount of notice that might be expected, we beg to say that they are seen under great difficulty and to great disadvantage, hung as they are on a staircase and a gallery, and it is impossible to give them the attention they deserve from the constant disturbance by the passing and resting of those coming in and out of the Exhibition rooms. Moreover, they are many of them hung so high that the details are lost. Among those that are hung may be mentioned a design for Liverpool Cathedral, view from the east, by Mr. R. P. Pullan (a Gothic design

with no very novel features, and hung so inconveniently that its detail cannot be judged of); Institute and Baths, Tamworth, by Messrs. Douglas & Fordham (a "Domestic Gothic" design possessing good character and detail, with half-timbered gables); a Design for Memorial Church at St. Petersburg, by Mr. R. P. Pullan (a Byzantine design, with dome); Board Schools, Webster-road, Liverpool, by Messrs. C. O. Ellison & Son (Cottage style, showing long front, and half-timbered gables); Business Premises for Messrs. Litherland & Co., by Messrs. C. O. Ellison & Son; New House, Oxton, Cheshire, by Mr. D. Walker; a Residence in Sefton Park, Liverpool, by Mr. Geo. Rushforth; House in Sefton Park, by Messrs. H. & B. P. Fry, &c. An Interior from the Church of St. Madeleine, Troyes, is a fine water-colour drawing, by Mr. C. G. Moundcell; another of the "North-east Chancel, Manchester Cathedral," is contributed by Mr. Alfred Goodfellow; and there are some designs for ceiling decorations by Mr. J. D. Crace, &c.

There are some good pieces of sculpture, including "Ruth and Naomi," by Mr. Warrington Wood. A terra-cotta bust of Mr. Finnie, the painter, is exhibited by Miss Evangeline Stirling, who is a Liverpool artist.

#### THE ARCHITECTURAL ASSOCIATION.

VISIT TO GUILDFORD.

The Architectural Association made their fifth Saturday Afternoon excursion on the 5th inst., to Guildford, under the guidance of Mr. Cole A. Adams.

The first building visited was the parish church of St. Mary, in Quarry-street. The position of this church on the slope of the hill is very picturesque, and the steep slope of the site has been the cause of raising the floors of the chancel and two chapels on either side some 4 ft. above the floor of the nave and aisles. This church was restored by Mr. Goodchild in 1863, but still presents a great many interesting features. It consists of a nave, 17 ft. 3 in. wide, and two very wide aisles, the total width of the church being 55 ft. 6 in., and the length 90 ft. The two aisles terminate in chapels dedicated to St. Mary and St. John; these have apical ends. The chancel also formerly terminated in an apse, but it was pulled down and the chancel shortened and a square end built in order to widen the street. This was done, it is commonly reported by the inhabitants of Guildford, to improve the road used by George IV. in passing through the town! There is a low square tower at the intersection of the nave and chancel. The oldest part of the church is Norman, but considerable alterations were made in the thirteenth century, when the aisles were widened and the chapels and chancel built. The nave arcade has circular pillars with well-carved capitals; these support slightly pointed arches. The corbels supporting the roof are also vigorous specimens of carving. The Chapel of St. John, on the north side of the church, has a vaulted ceiling of Early English date, decorated with outline frescoes, which have now become very indistinct; they are attributed to William the Florentine, who lived in the reign of Henry III. The subjects are: On the north spandrel, St. Michael weighing the merits of a human soul, with a demon trying to depress the scale; on the south, an angel giving two souls to a horned demon. The south chapel is dedicated to St. Mary; in both of the chapels are large hagioscopes, the line of which proves how much shorter the chancel is, as they now do not look on the present altar. There are also some openings in the west wall of the church which are supposed to have been for worshippers who were unable to get into the church. In the south chapel are the remains of a curious Perpendicular screen which was formerly part of the confessional and stood in the Chapel of St. John-the-Baptist, which was then used as a vestry. The east end of the church, with the circular roofs to the aisles, is the most interesting part of the exterior.

The visitors then proceeded to the castle, which now stands in the grounds of a boys' school, but it has been purchased by the Corporation, and it is intended to make public gardens round the castle, and throw the ruins open to the public. There is not much remaining of architectural interest in the castle, the square Norman keep, about 70 ft. high, being the principal feature. There is, however, a good

archway belonging to the outworks. The date of the keep is about 1150; it stands on a mound which is partly natural and partly artificial. The walls are 10 ft. thick, constructed of chalk-flint and sandstone, with a ragstone facing, having square quoins at the angles. There were three stories in the keep, the level of the principal floor being about 16 ft. from the ground. The entrance to this floor still exists, the date of the mouldings being Late Norman; the arch is circular inside and pointed outside. The hall measured about 26 ft. square. On the north side is the fireplace. The hall was lighted by three Norman windows; these have been repaired at some later period with bricks. In the south-west angle is a chamber that was probably used as an oratory; it contains some carving of a religious character and a Norman arcade. The staircase was at the north-west angle.

The next place visited was a curious crypt under 115, High-street, now used as a wine-vault. The local tradition is that this was an underground passage from the castle, there being a similar vaulted chamber on the opposite side of the street; but this is hardly probable, and it seems to be a great deal more probable that these were the crypts of religious buildings situate in the High-street.

The town-hall was next inspected. This is an interesting seventeenth-century building, the front being principally of wood. The projecting clock is an elaborate piece of work, and gives a very picturesque appearance to the building. The only rooms of interest in the building are the hall and council-chamber. The hall contains the portraits of Charles II. and James II., by Lely. The council-chamber, which is panelled to the ceiling, and has windows opening out to the balcony, contains an interesting old mantelpiece, which was brought from Stoughton House, in the parish of Stoke. The carvings on the frieze are said to represent the four human temperaments,—sanguineus, cholericus, phlegmaticus, and melancholicus. Over the fireplace hang the javelin which is carried before the mayor when he walks in procession in the town, and the beadle's staff. The two historic staffs presented to the town are not kept at the Town-hall.

The party then passed to the Abbot's Hospital, calling on their way to look at a fine Jacobean staircase at Mr. Booth's house. The hospital, founded by Archbishop Abbot in 1619, for the support of one master, twelve brethren, and eight sisters, all being over sixty years of age, was the most interesting building visited. The entrance to the hospital is through a handsome gateway which leads into a small quadrangle, the master's room being on the right, and over the gateway the chapel and dining-room in front, and the men's apartments on the left hand and the women's on the right. The building is full of most interesting detail, and has been carefully preserved. The master staircase is a splendid specimen of seventeenth century woodwork, the string being elaborately carved. Each string is of different design, the newels,  $\frac{7}{8}$  in. square, having richly moulded and carved tops, the handrail being carried on a ramped arcading the columns of which have Ionic voluted caps and richly-carved shafts. The door-frames are very interesting, having varied stops to the mouldings, while the doors are elaborately panelled. The room over the gateway, which was used by the Archbishop when he stopped in Guildford, has a good carved wooden mantelpiece, and is panelled throughout. There are some interesting sideboards and tables, and two chairs with stamped leather seats and backs of quaint design in this room. The pictures are portraits of Wycliffe and Fox. The room over this, called the strong room, was used to confine the Duke of Monmouth in after his defeat at the Battle of Sedgemoor on his way up to London. The Common Hall contains the original tables and forms, which are very solid and of good design. The fireplace is very good, and the old carved settle in front is the *beau idéal* of snugness. The chapel contains two stained-glass windows of Dutch character, which are stated to have been taken by Archbishop Abbot from the Priory buildings in the town. They are said to have been designed by Albert Dürer, but they are certainly not equal to his general work. The story is that of the patriarch Jacob, beginning in the west window:—1. Isaac telling Esau to get venison. 2. Rebecca showing Jacob how to supplant his brother. 3. Jacob with wife



and children. 4. Interview of Jacob and Laban on Mount Gilead. 5. Jacob in prayer.

The next building visited was the Grammar School, which was built in the early part of the reign of Henry VIII. The building has not much architectural interest. The jointing of the stonework is ornamented with chips of stone inserted in the mortar. The school-room contains the original desks for the head-master and ushers, with curious cupboards in the arms of the chairs for the books used in the school. The library contains the collection of Bishop Parkhurst, who died in 1574,—a not very large collection of books with the original chains attached for securing them to the desks.

The Church of the Holy Trinity was visited for the purpose of inspecting the tomb of Archbishop Abbot, who was buried in the church. The tomb is a good specimen of seventeenth-century design, the bases of the pillars being formed of books laid alternately so as to break joint. There are a few interesting tombs in the church. The building itself is a good example of eighteenth-century work.

#### STONE-WORKING MACHINERY AT THE INVENTIONS EXHIBITION.

In a former issue we made brief mention of the exhibit of stone-dressing machinery shown by Messrs. Brunton & Trier at the Inventions Exhibition, and we then stated that we should return to the subject again. We now illustrate in fig. 1, one of the principal machines shown at the Exhibition. As, however, Messrs. Brunton & Trier show a lathe on their stand, we will follow the usual practice and deal with that first. The tool in question is only of moderate size compared to some made by this firm. It will turn posts 23 in. diameter and 6 ft. long as a maximum, whilst some of

deep, can be taken with the machines in question, working with the rotating cutters, and this with a traverse of  $\frac{1}{2}$  in. a minute, the working making about twenty revolutions a minute. The accuracy with which columns and pillars can be made is, of course, absolute, and this, too, without the employment of highly-skilled labour. Perhaps, however, the greatest advantage is in the surface left. This is unstunned, as no percussive force is used in removing the surplus material. The surface, too, is so good that, as we are informed, the polishing can be done in less than a quarter of the time required for hand-worked stone.

The side-dressing machine to which we have made reference, and which is illustrated in fig. 1, is used for surface-dressing any kind of soft stone, such, for instance, as Longridge, Red Mansfield, or Dumfries. The reason it is not used for granite is on account of the difficulty of holding the latter stone securely, so that it will not yield to the side pressure of the cutters. On this account the very hard stones have to be dealt with by a top dresser. The machine consists of a massive vertical standard carrying the slide in which the chuck-shaft revolves. Fig. 2,

shows the machine in question the track is 2 ft. in diameter, and the cutters are each 8 in. in diameter. If the chuck runs at 300 revolutions a minute, the rotation given to the cutters by the geared wheels will be 900 turns a minute. The parts of the machine shown, of course, be accurately designed, and in such a case there is no attrition on the cutters at all, excepting that which is due to the traversing of the stone on the table. This, however, is very trifling in extent, and produces no appreciable heating, whilst the cutting edge lasts a very long time. The speed with which the cutters pass over the stone without causing sparks is very remarkable,—2,000 ft. a minute is, we understand, a usual speed, and, indeed, it is said that the higher the cutting speed the more effective is the machine. The chuck spindle is driven by the belt pulley on the opposite side of the standard, the driving shaft for the cutter-gearing (marked *k* in fig. 2), which revolves within the hollow chuck

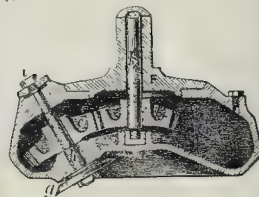


Fig. 2.

spindle, is also driven by a smaller belt pulley, shown in our illustration. The spindles are mounted in a slide or saddle, as shown, and this is given a vertical movement by means of the leading screw and bevel gearing shown, the latter being actuated in either direction by

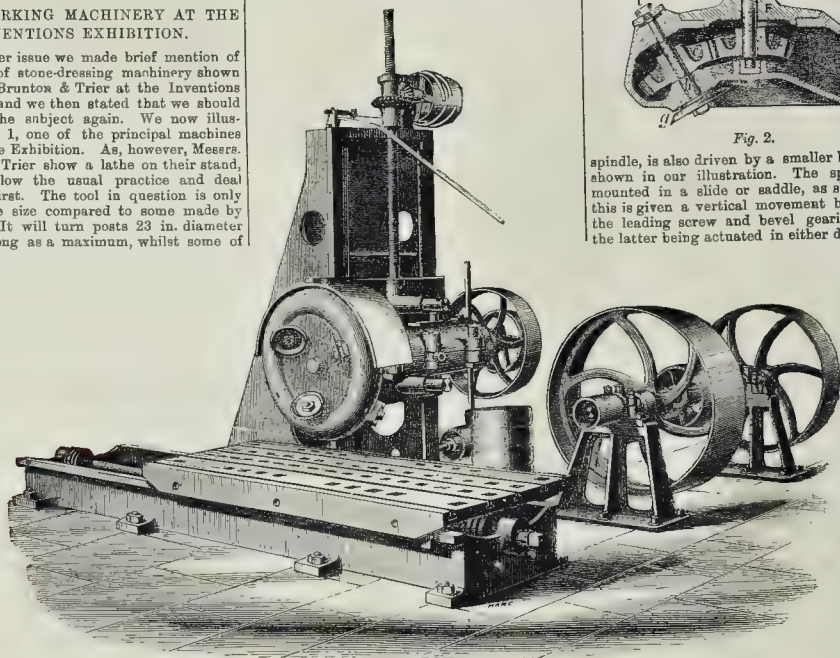


Fig. 1.

Messrs. Brunton & Trier's lathes are used for turning up granite columns 3 ft. 6 in. in diameter and 20 ft. long. The lathe is double-gear, and the work revolves between centres in the ordinary way. The bed is double on each side, so that there is no overhang of the slide-rest. The latter is of the ordinary type of compound rest, excepting that the tool-box forms a bearing for the horizontal spindle, to which the circular rotating cutter is attached. This cutter is in the form of the frustum of a hollow cone, the cutting edge being the base. The latter is brought in contact with the work as it revolves and in turn is caused to revolve by the rolling contact of the stone. These cutters are made of cast-steel hardened, and the traverse of the tool is automatic. There are two slide-rests, one on each side of the work, the bed being alike on each side for the purpose. This, together with the excellent design and massive nature of the whole tool, allows very small columns to be turned, such, for instance, as those used in Gothic architectural ornamentation. For this purpose granite columns 4 in. in diameter and 6 ft. long have been turned in one of these lathes.

At the Exhibition a granite post was being turned up at the time of our visit. Only a light chip was being taken, but Mr. Brunton tells us that a cut 1 in., and even  $1\frac{1}{2}$  in.

gives a section of this chuck showing one of the revolving cutters, *g*. Each cutter is mounted on a spindle, *h*, which has on it the toothed wheel *i*, the whole of the wheels on the cutter spindles gearing into the central wheel, *b*. The chuck is carried on a hollow shaft, *f*, inside which the shaft *k* revolves. Six cutters can be mounted on the chuck, but the whole of them are not always used; in our illustration fig. 1 only three are shown in position. The reason that the cutters have a positive motion imparted to them is because these dressing-machines do not always have the cutters on the work, and were they allowed to run freely they would require a fresh impulse each time they were brought again to their work. This would produce a certain amount of attrition calculated to injure the cutting edge. In the lathe, on the other hand, the cutter is always on the work, so that when once started there is no break in its rotation; in addition to which the lathe-cutters are of light steel, whilst the cutters of the machine in question are chilled cast iron, and therefore considerably heavier. The speed at which the cutters are rotated on their own axes by the geared wheels is so adjusted that it will correspond to the speed that is due to the path or "track" described by the cutters as they revolve in the chuck around the axis of the latter. For in-

belts on fast and loose pulleys. In this way the chuck can be raised or lowered to suit the work. The traversing is done by means of a shaft and gearing beneath the table; the latter running on a suitable frame. The cutter spindles are made of considerable length, with long bearing surfaces. The working pressure is against a back centre-pin of phosphor bronze. An important feature in connexion with this part of the work is the lubrication of the spindle-journals, and their bearings. Grease and oil were found very unsatisfactory, and after much trouble the present arrangement was devised. The gearing-spindle, *k* in fig. 2, is bored throughout its length, and an india-rubber pipe is inserted into it beyond the pulley-wheel. In this way soap and water is introduced, which flows through and fills the hollow chuck, so giving lubrication to all wearing surfaces. The soap and water which escapes washes out the grit. This arrangement has been found to work very satisfactorily.

A machine similar to the one shown at the Exhibition was supplied to Messrs. H. & T. Martin, the well-known Belfast contractors, in 1881, having been in constant use up to the present date, and, so far as we know, is still in operation. We are informed that with this machine 300 to 350 square feet of hard sandstone are faced in a day as a regular thing;



Messrs. Martin speak very highly of the machine, which they say has never given them the slightest trouble in working.

Messrs. Brunton & Trier also show on their stand photographs of other types of side dressing-machines, among them a large size one similar in general design to that just described, which will dress stones up to 2 ft. 6 in. square and 7 ft. long. The chuck has three cutters, and makes 350 revolutions a minute. The feed of travel of the table is 20 in. to 36 in. per minute. This machine requires 5 to 6 h.p. to drive it. Another side cutter has an internal chuck 8 ft. 6 in. in diameter, which makes eighty-nine revolutions a minute. There are twelve cutters, which may be arranged in four sets of three steps, in three sets of four steps, in two sets of six steps; the rate of travel of the table being arranged accordingly between 20 and 20 inches per minute. This will take work up to 3 ft. 6 in. wide, and, by inclining the bed, stones up to 9 ft. long can be dressed. The chuck neither rises nor falls, but moves in a horizontal direction for bringing it to the work.

steps, and other work of this description. The chuck makes 300 revolutions a minute. The bed is 13 ft. long, and the table 9 ft. by 3 ft. 6 in., there being side brackets to increase its width up to 5 ft. It will dress breadths of 17 in. at one travel,—of 2 ft. 3 in. in two breadths, or up to 4 ft. or 5 ft. in three or four breadths. The speed of travel of the table is 1 ft. to 2 ft. per minute, according to the work. It will take stones 3 ft. 6 in. high, and requires 8 to 10 horse power to drive it. The trains of gearing by which the various motions are obtained are so clearly shown in the engraving as not to require further description. This tool is not shown in the Exhibition, but we have included it in our notice, as it cannot fail to be of interest to those engaged in work of this description. Smaller machines are made, and there is a special tool which is attached to the cross slide, for monumental work requiring very fine arrises.

We now turn to a different type of machine, an example of which is shown in practical work at the Exhibition. This is a stone angling and

means of adjustment is obtained in this direction. The chucks are rotated by a suitable arrangement of bevel gearing off one shaft and the table carrying the work traverses automatically. A separate cutter for roughing out is placed at the side and can be used or not as required. We have no details of the speed at which this machine will work, but from the little we saw of its action at the Exhibition there can be no doubt it is a very effective tool. On Messrs. Brunton & Trier's stand is also shown Trier's grindstone dresser. This consists

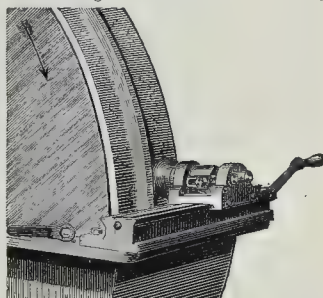


Fig. 4.

of a cutter of the same type as those already described fitted on a slide-rest, by which the stone is simply turned up true. Our illustration, fig. 4, shows this effective apparatus.

#### THE SEA-DEFENCE WORKS AT HOVE.

THESE works, having now been in progress for five years, are so far completed that the east foreshore, where the encroachments of the sea were greater than at any other point, may be said to be permanently protected. The works at Hove commenced as far back as September, 1880, and have involved an expenditure of upwards of 60,000*l.*, two-thirds of which sum has been expended by the Hove Commissioners, the remainder having been the cost of the works constructed by the West Brighton Estate Company and other owners of property.

Up to January, 1880, the Hove foreshore had for many years gradually received such accretions of shingle naturally, as to form a complete barrier to the action of the sea; but about the time named, the effects of the pier extension at Shoreham Harbour became so apparent, that the Commissioners' engineer, Mr. Ellice-Clark, advised the construction of groynes. These works were pushed on with, but towards the end of 1882 the encroachments had become so serious that it was clear groynes alone would not serve to protect the large expanse of lawns abutting on the sea at Brunswick-terrace. The supply of shingle, which naturally comes from the west, had practically ceased, owing largely to the projection of the Shoreham Harbour west pier, and to the extensive erection of groynes between Bognor and Hove. This being so, and the destruction of the west portion of the lawns being imminent, Mr. Ellice-Clark advised the erection of a sea-wall at the most dangerous place, as a first instalment of this mode of protection, to be ultimately continued along the entire front, about one mile and a quarter. The Commissioners having then expended nearly 10,000*l.* on the works, determined to fortify themselves with a second opinion, and consulted Sir John Coode, with a view to his reporting on the whole question of the sea defences, the result being that this eminent authority advised the immediate erection of the wall along the lawns,—a distance of about 720 yards. Consequently, in 1883, this scheme was let by tender to Messrs. Hill & Co., of Gosport, and in March, 1884, the first concrete block was laid, in the presence of the Municipal Engineers' Association. The extraordinary summer of 1884, coupled with the great energy of the contractors, enabled the work to proceed with such rapidity that previously to the equinoctial gales in October of the same year, the wall, as a sea-defence, was practically completed.

The wall is, for the most part, 24 ft. in height above the foundations, it is 8 ft. 6 in. in width at the base and 3 ft. wide at the top, having counterforts every 12 ft., 6 ft. in length and 4 ft. 6 in. in depth. The outer part of the wall

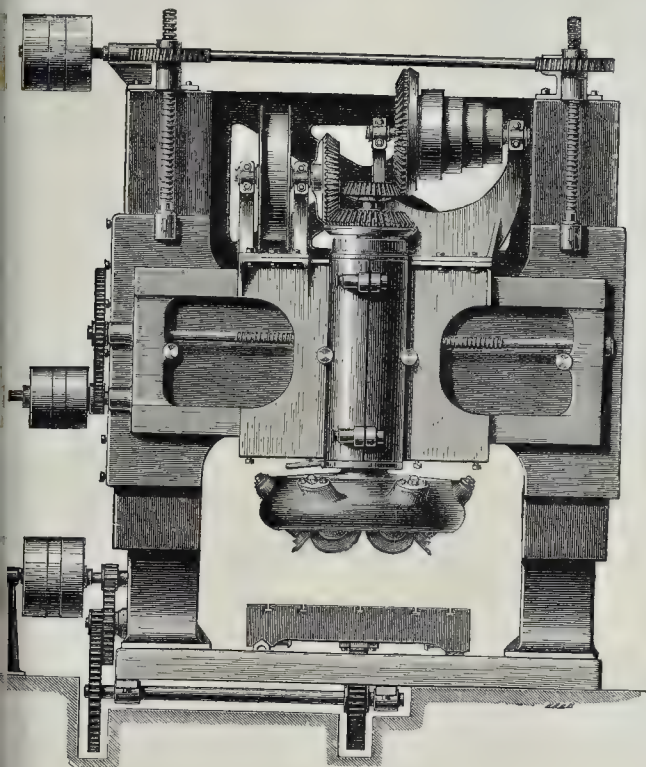


Fig. 3.

of these machines was supplied to Messrs. Morrison & Mason, of Glasgow, who were the contractors for the Carlisle Station. This firm gives the following details of the performance of the machine on the sandstone used in the work. Stones 4 ft. 6 in. by 2 ft. were dressed at the rate of six stones an hour, which was equal to square feet per hour. Stones varying between 6 in. to 2 ft. high by 3 ft. to 5 ft. 6 in. g., on an average 6 square feet to a stone, were dressed at the rate of fifty per day. The cutters were changed once a day, and was seldom that the work had to pass the chine twice. Messrs. Morrison & Mason state that, owing to want of space they only had one table, and the machine had therefore to be stopped while the work was being changed. They estimate that, with three tables, twice the work could have been done. Fig. 3, above, we give a general view of a dressing machine made by this firm. Machines of this type are used for granite and other very hard stones, but with certain modifications they can be adapted for flags, landing-

moulding machine, which is capable of cutting out internal and external angles. The cutters are of the same type, but are not given a positive motion by gearing, as in the side and top dressers. There are two chucks supported by a suitable standard. These chucks are each composed of four arms in one casting, and they work respectively in a vertical and horizontal plane. The arms of the chucks revolve in intersecting planes, which are, of course, at right angles to each other, but the edges of the cutters describe two circles, the circumferences of which meet at the cutting-point, and in this way the two sides of the angle are formed on the stone. The cutters are made of thin steel, and never require sharpening; all the working parts are enclosed, so as to be protected from grit, and each cutter is adjustable in the direction normal to the plane in which it revolves by means of a sliding bush, in which the cutter spindle is carried. The latter is placed eccentrically in the bush (the bush being free to turn when required in the part that it lines), so that an easy



consists of concrete blocks, faced with large land flints set in neat cement. It may be here stated that, the number of blocks made and fixed *in situ* during the summer of 1884 exceeded 35,000. The entire wall is coped with a bold Cornish granite coping, 2 ft. 6 in. in width, and about 2 ft. average depth. The foreshore is approached by two inclines of 1 in 8, and four flights of steps,—all in Cornish granite. In front of the wall there are five timber and three concrete groynes, each extending from the face a distance of 210 ft. into the sea. Owing to the great impoverishment of the foreshore, the engineers adopted the novel expedient of artificially replacing the shingle removed by the scour of the sea; 20,000 tons of beach have been dropped on to the foreshore from hopper barges. This work has been attended with the best results, the wall having now a considerable bank of shingle in front of it, where, fifteen months ago the denudation had barred it to within 4 ft. of the underside of the foundation. This rapid natural withdrawal of the shingle during the progress of the work caused the engineers considerable uneasiness; but their resources were equal to the difficult position so rapidly set up. For while the artificial deposit of shingle was proceeding at the barest places, sheet-piling was driven in front of the wall, and a large number of faggots was employed. The work proceeded night and day without intermission for three months, so that by the time the heavy winter gales set in the work was completed. Within a very short time of such completion a very heavy S.W. gale on the top of a spring tide put the new work to a most severe test, with the result that though the waves reached a height of 40 ft., when they broke on the face of the wall not a stone was disturbed.

The work projects seawards a distance of 30 yards from the original margin of the lawns. The desire of the engineers to execute such a bold scheme was the subject of much angry controversy at the time, but fortunately the plans were adopted in their entirety with the result that the Hove people have, as a first instalment of the works, a promenade nearly half a mile in length, and thirty yards wide. The great success of the work is borne testimony to by the Brighton public, who frequent the wall in large numbers.

In the course of a few weeks the promenade will be protected by a substantial ornamental fence, which is now being founded by Messrs. Reed & Son, of Brighton. As before stated, the engineers are Sir John Coode and Mr. Ellice-Clark. The contractors were Messrs. W. Hill & Co., of Gosport, to whose energy in completing the works with such rapidity the greatest praise is due.

#### THE TRADES' UNION CONGRESS.

THE eighteenth annual Congress of Trade Unionists commenced on Monday last at Southport. The chair was taken at the outset by Mr. J. S. Murchie, chairman of the Parliamentary Committee, who, in opening the proceedings, contended that these annual congresses had been hitherto far more representative, and possessed the confidence of the trades in a higher degree, than at any other period of their history. He drew attention to the rapid strides "these congresses have made in the public estimation. They have grown," he said, "by sheer perseverance out of the necessity for repeatedly defending our principles against the attacks of a hostile Press and an anti-trade union public into a position of great and increasing power and public influence, which is constantly being exercised for the promotion of the welfare of the masses of the people, and not confined to the trade unionist section alone. Sometimes I entertain doubts on our policy of prohibiting the reading of papers, &c., devoted to the defence of trade unionism, because whenever the public hear of us it is almost always at a time when we may be engaged in some great struggle with employers and when we are naturally our worst side out. The better side of our work is too frequently lost sight of. The work we have performed in the direction of making the people thrifty is too little known. Mr. George Howell, in a very excellent article he has contributed to the *Contemporary Review*, shows us that seven trade societies alone paid to their sick and needy members in the year 1876 and the five bitter years immediately succeeding it nearly

2,000,000, this amount being nearly 200,000 more than their net receipts during the same period. It is a very common superstition that trade societies spend their money on strikes alone, and hence we are frequently lectured by no doubt good-intentioned, but ill-informed, people about the 'error of our ways' in this respect. Now, what is the truth on this subject? I take the same seven societies referred to by Mr. Howell,—viz., the Amalgamated Engineers; Ironfounders; Boilermakers and Iron Shipbuilders; Steam Engine-makers; Iron-moulders of Scotland; Amalgamated Tailors; and Amalgamated Carpenters and Joiners, and I willingly confess that I take them for no other motive than because I find the work partly accomplished by his able pen; and I find that in the nine years ending 1884 their receipts were 2,818,548. 12s. 5d., and their expenditure 2,963,186. 6s. 4d.; of this amount 1,207,180. 11s. 1d. was spent in unemployed benefit; 632,273. 9s. 7d. in sick benefit; in compensation for loss of tools, superannuation, funerals, accidents, benevolence grants, and other minor benefits, including cost of management, 975,052. 2s. 7d.; and the remainder, 188,680. 3s. 1d., or about 6½ per cent., was the only amount expended in connexion with trade movements. These figures satisfactorily demonstrate that, although we have exercised considerable influence over the conditions under which we have to labour, we have not exercised it in the wild and reckless manner for which we have been so often and so mistakenly condemned."

On the motion of Mr. Richards (Southport), seconded by Mr. Drummond (Glasgow), Mr. T. R. Threlfall (Southport) was unanimously elected President of the Congress. Mr. John Young (Southport) was appointed Secretary to the Congress, Mr. Laird (Newcastle) Vice-President, and Mr. Burnett (London) Treasurer.

The President having taken his seat, intimated that, in accordance with custom, he would reserve his address until Tuesday morning.

Mr. Broadhurst, M.P., Secretary to the Parliamentary Committee, read the report of that body, which dealt with a number of subjects. We make a few extracts:—

#### Increase of Factory and Workshop Inspection.

In Committee of Supply, on June 4th, your secretary called the attention of the House of Commons to the desirability of an increase in the staff of factory and workshop inspectors, and in his remarks the views of the Congress were fully set forth. The speech was received by a most interesting debate, in which Mr. Burt took an able part, and in which the opinions expressed were all but unanimous in our favour. The Under Secretary of State for the Home Department, Mr. H. H. Fowler, in replying for the Government, said that they were fully in favour of the principles advocated, and it was only a question of degree as to its application. He showed that a steady increase had been going on. In 1868 there were 38 inspectors, in 1872 there were 49, and in 1885 there were 66, and a further increase was being carefully considered by the Home Secretary, Sir William Harcourt. Altogether, the debate was most successful. We are glad to announce that during the year Mr. J. T. Birtwistle, son of Mr. Thomas Birtwistle, has been added to the staff of factory and workshop inspectors.

#### Workmen Magistrates.

The Parliamentary Committee have frequently received complaints from societies concerning alleged partiality of magistrates, and of the police partly controlled by them, in cases of trade disputes. The Committee was of opinion that the most practical way of dealing with these complaints was to seek to get raised to the bench representatives of labour; and in the early part of the year your secretary sent to the Chancellor of the Duchy of Lancaster a statement on this subject. After considerable correspondence, and several personal interviews, Mr. Trevelyan, the then Chancellor, announced his intention of adopting the suggestion, and, in a short time, four of our friends were raised to the bench, viz., Mr. Slater, Manchester; Mr. Birtwistle, Accrington; Mr. Fielding, Bolton; and Mr. W. Pickard, Wigan. This movement must not be permitted to rest here; we must have men on most of the magisterial benches of the United Kingdom. The appointment of magistrates is too much a matter of political influence and social intrigue; but in all cases where recommendations for such appointments are made by elective bodies, the well-directed pressure of the working classes may ensure that the name of some suitable workman shall be included. The departure thus made cannot be over-estimated in its importance.

#### Employers' Liability Act Amendment Bill.

The Employers' Liability Act Amendment Bill was first for second reading on Wednesday, April 29th, but, like the other Bills of private members, it was crowded out by pressure of Government business, and a woful fate awaited attempts in other directions and other subjects of last year's programme. Although our special questions may not be advanced so rapidly as we could have wished, still our cause has been broadly and progressively by leaps and bounds. We have gained two millions of votes, a more equitable division of electoral power, the extension of the hours of polling from four o'clock till eight o'clock at night,—objects for which we have been contending will be the more easily attained with our enormously-increased political power. The work of the next Parliament will be mainly decided at the elections in November. It is, therefore, to the ballot-box that we advise our friends to direct their attention for the next month or so. Other interests, vast in extent, powerful in their influence, unremitting in their efforts, will crowd

and jostle in the same place and at the same time. It rests with us to press ours to the front.

#### Co-operation.

In accordance with the resolution of the Nottingham Congress, your committee appointed four of their number, Messrs. Mather, Bailey, Seivewick, and Slater, as their representatives on the Joint Committee of Trade Unionists and Co-operators for the purpose of promoting co-operative production on just and sound principles, and of endeavouring to adjust disputes that might arise between co-operative societies and their workpeople. Only in one case, and that quite recently, has the committee been brought under its notice any difficulty between co-operative societies and their workpeople. No formal action was taken by the committee, but they have reason to believe that a communication sent in their name had some influence in securing a settlement of the differences which had arisen between the manager of a large wholesale co-operative establishment and the members of a trade union in their employ.

#### The Royal Commission on Trade.

A royal commission has been appointed to inquire into the cause of the depression in trade. Out of upwards of twenty members of which it is composed, representing the interest of capital and labour, there was only one labour representative until your secretary had, by letters to the Government and questions in the House of Commons, raised a protest against the one-sided composition of the commission, when Mr. Drummond was added to Mr. Birtwistle, after your secretary had refused to join it on the ground that the labour interest had been grossly neglected. Your secretary's intervention was thus a most timely one, and would in all probability lead to an inquiry into the wages and hours of labour, as well as into the policy of restrictive laws, such as the Factory and Workshops Act, the Mines Act, the Employers' Liability Act, and similar legislation affording protection to life and limb. If this should prove to be the case, then, we contended, labour was entitled to an equal representation with capital either in the persons of working men or men in whom the labour interest had the fullest confidence. We are quite ready to acknowledge the ability and fitness of Mr. Drummond, but we cannot contend in arguments and votes against twenty others, some of whom are men of great weight and ability.

On the motion of Mr. Shipton (London), the Congress adjourned until Tuesday morning, when

The President delivered his address, in the course of which he said,—It seems to me that the establishment of the nine-hours system was one of the great landmarks in the progress of the labouring population. Education loses half its force and benefit when given to overworked and underfed people, and there is abundant evidence that the educational progress of the last few years has been materially assisted by the reduced working-day. At the present moment there is a stronger moral activity amongst the masses, a greater restlessness against social wrongs, a more searching desire to get to the primary causes of our troubles, and a louder cry for domestic reforms, than has ever been heard before. While the people have been educated, they have had more time to think and read. What is our duty now in respect to the present depression in trade? People are tired of prophesying and hoping for a revival, and a dull resignation is settling upon all classes. It has, as we know, lasted fully eight years, and the universal cause ascribed is over-production. Protectionist countries as well as Free Trade England are alike suffering from it, and the time has come to go deeper into the cause than skimming the surface by competing with other nations in restrictive tariffs. As a first step, I believe that time has arrived for the trades of the kingdom to take action in securing the eight hours' working day. Beneficial as its operations would be to the individual, it would cause employment to be given to thousands of our starving brethren and sisters whose distress wrings our hearts. It must not, however, be thought that this will be a permanent solution of the difficulty. It will relieve the country for a few years. We have a rapidly-increasing population, a glutted market, and little hope of any great expansion of our foreign trade. Foreigners have a perfect right to manufacture their own goods, and we must in future expect greater competition in this respect. Indeed, if our manufacturers continue to supply the semi-civilised races with sized cotton, shoddy, and spurious imitations, they deserve to lose this trade as well. Instead of wandering over the earth, panting for fresh markets, or debating as to being quits with the foreigner by taxing food, I think practical steps should be taken to reorganise our home market. Vast as our population is, there is plenty of room for millions more if the land were properly cultivated. You will discuss this subject at length, but let me say that trade may well be depressed when 1,600,000 acres of land have gone out of wheat cultivation in ten years, and the agricultural population has decreased about 15 per cent. Our over-crowded towns and repleted labour-market show where these displaced workers have gone. I have no sympathy with State-



ded emigration, or emigration at all, while at tracts of our native country are lying waste, waiting for labour to make them teem with plenty . . . . From first to last Parliament has always taken the standpoint of the capitalist in all industrial questions. It has been the boast of trade unionists that they belong to no political party; I hope they never will as it is now understood. It will be an evil day when English trade unionism is dragged at the heels of modern partisanship. We have everything to gain for the people by standing aloof from office-seekers and place-hunters; and our duty is to organise the masses, and thereby obtain reforms which shall make the conditions of living better than they are now. We should now be selecting the planks to form a platform whereon workers of all sections, beliefs, and creeds may unite. . . . It seems to me the most critical period in the history of English trade unions at this moment. They must either lead or follow: they cannot halt between two opinions. They must form the nucleus of the Labour party of the future, or sink into comparative insignificance. Let me remind you that the destiny of the empire is now in the hands of labour, and, whether we will or no, the masses will choose to go on the old lines.

At the close of the President's address, a vote of thanks was accorded to him for delivering it, the proposition being moved by Mr. Blower (Burslem), seconded by Mr. Jack Glasgow, and supported by Mr. Knight Newcastle).

The Congress then proceeded to discuss the report of the Parliamentary Committee, and after the Standing Orders Committee had reported that they had examined the credentials of the delegates, and found that there were 136 delegates present, representing 136 trade societies or trade councils, with a muster roll of 9,976 members, the Congress adjourned until Wednesday morning, when

the consideration of the Parliamentary Committee's report was resumed. With regard to the Employers' Liability Act, the following resolution was proposed by Mr. J. Burnett, seconded by Mr. Hunter (Glasgow), and adopted unanimously:—

That, having regard to the unsatisfactory condition of the Employers' Liability Act, by reason of the power left to employers to compel workmen to contract themselves out of its provisions, and also on account of the Act failing to afford compensation for or security against accidents in the defective fencing of special machines as distinguished from general machinery or mill gearing, it is resolved that the Parliamentary Committee be instructed to its utmost efforts to secure the amendment of these defects in the Act by the new Parliament; also that workmen generally be called upon to obtain pledges of support on this subject from Parliamentary candidates."

On the subject of certificates for engineers, the motion of Mr. J. Swift (Manchester), seconded by Mr. W. H. Lambton (Durham), the following resolution was approved by the Congress:—

That, in the opinion of this Congress, it is necessary, for the prevention of the sacrifice of life and injury to the public, which not infrequently take place through the inefficient management of steam engines and boilers on land, that judicious legislation should be enforced, making imperative that all men in charge of such engines and boilers must possess a duly qualified certificate, the same as provided in the case of men in charge of steam engines at sea; and the Parliamentary Committee are hereby instructed to use every means in their power to have effect given to such legislation."

With reference to factory and workshop inspection, Mr. Holmes (Burnley) proposed, and Mr. Drummond (Glasgow) seconded, the following resolution:—

"This Congress, while fully recognising the importance of the appointments made by the late Government of official working men as factory and workshop inspectors, trust the Parliamentary Committee to again draw the attention of Government to the inability of the present staff to maintain anything like a due observance of the Act, and urge upon them in the strongest possible manner the necessity for the appointment on the staff of a considerable additional number of practical working men, and, where expedient, women."

Considerable discussion followed the resolution, the scope of which was that there was a great need for the extension of the staff of inspectors. An expression of opinion was given (as inspection should be applied to workshops where it at present did not exist, and that shops, such as those of bakers, which were underground, should receive extra attention. Mr. Trotter (Durham) suggested an amendment to the effect that the motion should be altered so as to include the appointment of inspectors to supervise workshops in connexion with mines, which at present are inspected either by factory nor mine inspectors. Mr. Wiley (Preston) objected to the second point



"David entering Saul's tent."

being discussed as an amendment, and on being put to the vote it was rejected by 72 votes to 19, and the resolution was adopted.

In the evening, the delegates and their friends dined together in the Cambridge Hall.

#### THE MASTER MASON WHO BUILT ST. PAUL'S CATHEDRAL: EDWARD STRONG.

IN the Parish Church of St. Peter, at St. Albans, is to be seen the monument to this man's memory; when we look at St. Paul's and see his excellent workmanship, and consider the mechanical means at his disposal, his name, without doubt, is worthy of being more generally known to the present generation. This handsome monument is formed of grey and white marble, with a bust at the top, and the following inscription, viz. —

"Near this Place are Deposited  
the Remains of  
Edward Strong,  
Citizen and Mason of London  
Whose masterly abilities and Skill in his Profession  
The many Public Structures he was employed in Raising  
Will most justly manifest to late Posterity.  
In erecting the Edifice of St. Paul.  
Several years of his Life were Spent,  
Even from its Foundation to His Laying the Last Stone  
And herein (equally with its ingenious Architect  
St. Christopher Wren  
And its truly pious Diocesan Bishop Compton)  
He shared the Felicity  
Of seeing the Beginning & Finishing  
Of that Stupendous Fabric.  
In Piety to his God  
In Justice, Fidelity, Kindness & Charity to his Neighbour,  
In Temperance, Humility, Contempt of the World,  
And the due Government of all his Appetites & Passions,  
In Conjugal & Paternal Affection,  
In every Relation, every Action, & Scene of Life,  
He was what the Best Man, the Best Christian,  
Would desire to be at the Hour of Death.  
He died 8th of February MDCCLXIII. In the 72nd year  
of his Age."

W. S. HORNER.

#### SCULPTURE: "DAVID ENTERING SAUL'S TENT."

THIS bas-relief was one of the sculpture exhibits in this year's Royal Academy which we wished to illustrate, but of which the artist, Mr. Mark Roche, was unable to give us a photograph till after the close of the exhibition. The work is a decorative panel in relief, the subject being suggested by the lines in Browning's well-known poem, "Saul," where David is represented as pausing outside the tent:—

"Then once more I pray'd,  
And open'd the fold skirts and enter'd, and was not afraid."

The work struck us as one of those which evinced original thought and feeling, and we are indebted to the artist for giving us the opportunity of reproducing it.

#### THE HARDENING OF PLASTER.

M. JULIE recently brought before the notice of the French Academy of Sciences a number of experiments made by him regarding the more extensive use of plaster by such means as substituting it for wood in the construction of flooring. His idea is based upon the augmentation of volume which takes place in plaster after its application, while other mortars or cements (as well as wood) are liable to shrinking or cracking as consequences of desiccation. When applied in layers of sufficient thickness to resist breaking, it is unaffected by time and atmospheric changes, provided it is not exposed to water.

Two properties are, however, still needed before plaster could be used in the general manner indicated, hardness and resistance to pressure from above, and these M. Julie considers he has found a method of supplying. He thoroughly mixes six parts of superior plaster with one part of fat lime, recently slaked and



finely sifted. This composition is applied in the same manner as ordinary plaster. When dried, the object produced is steeped in a solution of any sulphate with a base capable of being precipitated by lime and an insoluble precipitate. Sulphate of iron and sulphate of zinc are the most suitable agents. The lime in the pores of the plaster decomposes the sulphate, and two insoluble substances are produced; sulphate of lime and oxide which fill the pores of the object treated. With sulphate of zinc, the plaster remains white, and with sulphate of iron it passes through a greenish stage by the action of time and desiccation into the tint which characterises sesquioxide of iron. By using sulphate of iron greater hardness of surface is produced, and the resistance is twenty times that of ordinary plaster.


The proportions of lime and plaster are not exactly fixed, but may be varied in accordance with the results sought to be obtained. Still, the proportion of 1 to 6 has been found by M. Julbe to give the most satisfactory results. It is also recommended not to pass and repass the trowel for too long a time, the quickest workman being the most suitable for this operation.

By using sulphate of iron an aspect of rust is obtained, but if there is passed over the surface some lithargised linseed oil (a little browned by heating) a mahogany tint is produced, while a certain superficial elasticity is likewise gained. The shade is improved by the use of a layer of hard copal varnish. A layer of plaster, 2½ in. to 2 in. in thickness, treated in the manner indicated, will make a perfectly smooth flooring, quite applicable as a substitute for oak, and at a quarter the price.

### Illustrations.

#### BUILDINGS IN TOLEDO:

THE "PUERTA DEL SOL" AND THE HOSPITAL OF SANTA CRUZ.

 AMONG the great historical but still existing cities of the world, it would be difficult to find one which has more completely preserved its ancient features than Toledo. Rome may date further back, but its actual appearance is modern compared with Toledo. For one reason among others, because it was reconquered from the Arabs centuries before the rest, Toledo possesses special features of its own, not to be found in the same degree, or not at all, in any one of these. Cordova, in respect to its narrow, tortuous streets and Roman remains, is the city that comes nearest to Toledo. Cordova, indeed, owns a monument unique in its kind, that marvellous mosque, like nothing else we have ever seen; but, exception made of the mosque, Cordova cannot compete in variety of artistic monuments of every age with Toledo.

In the course of these notes it is quite out of the question to do justice to an ancient city of such striking architectural merits; and hence we shall have to confine our remarks to the chief points brought into view in our illustrations.

The finest views of the city are obtained from across the Tagus. Thence the peculiar strength of the position can be understood at a glance. The Tagus curves round in the shape of an extended arc, and is lost to view at either extremity amidst its embosoming rocks. No bridge is visible, neither Alcantara, lying eastwards, nor San Martin westwards.

Sloping upwards from the summit of the cliff, overhanging the river towards its culminating point, lies the picturesque city; the imposing Alcázar crowning the *arx* or summit to the right, the cathedral in the middle, another noble group not far beyond, and the walls of a ruined palace lower down. As to the rest, the city is one of irregular lines and flat roofs, of a type quite as Oriental as it is Southern.

LA PUERTA DEL SOL, or "Gate of the Sun," of which we give an illustration, is one of the most characteristic and best known in Toledo. It is situated on the north side of the city, in the immediate vicinity of the buildings last described. It is so disposed that about sunrise the luminary appears through it from the outside rising over the city. The gateway is formed by a series of five arches of different shape, the two innermost guarding the porticula. The style of the gateway is Moorish in process of development, though not so far advanced as in

the Alhambra. The two brick arcades in panel above the gateway, show the double influence of the round and pointed arch, thus exhibiting a sort of transition phase in the Moorish style, similar to the Transition from Romanesque to Gothic farther north. The Puerta del Sol is placed between two lofty towers, one of which is square and seems to form part of the defending wall of the city, and the other is round, adorned with a row of windows and projecting turrets in the higher stage. The lower and higher parts of this round tower seem to belong to different periods. The medallion over the round arch contains a triangle, in which appear the sun and moon upon a band across the middle. This medallion shows the arms of the Cathedral of Toledo, in which the Blessed Virgin appears to San Ildefonso and bestows a vestment upon him in consideration of a work he had written in her honour. In the middle of the lower arcading above the outer arch are some small figures, scarcely distinguishable through the effects of time, which connect the structure with San Fernando, the conqueror of Seville from the Moors, and who died A.D. 1252. These worn-away figures are believed to represent "Las Justicias del Rey Santo" upon the Alguacil Mayor or High Constable, Fernan Gonzalez, for outrages upon two "Toledanas."

The author of "Las Bellezas de Españas," Sr. Quadrado, is of opinion that these remains, connecting the structure with the Christian monarchs who reigned in Toledo and made it their capital from the end of the eleventh to the middle of the sixteenth century, were later insertions into the original Moorish gateway, dating, in his opinion, from the eleventh century and previously to the Christian reconquest in 1085.

The figures referring to San Fernando are in the central of the intersecting round arches. In the higher stage are pointed intersecting arches, the intersected arcs being cinquefoiled below and trefoiled above. This gate and the older one above (see in the illustration) are just outside the wall of Wamba the Goth, though inside that of Alonzo VI. of Castile and Leon.

#### THE DOORWAY OF THE HOSPITAL STA. CRUZ.

We give this doorway, with its accompaniments, as a fine specimen of sixteenth-century work in Toledo. They appear to be insertions in older walls. The sculpture exhibits expression and force. The ornament is, indeed, overloaded, but it shows great delicacy of execution. The peculiar combination of Arabesque ornamentation and Greco-Roman forms, with a reminiscence of Mediaeval detail, which elements went to make up certain phases of the Renaissance in Spain, can be studied in this gateway, as well as in the two fine *patios*, or courts, and richly wrought staircase of the hospital. The especial phase of Renaissance here illustrated is that known to architectural historians as "Plateresque."

#### HIGHER GRADE SCHOOLS, CARDIFF.

We give this week an illustration of the Higher Grade Schools built by the Cardiff School Board, which were opened in February last, this being the first one built by the Board for higher grade instruction. It occupies an excellent open site in Howard-gardens, in the Roath suburb, the best part of the town. In general arrangement, it is greatly similar to an ordinary fair-sized elementary school, except that a laboratory, fitted up for chemistry teaching, is provided in the rear of the boys' department. It is designed to accommodate 800 scholars,—350 girls and 450 boys.

On the ground-floor, which is the boys' department, there is a large schoolroom and four classrooms, all in direct communication. There is also a master's room, with water-closet and lavatory accommodation attached, together with room for hats, &c., and lavatories for the scholars. The laboratory is entered by a covered corridor from the main building, and covered spaces extend therefrom along the playgrounds.

On the first floor, which is approached by a staircase of concrete blocks, is the girls' department. This floor contains a large schoolroom, with three class-rooms in direct communication; also private room for mistress, room for hats and cloaks, and lavatory, &c. There is a separate stone staircase giving exit from this floor down to the playground and covered play-

sheds at the end, near which are the conveniences for the scholars. The floors are of fireproof construction, formed of concrete between webbing and girders, the soffits of the latter being visible and painted to relieve the ceiling of the ground-floor rooms.

All the rooms are constructed to allow cross-ventilation. The heating throughout by means of hot-water pipes or coils. Traps are provided for the extraction of vitiated fresh air is admitted by means of wall flues, mouths of which can be opened or closed at pleasure. The building is faced with local bricks, with bands of red brick and dressings. Bath and Grey Portland stone, the roofs covered with green slates, finished with terra cotta crests and terminals, &c. The fittings throughout were designed by the architects, Messrs. James Seward & Thomas, of Cardiff, and Swane, were the architects, the building being Mr. Clerke Burton, of Cardiff.

#### BALTIC CHAMBERS, SUNDERLAND.

This block of property, which has been erected at the corner of John-street and Thomas-street, contains on the basement restaurant and grill-room, with smoke and reading rooms attached. The floors are tiled, and the tiled dados in the rooms and to the staircase.

On the ground-floor, facing into St. Thomas-street, are five shops and two offices facing John-street.

The first and second floors are occupied by suites of offices, which are approached by a staircase and corridors (which will have tiled dados), from the entrance in John-street.

On the third floor are the caretakers' rooms together with conveniences, &c.

The fronts are of polished freestone from Prudham Quarry, and there are polished granite pilasters between the shops on ground-floor. The main entrance for the office is in John-street, that for the restaurant being in St. Thomas-street. The building has been erected under the superintendence of the architects, Messrs. J. & T. Tillman, at a cost of £8,000. The contractors were Messrs. E. J. Read & Sons, of Newcastle-on-Tyne; W. H. Surtees, Sunderland, undertaking the iron and plumbers' work; and Messrs. B. Bros., Sunderland, the plaster work.

#### ST. MARY'S COLLEGE, WOOLHAMPTON.

This college, which is situated a short distance from Newbury, in Berkshire, has existed as a Catholic educational establishment for many years. The buildings, however, with the exception of the church, erected in 1848, were of a very unsubstantial nature, and had become much dilapidated. Last year, therefore, it was finally determined by the Bishop of Portsmouth to reconstruct the college (excepting the church) on a larger scale, providing accommodation for church as well as lay students.

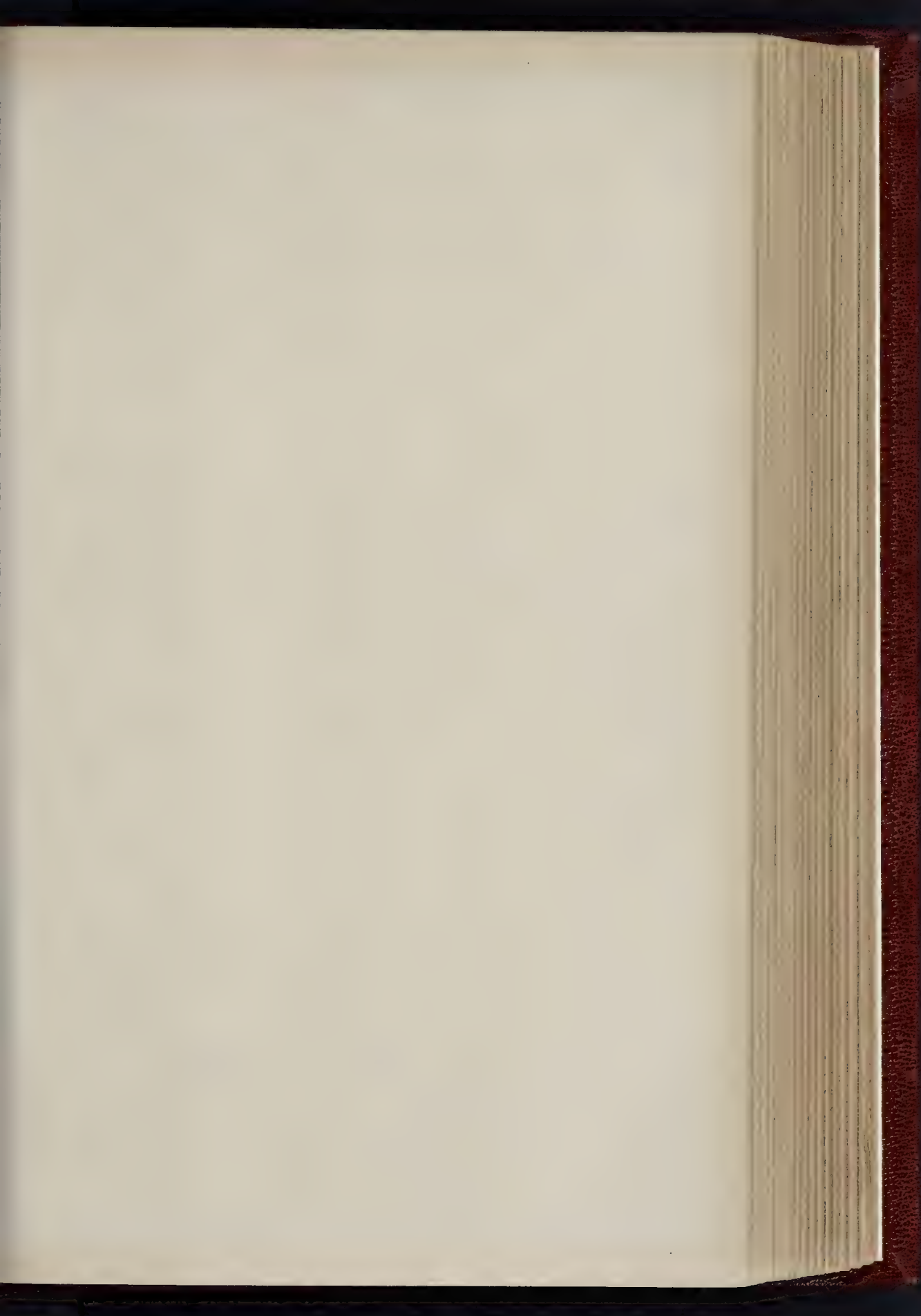
The new buildings are of Late Perpendicular or Tudor character, and are carried out in brick, with Ham Hill stone dressings, and roofs. Internally the staircases are of stone and the ground floors, where not tiled or paved, are laid with wood block pavements. The whole of the internal fittings and woodwork are in strict accordance with the style of the buildings.

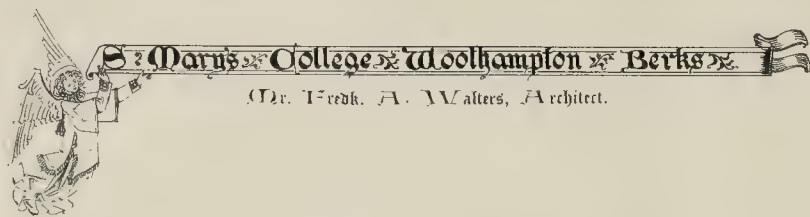
Mr. Fredk. A. Walters, of 4, Great Queen-street, Westminster, is the architect; and Messrs. Buckle & Wheeler, of Abingdon, are the contractors.

#### REMINISCENCES OF THE ARCHITECTURAL ASSOCIATION EXCURSION.

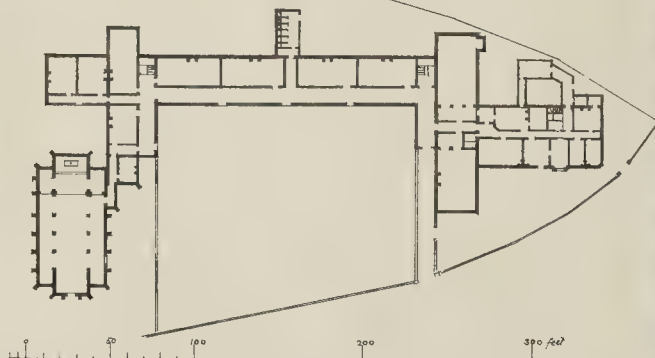
A DESCRIPTION OF Canons Ashby Church may be found in the report of the annual excursion of the Architectural Association in our number for August 15th; while some account of Broughton Castle and the churches at Alton, Hanwell, and Bloxham will be found in the number for August 22nd. The third storied porch at Bloxham is especially interesting. The ground-floor story is groined, and forms the south porch to the church; the first floor was probably the priest's room, as the fireplace in it, and the second floor may have been used as his sleeping apartment. A careful measured drawing of it has been published in the current volume of the "Architectural Association Sketch-book."



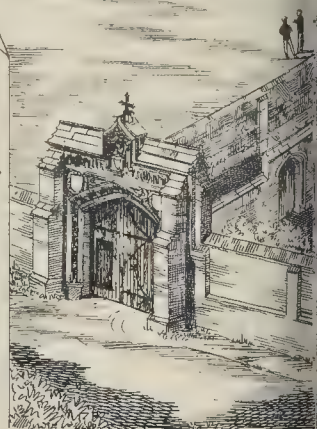




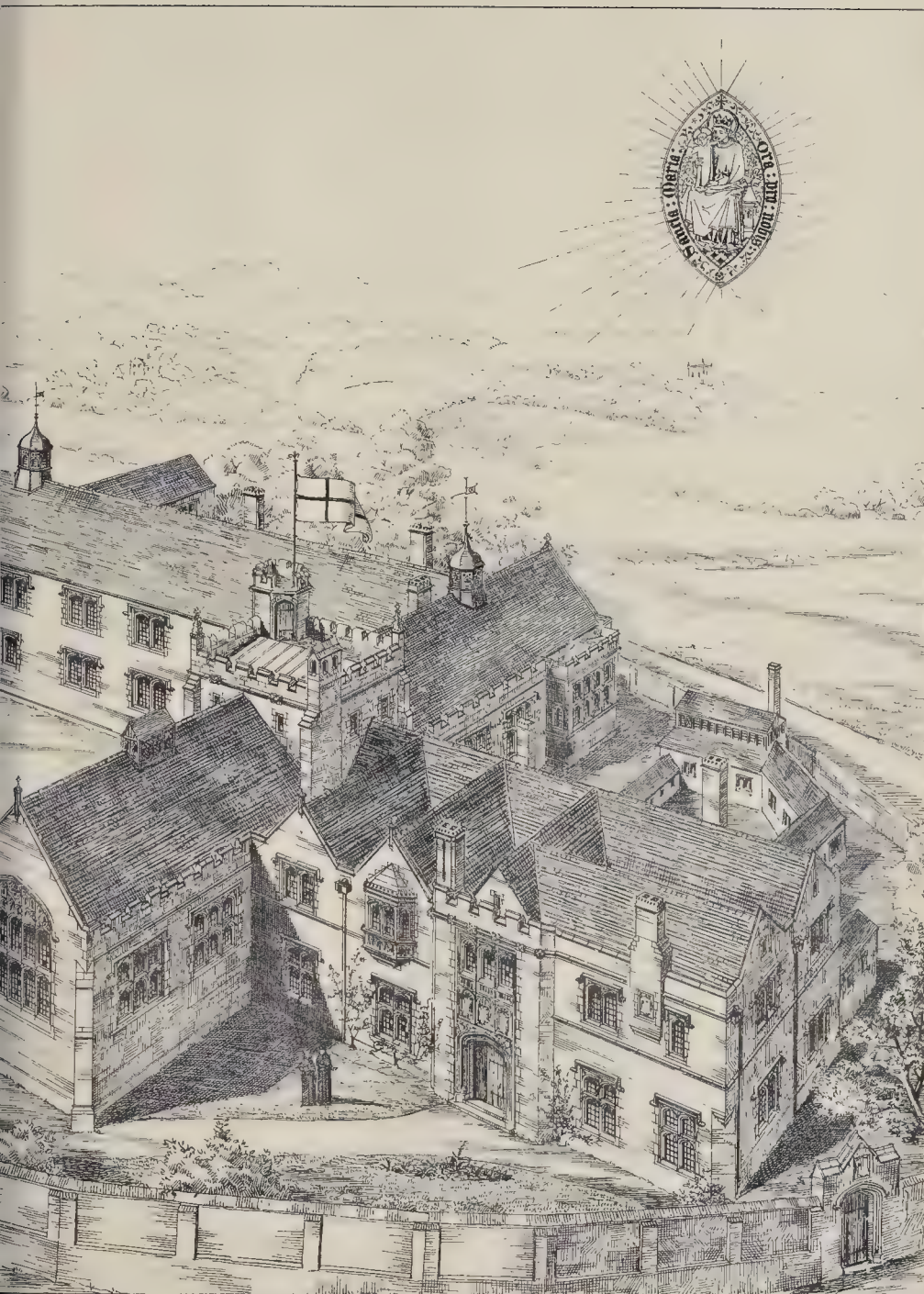
Plan



Wyman & Sons Photo-litho



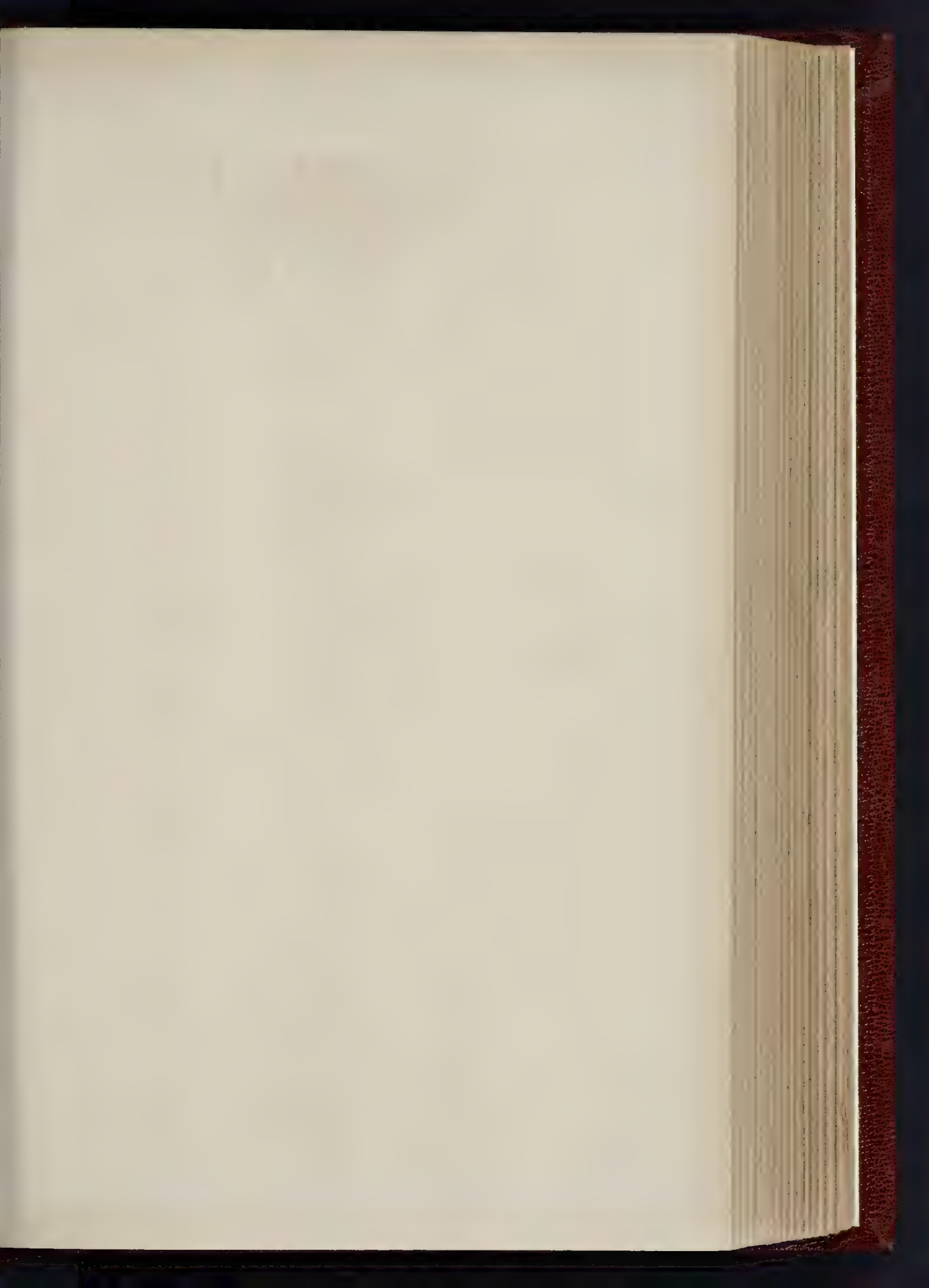




Queen's College, London, W.C.









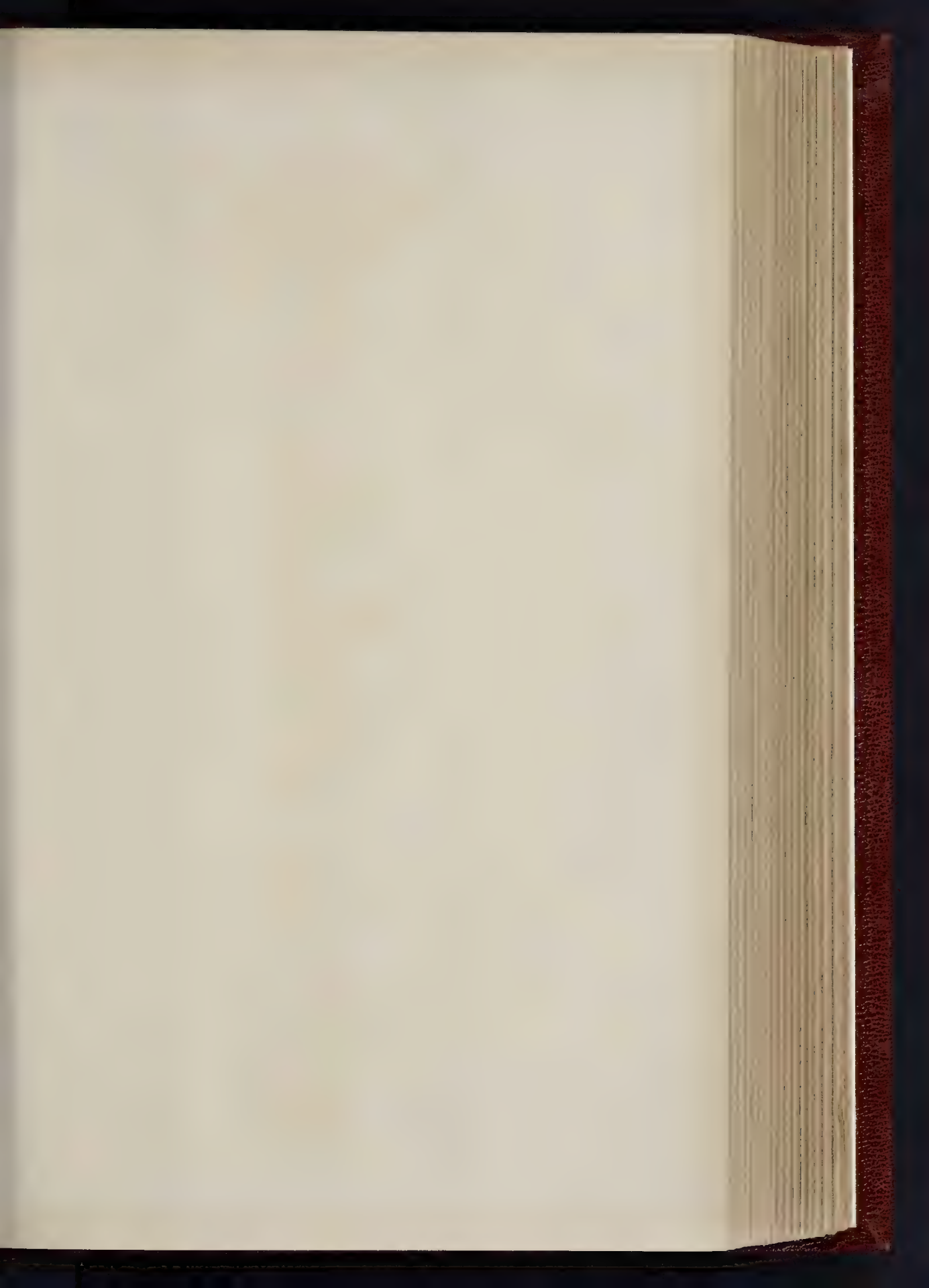
THE PHOTO SPRAGUE & CO. LONDON

REMINISCENCES OF THE ARCHITECTURAL ASSOCIATION

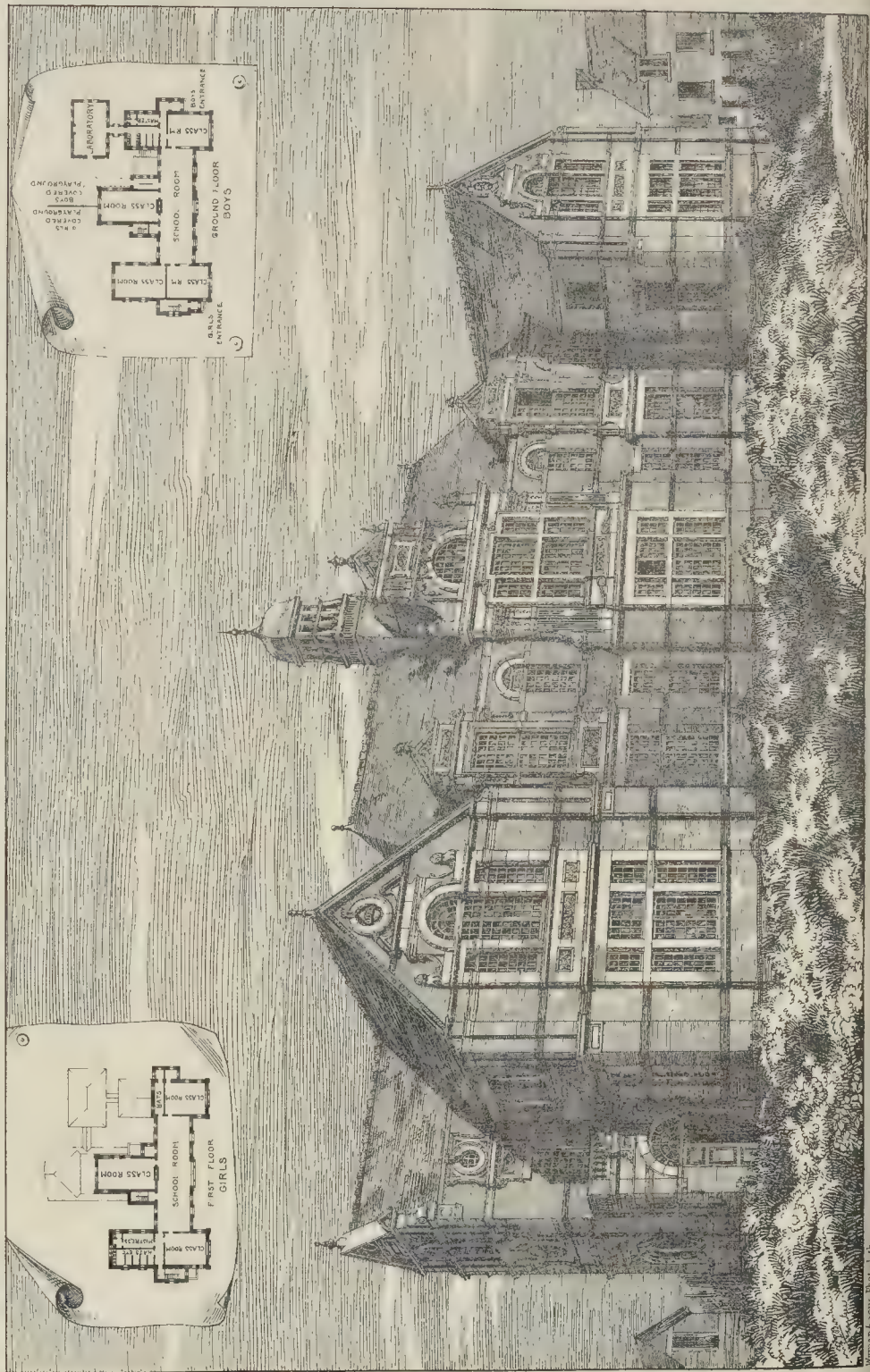
EXCURSION, 1885

BROUGHTON CASTLE, FROM A WATER-COLOR SKETCH BY MR. J. JOHNSON





THE BUILDER, SEPTEMBER 12 1885

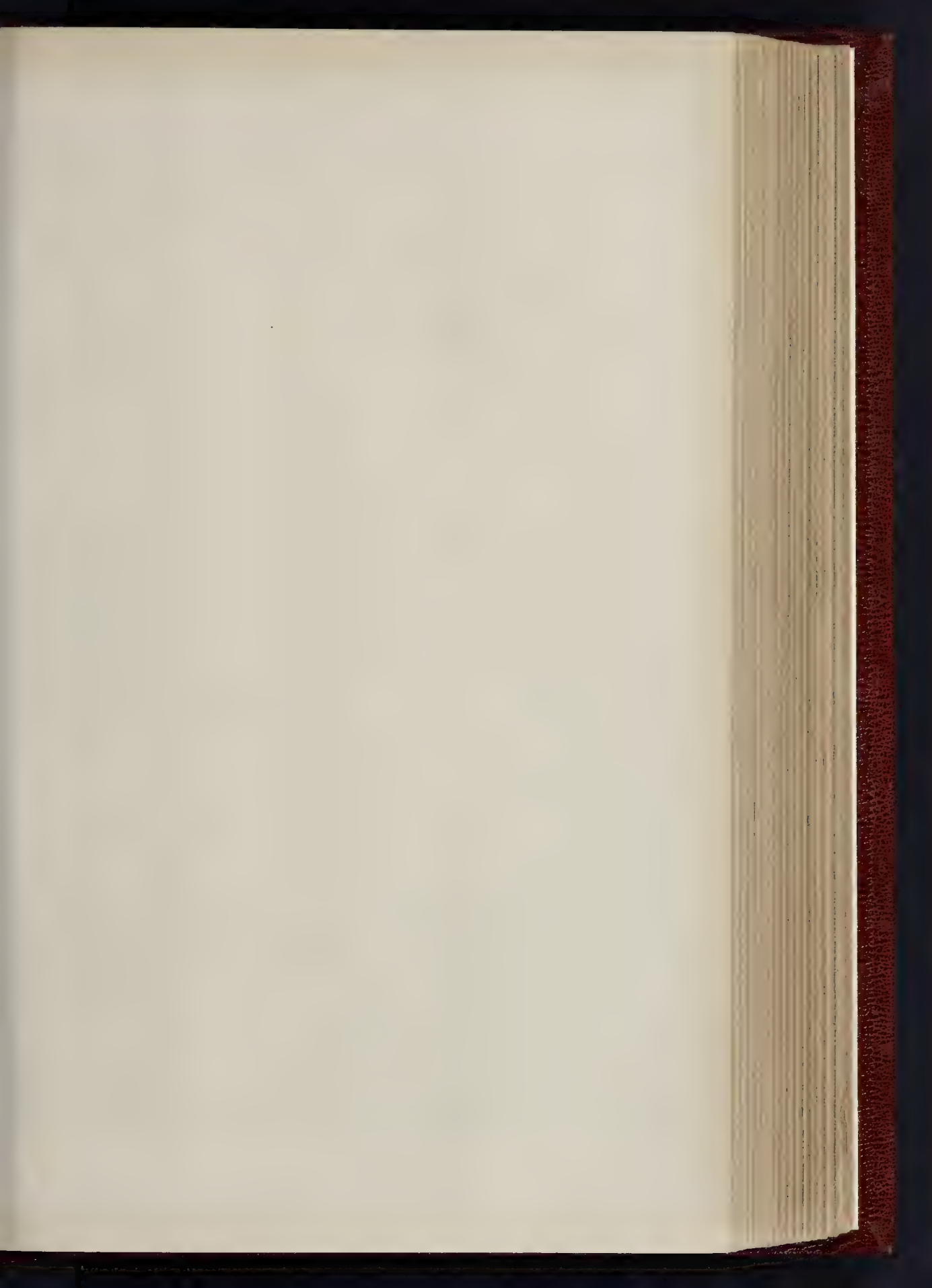


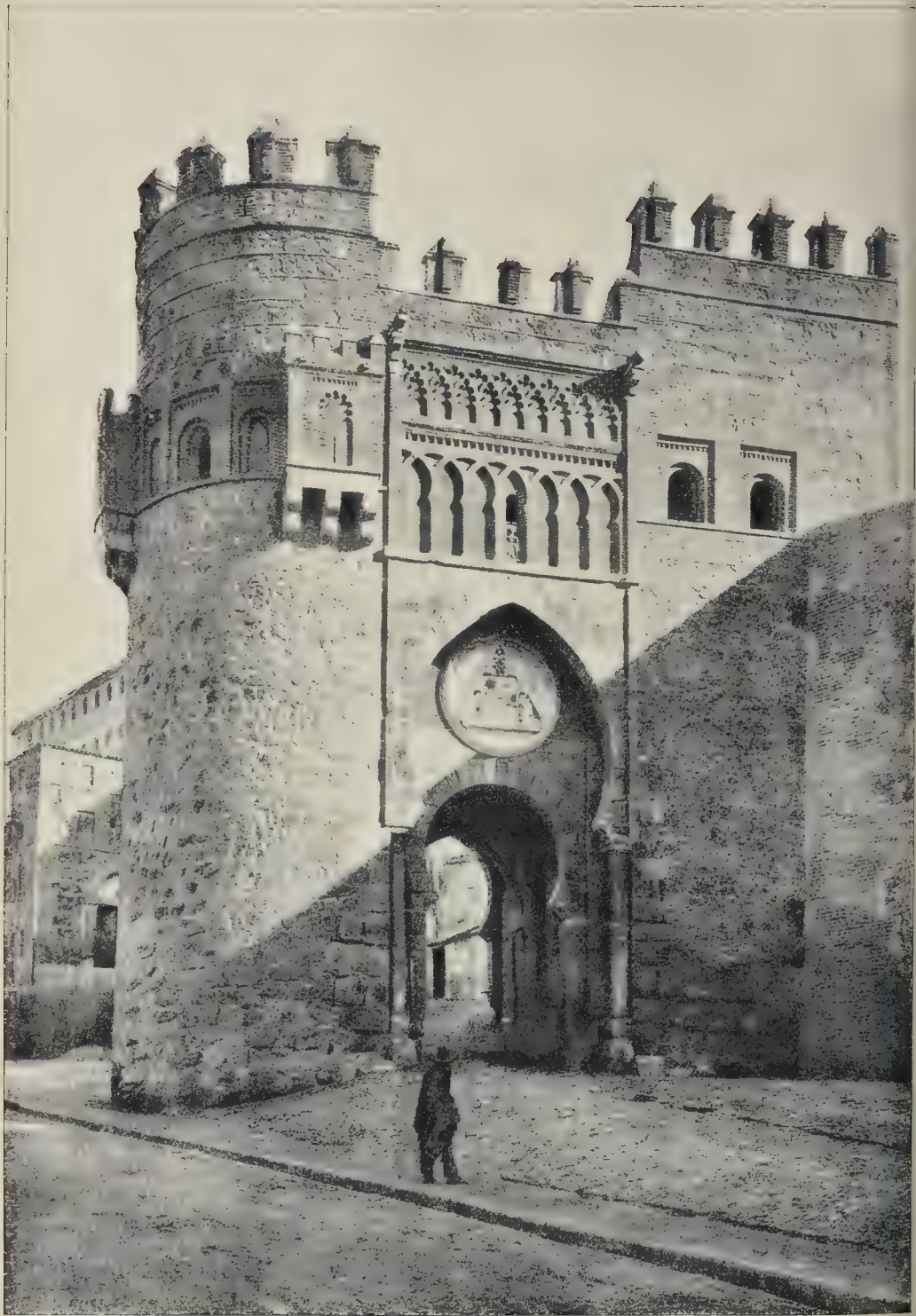
Wm. & Sons, Phos. Lith.

HIGHER GRADE SCHOOLS, CARLISLE.—MESSRS. JAMES SEWARD & THOMAS, ARCHITECTS.

DESIGNED BY L. L. L. & W. L.







THE "PUERTA DEL SOL," TOLEDO

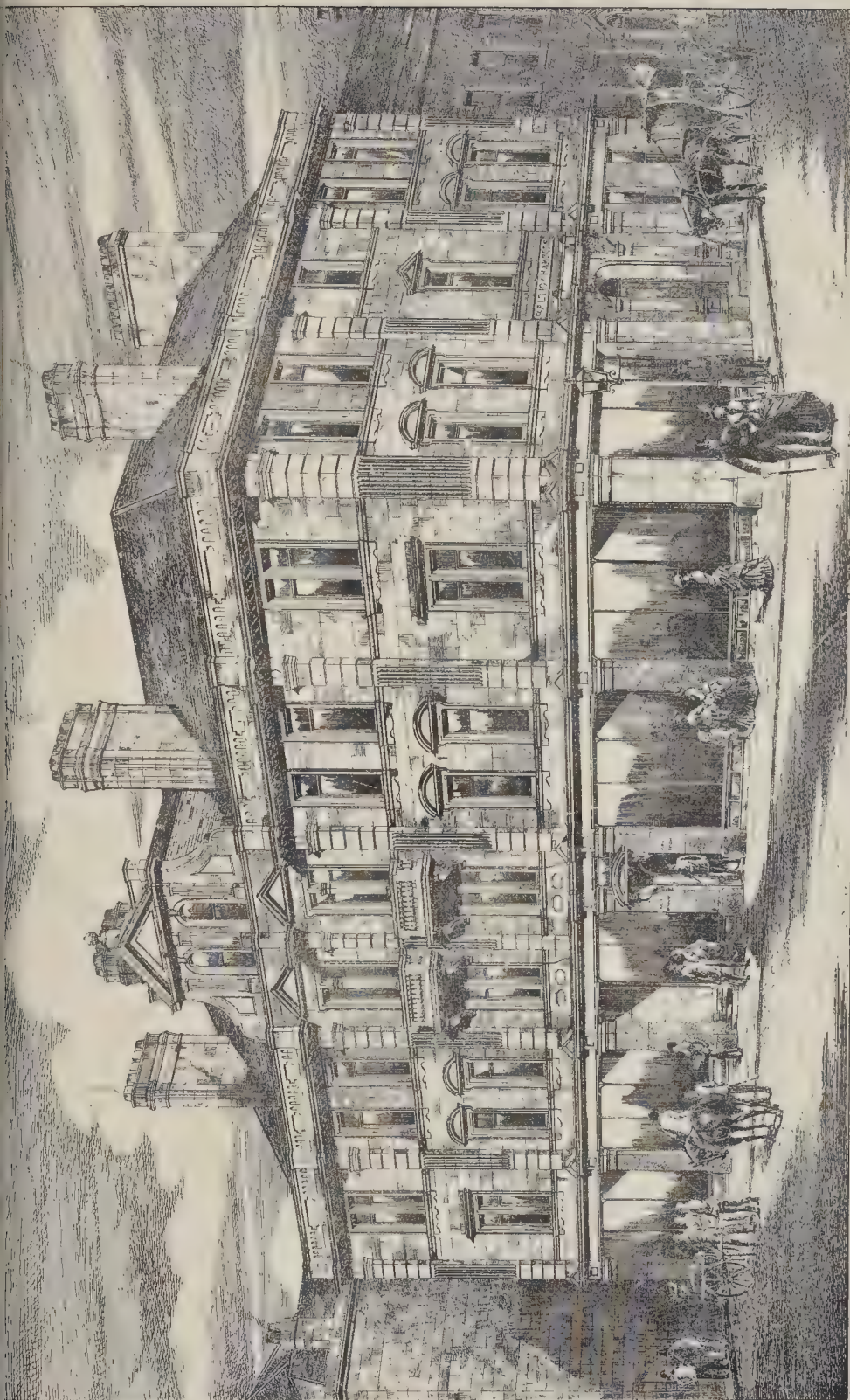




PORTAL OF THE HOSPITAL OF SANTA CRUZ, TOLEDO







Wynard Sons Photo Litho

BALTHAM CHAMBERS, SUNDERLAND. — MESSRS. J. & T. TILMAN, ARCHITECTS.

7, Queen St. London W.C.







REMINISCENCES OF THE ARCHITECTURAL ASSOCIATION  
EXCURSION, 1885







A SIXTEENTH-CENTURY ROOM AT THE INVENTIONS EXHIBITION.

The subjoined sketch gives a view of one of the three rooms arranged by Mr. Geo. Donaldson. We have selected the sixteenth-century room as being the most interesting of the three. The best traditions of the Middle Ages (the golden ages for handicraftsmen) had not quite died out, though partly modified by the revived Classicism of the Renaissance. The furniture of this period is sumptuous and elaborate rather than graceful and refined: the chairs are massive and richly ornamented with carving, and contain enough material in them to make three or four chairs of a later period, when "refinement" was the chief quality to be attained. Sumptuousness is the word that best expresses the decoration of the sixteenth century, whether we use it as referring to furniture, textiles, or decoration. The Flemish tapestry covering one side of the room is as fine a specimen as it would be possible to find, and it is in excellent preservation. Kensington Museum possesses three large pieces of tapestry of the same period, which certainly vie with those of Mr. Donaldson's, but it is rarely outside a museum one sees such fine or well-preserved specimens as these two in this sixteenth-century room, portraying the parable of the "Prodigal Son." The chief charm of these old tapestries is their colour; there is something rich and mellow about them which is so satisfactory to the colour sense. The one figured in the sketch swims in sunlight, and breaking into this is a cold indigo blue used in various parts of the work. This blue is used as a shadow on the foliage, not only of the border, but also in the trees that surround the different groups in the picture. The flowers and fruits are worked with crimson, so that the three primaries, carefully balanced, are combined. This method of having the local colour with positive colour is employed in the draperies of many of the figures, and the effect of shot-silk is obtained in some cases by shading amber with green.

Looking at the work generally, with half-closed eyes, the colour is blue, crimson, and yellow. The drawing of the figures is quaint, but the chief interest in them is that they show us the dress of the day. The head-dress of the women and the hats of the men are very familiar to us, and we ought to be thankful that historical accuracy was a quality the sixteenth century designers troubled themselves no whit about. The designer of this tapestry clothed the Prodigal Son in out-at-elbow garments of his own time, as he clothed the rest of the folk in the sumptuous apparel he saw on the bodies of those who moved about him. We, in these days, attempt historical accuracy, and perhaps it is as well, for the story of the Prodigal Son, treated with the local accuracy of this sixteenth-century designer, with the trousers and top hat of the male, and the bonnet and crinoline of the female of the present day, would have an indescribably ludicrous effect, even to those who might come three centuries afterwards.

A passing glance may well be given to the Persian carpet (also of the sixteenth century) whose beautiful colours harmonise so well with the tapestry. The centre part has a crimson ground ornamented with the familiar leaf-and-flower ornament, arranged geometrically, and whose prevailing colour is amber and light yellow, varied with dark and middle and turquoise blue, grass green, grey, and cream colour. The border, with a rich juicy cold green ground, has the colours of the centre brought into it. Queen Elizabeth's Virginal, decorated with arabesques in gold on dark green ground with red panels, is worthy of attention.

The other two rooms, one called an eighteenth-century English room with an elaborate architectural chimney-piece ornamented with plaster work and some rather quaint furniture, and a finely-inlaid music-stand for a quartette; and a Louis XVI. *salon*, with its gilt furniture and ornate decorated cabinet-work, are interesting in a lesser degree, as the historical

accuracy of the rooms is somewhat doubtful. Messrs. Wright & Mansfield have lent several of the accessories in these two rooms, and in the *salon* is an elaborately-painted harpsichord lent by Viscount Powerscourt, said to have belonged to Marie Antoinette.

#### A STEEL STRONG-ROOM FOR A BANK.

We have had an opportunity this week of inspecting, at Messrs. Chubb & Son's works in Glengall-road, Old Kent-road, a very large and in other ways noteworthy strong-room of steel, which has been made by them for the National Bank of Scotland, Edinburgh, and temporarily erected for inspection prior to being dispatched to its destination. The strong-room, in addition to being the heaviest in proportion to its size yet constructed by Messrs. Chubb, is also believed to possess the thickest walls of any steel room of such a size in use by British bankers. In point of construction, it contains some new and important features, which have been introduced for the first time, and which ensure greater security than has been hitherto obtained. This room is constructed with a triple series of plates, as adopted for many years in Chubb's bankers' safes, giving both toughness and hardness, so that neither the force of blows nor the cutting of drills has any effect. This "compounding" of the plates involved the drilling of no fewer than 1,000 holes in each section, each hole being closed up, and securing the different thicknesses in such a way as to ensure strength. To effect this drilling, the machinery at Messrs. Chubb's works has been running night and day. When the compounded sections were completed they were jointed with one another in a novel and peculiar manner. To insure absolute accuracy, and the matching of all holes, every plate and bar was marked from a template, and then drilled with twist-drills, under a powerful multiple machine. The strong-room is divided internally by heavy steel



partitions into various compartments, these partitions containing cases of non-conducting composition, so that a fire happening in any one part would be isolated. By means of small fireproof doors or manholes (ordinarily to be kept locked) in the partitions, access could be obtained, in case of emergency, from one compartment to another. The room is entered by three massive doors and grilles, measuring 7 ft. by 3 ft. 4 in., and 7 in. thick. These doors weigh about a ton and a half each, and are hung on hardened steel pins, on which they turn with the greatest ease. Apart from the immense thickness of compounded hard and mild steel plates in these doors, the chief feature is the use of Chubb's patent diagonal bolts, as fitted to some of the safes exhibited at the International Exhibition, where they obtained the gold medal. The bolts, shooting out from the edge of the door at opposite angles of 45 degrees, form a powerful dovetail into each side of the frame in which they engage; so that any attempted wedging between the door and its frame simply tends to bind the bolts tighter in their holes. Unlike more elaborate claws, clutches, and interlocking bars, these bolts are perfectly simple in shape, and so, whilst effecting a similar result, are much easier and more certain in their action, and do not involve excessively large bolt-holes in the door-frame. The bolts in each door, twenty in number, weigh 2 cwt., but by careful balancing can be thrown out or drawn in very easily. Besides the points named, there are various secret methods and appliances used in order to defeat all attempts of burglars to enter the room by any known or possible ways of attack. In each vestibule of the three doors is a pair of folding grilles for use during day-time when the doors may remain open; these are self-locking. The inner compartments of the room are fitted with steel treasuries, cupboards, and shelving for the use of officials. The whole strong-room has occupied seven months in construction; it measures 50 ft. in length and weighs close upon 100 tons. It may be mentioned that so accurately were the component parts of this structure turned out by the machinery that when they came to be put together there was found to be only a difference of  $\frac{1}{16}$  in. in the total length at the top, the bottom being 50 ft. exactly. By taking off  $\frac{1}{16}$  in. from each of the end plates at the top the structure was exactly the size stipulated for. When erected in its permanent position it will be encased in immense walls of concrete surrounded by a patrol passage, outside of which again comes the massive stone outer wall of the main building.

To give an idea of the capacity of this steel structure, it may be mentioned that it has been calculated that it would hold 1,250 tons weight of gold bullion, equal in value to over 110,000,000l.,—considerably more than the national revenue of this country for a year.

#### CASE UNDER THE EMPLOYERS' LIABILITY ACT.

SCOTT v. OWEN.

In this action (which came before Mr. Justice A. L. Smith, sitting as Vacation Judge), the plaintiff, a workman unaccustomed to the use of the circular saw, was using it under the impression that it was not in motion; the saw was set in motion, and he lost a finger. He obtained judgment against his employer for 50l.

Mr. Ruegg, for the defendant, said that as no Divisional Court was sitting, with the permission of his Lordship, he would move this Court for a rule nisi to enter judgment for the defendant or for a new trial.

Mr. Justice A. L. Smith doubted whether the application should not have been made in chambers. Mr. Ruegg said that the grounds of the application were—(1) That there was no evidence of negligence; there was no evidence that Reeves, the workman in charge of the saw, had set it in motion; (2) Reeves was not a workman for whom the employer was liable under the Act; (3) the plaintiff was guilty of culpable negligence.

Mr. Justice A. L. Smith granted the rule nisi, on payment of the 50l. into Court.

**The Bells of Exeter Cathedral.**—A subscription is on foot to re-hang and re-arrange the bells of Exeter Cathedral, by way of a memorial of the Rev. H. T. Ellacombe, the father of bell archaeology, whose death we recorded a few weeks since.—*Athenæum*.

#### "SCAMPED DRAINAGE WORK."

SIR,—The paragraph in my paper at Aberdare, to which you allude in your issue of the 5th inst. [p. 344], was not intended by me to convey, against any class of builder, a charge of wilful malpractice. I would not willingly believe that builders who knowingly insert seriously defective drainage in houses are other than a minority of the profession. But I do believe that the integrity of underground work can only be secured by constant attention on the part of the person ultimately responsible for it, and I do fear that "builders in general" are not yet sufficiently impressed with its importance to give the amount of personal supervision necessary to ensure it. It is the practice of delegating the superintendence of the details of the work to subordinates, who care less, which opens the door to many of the results that I described "even in the best class of houses."

ISAMBARD OWEN.

September 10th, 1885.

#### BOURNEMOUTH UNDERCLIFF DRIVE COMPETITION.

SIR,—The Bournemouth Improvement Commissioners advertised for competitive plans for the above last May, and although most elaborate printed conditions were issued, no mention was made as to cost, other than a general clause that the commissioners wished for efficiency combined with economy.

Twenty-nine sets of plans, with estimates varying from 22,000l. to 116,000l., were submitted, and I now hear that one of the commissioners proposes to reject all plans with estimates over 30,000l.

If this is the case, it is most unfair to the engineers who have devoted a large amount of time to the matter, without any guide as to the amount to be spent.

It is only right that the engineer who is to adjudicate on the plans should say which is the best one combining the requirements of the commissioners, as set forth in the conditions of competition, irrespective of any limit of cost. I enclose my card.

A COMPETITOR.

September 9th, 1885.

#### PROVINCIAL NEWS.

**Paulton (near Bristol).**—The cottage hospital here, which was opened in the year 1872 through the exertions of the late Mr. Mogg, of Farrington, aided by Mrs. Mogg and other personal friends, having, on account of the dilapidated condition of the buildings and the defective sanitary arrangements, become unsuited for its purpose, a new hospital is now in course of erection at the southern end of the village, on a site given by Capt. Molyneux Carter, and on the 3rd inst. the corner-stone was laid by Mrs. Mogg, of Farrington Gurney. It is placed, according to Masonic rule, at the north-east corner of the building, and is lettered on its east face as follows:—

"1875. I.G.M.-M.M."

In a cavity in the centre of the stone was placed a bottle containing a parchment with the following inscription:—

"1875. V.R.—The corner-stone of this hospital was laid on Thursday, the third day of September, one thousand eight hundred and eighty-five, by Mrs. Marianna Mogg, of the Manor-house, Farrington Gurney; Mr. W. F. Unsworth, Associate of the Royal Society of British Architects, of 2, Great Queen-street, Westminster, being the architect; Mr. John Vellia, of Frome Selwood, being the builder; Thomas Williamson Bull, vicar of Paulton, treasurer of the building fund and honorary chaplain."

The hospital will be erected of local stone and red brick, with a high-pointed roof of Bridgewater tiles. It will contain a men's ward fitted with seven beds, to be called the Kilmerston ward, after the late Lord Hylton, who erected a similar ward in the old hospital; a women's ward fitted with four beds, to be called the 'Julia Hill' ward, after a lady whose family have been great benefactors to the parish of Paulton, and who has herself contributed 350l. towards this undertaking; a third ward for any case requiring separate treatment; a patients' convalescent-room, sitting and bed rooms for the lady superintendent, wardman, and other servants, a surgical and operating room, &c. The total estimated cost of the building,—inclusive of boundary-walls, fences, &c.,—is about 1,800l.

\* We have been asked by the builder to insert this inscription, and although, as a rule, we cannot comply with such requests, we do so in the present instance in order to point out that there is no society named the "Royal Society of British Architects." Mr. Unsworth is an Associate of the Royal Institute of British Architects.

**Peterborough.**—8,500l. was set apart by the Charity Commissioners in 1882 for the erection and maintenance of new buildings for the King's School, Peterborough. The site was given by the Ecclesiastical Commissioners, and at that time consisted of a plot of ground on the Thorpe-road, afterwards exchanged for an admirable and more suitable site on the Park-road, between Granville-street and Huntly-grove. The buildings were not commenced until the beginning of the present year, but the pile is now completed. Mr. J. E. Naylor, of Derby, is the architect. The entire frontage of the building is 184 ft. It has been built of dull red bricks, with white stone dressings, by Mr. John Thompson, Peterborough. In the centre is a substantial tower, pierced at the foot by the main entrance. To the right, at the end of a long wing, stands the main school-room; to the left, in a similar position and attached, the master's house. The whole is built in the Tudor style of architecture. It will accommodate when completed 100 day boys and forty boarders, but the room for the latter is now limited to 28. At the south end, or on the left, as stated, is the master's house, with drawing, dining, and morning rooms. On the other side of his entrance hall is the boys' dining-room, with oak and pitch-pine fittings, the windows looking directly on to the Park-road, and being 85 ft. by 22 ft. in extent. Leading from it is a corridor to a lobby for hats and coats, also containing a lavatory, which in its turn communicates with a corridor running parallel with the main or tower entrance, 63 ft. in length. The main hall is some 14 ft. square, and is surrounded by the master's common room, 14 ft. square, and the main staircase leading to the studies of the scholars. On the other side of the long corridor are three class-rooms 21 ft. by 19 ft. in size, which being passed, the large school flanking the right wing is approached. It has at the east end a large window of plain perpendicular tracery, filled with cathedral glass. The room is 50 ft. long and 25 ft. broad, plastered walls, with varnished pitch-pine fittings, the ornamental rafters supporting the roof being of the same material. It is about 30 ft. high, and is a spacious, well-ventilated building, lighted by nine plain Tudor windows filled with pale cathedral glass. The west end is so built that it can be at any time broken through in order to join a library, which funds at present have precluded from being erected at its western extremity. This schoolroom is designed to afford accommodation for 250. At the top of the main landing just mentioned, are the house-master's rooms, at present to be used for an infirmary until the sanatorium and sick rooms can be built at the back. Passing inwards are to be found the dormitories, which are built on a novel principle. Each sleeper has a little private dressing-box erected at the head of his bed, whilst the bed itself stands in the open room. This combines all the privacy of a cubicle, and at the same time allows of free supervision. The three dormitories measure 77 ft. in length, and are communicable into one another by double swinging doors.

#### CHURCH-BUILDING NEWS.

**Dartmouth.**—The chapel-of-ease (built 1831) to the old parish church of St. Petroc has just been transformed and rededicated to St. Barnabas, from the designs of Mr. George H. Birch, F.S.A. The building was of the most dreary carpenter-Gothic type then prevailing, and the ascent to it by a path zig-zagging up the cliff, 40 ft. above the road, exceedingly difficult. The entrance was at the east end, the altar being at the west; and, internally, was a mass of bewildering pews and galleries. The alterations effected have been to build a chancel at the proper east end, the galleries being removed and the roof opened up. Arcades have been built on each side, of brick and the portion of the roof over the aisles thus formed has been panelled with a wood ceiling divided into panels with moulded ribs, the central portion over the nave being open to the ridge with an arched panelled ceiling in wood, the old tie-beams and king-posts being cased. lofty chancel arch of stone, the inner arch being carried on corbels, opens into the new chancel, which is lighted by seven lofty lancet-windows. The chancel is apsidal in plan, with an organ-chamber on the north side. The entrances are still obliged to be at the east end, but an ambulatory, with a lean-to roof, surrounding the



apse, has been added. This shelters the porches and stone staircases leading to the church. The chancel is raised on a crypt, to be utilised for the daily service, and the old altar removed into it. The whole floor of the church has been lowered nearly 13 ft. into the rock, to render the access easier, and a large vestry formed under the organ-chamber, access to this vestry and crypt being from the lower level. Externally two lofty flanking turrets, with slated spires, stand at the junction of the old nave and new chancel, and these are connected by a gallery with a lean-to roof, above which is an open arcade of stone connecting the turrets, and in which is to be placed a carillon. The materials are of local stone throughout, with Box-ground dressings, and the roofs are covered with grey slates. The fittings internally are of pitch-pine, and the roofs are stained, but not varnished. The altar frontals have been worked from full-size drawings by the architect by Miss Wollard and Miss Carpenter, of Chelsea-gardens, and the sanctuary hangings and embroidered dossel supplied by Mr. Tatterhall, and designed by the architect. Messrs. L. J. Pillar & Sons, of Dartmouth, have carried out these alterations, and the total cost has been a little over 3,000l.

**Luton.**—There has just been erected in St. Matthew's Church, Luton, a new reredos, the gift of Mrs. Wood, widow of the Rev. John Wood, the first incumbent of the parish. It is the work of Messrs. Jones & Willis, of London and Birmingham, and has been put up by Mr. Walter Pakes, of Luton. The material used in its construction is Caen stone. Under each of the three arches which constitute the main feature of the work, is a panel, which is flanked by two columns, one of the red marble of Devonshire, and the other of Greek marble. The middle panel is of dark alabaster, plainly polished, in front of which stands a cross of Sicilian marble; while the others are of Caen stone, relieved with elaborately-carved devices emblematical of the Holy Sacrament.

**Bicton.**—The foundation-stone of a new church here has been laid by Bishop Bromley, the site of the church was given by Col. Wingfield, and is next to the old burial-ground. It is being erected at a cost of 2,233l., and the erection of the tower will cost an additional 387l. The building is designed in the thirteenth-century style, the exterior being faced with Cardiston stone and Shelvock dressings, and the interior with Redhill stone and Shelvock. The principal entrance will be on the south side of the church. The roof will be composed of open timber, stained and varnished. There will be a chancel, vestry, and organ-chamber, the latter being situated underneath the tower. The seats in the chancel-stalls will be of oak, and the fittings in the nave of pitch-pine, the latter accommodating 150 persons. The tower will be 70 ft. high to the vane, and will be a square structure, the length of the nave 54 ft. by 30 ft. 6 in., and the aisle 18 ft. 6 in. The chancel measures 25 ft. long and 18 ft. 6 in. wide. The nave will be 21 ft. high to the wall-plate. The architect is Mr. A. E. Lloyd Oswell, Shrewsbury, of the firm of Messrs. Oswell & Smith; Messrs. T. & G. Groves are the builders; and Mr. H. L. Whittingham is clerk of the works.

**Lyceum Theatre.**—This theatre has undergone a complete change in the *motif* and character of decoration, and so far as the department behind the proscenium is concerned, of structural plan. Over the stage the roof has been elevated nearly 20 ft., by which improvement the scenery is now taken up straight out of sight without any rolling or doubling. With regard to the auditorium the old box-fronts have been removed. In their place Mr. C. J. Phipps, F.S.A., the architect under whose entire superintendence the new works have been brought to a conclusion, has introduced a style of decoration somewhat of the character of that of the interior of Her Majesty's theatre as it appeared before the destruction of that house in December, 1867. The paintings have been executed by hand on a flat ground, modelled in with massive mouldings. All the details of the ornamentation were entrusted to Messrs. Campbell, Smith, & Campbell. Several improvements in the construction of the auditorium have been effected in a manner to interfere very little, if at all, with its original plan. Four of the private boxes at the side of the stage have been removed, and additional space given to the stalls.

## Books.

*The Builder's and Contractor's Price-Book and Guide to Estimating (late Bevis's).* London: Scientific Publishing Co. 1885.

**HIS** price-book is a great improvement on Bevis's. It is more complete and perfect, and has been carefully revised and had many things added to it, making it, in our opinion, as good as other existing price-books; but all price-books that talk of guiding builders and contractors in estimating aim at more than they perform. No price-book exists that is of much use to a builder for this; they may be of use to refer to for some not often met with item; the prices are much too high for any other use to the competing builder. The first section, on plant, machinery, scaffolding, &c., is a very complete and useful one, especially to contractors doing a very large business. In Section 2, Excavator, the prices are very fair until we come to the drain-pipes on page 35. They are given at the gross "Lambeth" list; this would give a builder 40 to 50 per cent. profit, if he could get it. It is the same with most of the price-books.

The cartage and horse-hire is just as low in price. The prime cost that a builder has to pay to a cartman is 11s. per day for a one-horse cart and man; this should be charged 12s. 6d. per day, or 1s. 6d. per hour, as seldom more than nine hours is worked by them.

In Section 3, Bricklayer, the price of 32s. per thousand for bricks is really a prime-cost average and a very fair one, but the gross prices for labour and material that follow are high, 12l. per rod being about the present price for brickwork in stocks. The prices for daywork are evidently country ones. A bricklayer is paid 9d. per hour in London and working expenses cost 4d. Where there is a foreman of works nothing less than 11d. per hour will pay a builder, and 9d. is given. This is clearly an error. Labourer is put at 6d. This is exactly what he is paid; then there is the addition to make for working expenses. Some of these prices want altering.

In the Slater, page 58, the value of Countess slating, 24 lap, zinc nails, is given at 40s. This is at least 30 per cent. too high.

In the Mason, some of the prices for stone in block are the lowest the builder can buy them at, to which his waste expenses and profit have to be added.

In the Carpenter, the prices for measured work are the best and most fair in the book, though not low enough for estimating in competition.

In the Joiner, the floors are given at impossible prices, the value in competition of the closest for 1 in. floors laid complete being 19s., and for 1 1/2 in., 23s. per square.

The skirtings are just as high as the floors are low. As to the doors, they are priced as in most price-books, at about 50 to 100 per cent. on prime cost. The prices for staircase work are very good on page 94; while on page 99 labour only is priced at nearly the same prices.

There is a very complete list of ventilators.

The prices of lead work in the Plumber are high. On p. 141 the rain-water goods are too low, and would not pay a builder. How these excessively low prices creep into a price-book of any kind where the prices are generally so high, it is difficult to imagine.

There are many articles given in Smith and Founder much more fully than some of the other books. Of the rolled iron girders or joists there is a very good list, and really about the lowest and nearest list we have ever seen in a price-book.

Turning to the Plasterer, page 170, we find a very low list of prices for Portland cement work that would not pay, they are barely "prime cost" for the plain face; the arris is too high at 2 1/2d., and the 1 1/2 in. floors at 4s. are too high.

In the Gasfitter the gas-pipes are given, as usual, at the gross list price, off which there is a long discount, and, when labour and profit are added to the net prices, there is still a large excess. The same may be said of the list of prices for British plate, &c. Gross prices are given when they would leave a fair profit at 15 per cent. discount. Some of the prices in the Painter daywork are exact "prime cost," some three times the cost. There are a few things under "Sundries" that are useful, and the usual memoranda, wages table, &c., are given at the end. Alto-

gether the book is a better one in many particulars than it was as "Bevis's," but possesses, as we have already said, most of the faults that most price-books have, and should, we consider, be revised by practical men of each trade, capable, as so few practical men are, of carefully pricing each item of their own trade, so that there is a fair profit left to the builder, and yet leave the price a fair one to him who has to pay it. There seems to be a fear with most of the books to let the public or those who represent them, the architects, into the secret of the true value of builder's work. This we think a mistake, at least for the honest builder who is willing to do work at a fair price and ordinary profit.

*Gasworks, their Construction and Arrangement, and the Manufacture and Distribution of Coal-gas.* Originally written by Samuel Hughes, C.E.; revised, re-written, and much enlarged, by WILLIAM RICHARDS, C.E. Seventh edition. London: Crosby Lockwood & Co. 1885.

A TREATISE written thirty years ago on the subject of gas, however ably dealt with according to the best information attainable at that date, would have little other than historic value for the student in 1885. To maintain the efficiency of such a work, it must be served like the knife of the Irishman, that was not only new bladed, but new handled. Such a duty has been performed for this volume of Weale's Rudimentary Series by Mr. Richards, the author of a valuable "practical treatise on the manufacture and distribution of coal gas," which was printed by Messrs. Spon, in a handsome quarto, in 1877.

Since Mr. Hughes wrote, Mr. Richards reminds us, the cost of the production of gas has been reduced one-half, with the result of multiplying the consumption twelve-fold. Advance has also been made, if not so rapidly as might have been anticipated, in that which is, after all, the true economical use of coal-gas, namely the liberation of heat. "The successful application of gas for heating apartments and buildings, for cooking, as well as for producing motive power, are of comparatively recent date, and its superiority for these, as well as for many manufacturing purposes, is beyond all doubt." As a motor, Mr. Richards thinks that gas will, in many cases, supersede steam-power, on account of superior safety, economy, and facility of application on any required scale. Perhaps of all the economical qualities of gas, whether as an illuminator or as a heater, none is more valuable than its capability of being instantly awakened, at any moment, to its full energy, and as instantly thrown into a state of rest when its activity is no longer required. There is no loss incurred in kindling or in raking out the fire, or in getting up or blowing off the steam. When an occasional, and not a constant, service is required, the economy thus to be secured by the use of gas is very considerable.

The twenty-four chapters of which the volume is composed might have been advantageously grouped in books. They deal with, first, the history and the chemistry of gas lighting; secondly, the construction and details of gas-works and appliances; thirdly, the distribution and application of gas, and the various influences which affect its chemical or photometric value; with some glances at the various methods of producing light.

Among those parts of the book which have a wider interest than the mere technical details, is a chapter on gas-holder tanks, whether constructed of brick, stone, iron, composite materials, or concrete. "The merit of making the first concrete tank is due to Mr. Douglas, of Portsea." The date is not annexed. A tank of 112 ft. in diameter and 26 ft. deep has been built entirely of concrete rendered with Portland cement and sand by Mr. Valon, at Ramsgate, for a cost of 3,500l. "But this sinks almost into insignificance when compared with a concrete tank designed and constructed by Mr. George Livesey, at the South Metropolitan Company's works, in the Old Kent-road. The tank is 218 ft. in diameter, and 55 ft. 6 in. deep at the sides. It is formed entirely of concrete, without a brick or a stone in the ordinary sense of the term, or a single yard of puddle, in the whole building. The ground where it is erected is loose running sand, with abundance of water at the depth of 11 ft., and necessarily it would be supposed to be a very costly structure by reason of the soil, and the great depth and diameter of the tank; yet, strange to say, it is



among the cheapest tanks on record, as it cost but 18,500*l.*, which is little more than 9*l.* per 1,000 ft. capacity of the tank." This compares favourably with the cost of the Ramsgate tank, which we make to be about 13*l.* 5*s.* per 1,000 cubic feet for about one-fourth of the capacity of the other. But the difference is simply an illustration of the mathematical law of the different rate of increase of the superficies and the contents; a law to the appreciation of which by Mr. Brunel we owe much of the increased size of our merchant shipping.

Another point of interest, as to which Mr. Richards's remarks might with advantage have been somewhat clearer, regards the difference in both production and consumption of gas due to variation in barometric pressure. "Munich is about 1,700 feet above the sea, and, according to Dr. Frankland, a description of gas that would give the light of 100 candles at London would there only give the light of 91 candles; and if the same gas were burned at Mexico, which is about 7,400 feet above the level of the sea, it would give the light of 61½ candles only."

Chapter XXI. contains a short account of the electric light, but does not enter into the question of that natural division of the field of practical application which may exist between the distinct sources of illumination. Even where the dynamo machine is most applicable, it not unfrequently happens that it can be driven most economically by a gas-engine,—another illustration of the greater calorific than luminous energy of coal gas. Another point which might with advantage have been mentioned in the volume is the method of applying gas to the maintenance of the even temperature of green-houses. Coal gas, indeed, is so fatal to plant life that no flowers can be kept alive in rooms where gas is burned. But by the introduction, in a little closet on the outside of a greenhouse, of a small tank of water heated by a gas jet, and connected with water-pipes within the greenhouse, the advantage of an economical source of heat, that requires no attention, may be combined with the perfect freedom of the interior of the greenhouse from any of the products of combustion,—excepting, of course, heat, if that may be so designated.

We can heartily recommend Mr. Richards's little work to, as we should anticipate, a pretty general class of readers.

#### VARIORUM.

FROM the City and Guilds of London Institute for the Advancement of Technical Education (offices: Gresham College, London, E.C.), we have received a bulky "Programme of Technological Examinations" for Session 1885-86. Examinations are to be held in no fewer than thirty-five subjects, "but no candidate may be examined, in the same year, in more than one subject." A new subject, "Brick-work and Masonry," has been introduced into the programme, Mr. John Slater, B.A., being the examiner. Other subjects of immediate interest to our readers are "Carpentry and Joinery" (Mr. Thomas Blashill, examiner), and "Plumbers' Work" (Mr. W. Eassie, examiner). Arrangements are made whereby the Institute will afford facilities for carrying out an examination in any of the subjects, wherever a class for instruction is formed, or a sufficient number of candidates present themselves, provided a local committee undertakes to carry out the examination according to the rules laid down. The examination will be in two grades: I. Ordinary; II. Honours. The Ordinary Examination is intended principally for apprentices and journeymen; the Honours Examination for foremen, managers, and teachers of technology, but candidates may enter themselves for either grade, except in certain subjects. There is no limit of age, and no fee for examination. The examinations will be held in May, 1886. The "Programme," which gives syllabuses of the examinations and much other information as to the mode of procedure, should be obtained by employers of labour and others who may be desirous of doing something for the advancement of technical education and industrial prosperity. A well-printed "Pictorial Supplement" to the *Torquay Directory and South Devon Journal* has been sent to us. It contains a number of well-executed wood engravings of that pleasant seaside resort, together with extracts from articles which have appeared in various journals (the *Builder* amongst them) on the sanitary and other merits of the town.—Mr. Edward Stan-

ford, of Charing-cross, has sent us a new edition of his Map of the new London Boroughs, which defines in colours the boundaries and sub-divisions of the new boroughs. On the appearance of the first edition, we commented (vol. xlviii., p. 253) upon some of the anomalies of metropolitan boundaries, and though these are only too apparent in the present map, we are pleased to see that the Boundary Commissioners have not sanctioned the extraordinary boundaries of electoral divisions which were proposed in some quarters of the metropolis, and of which we spoke on the occasion referred to.—"Chantry's Peak Scenery, or Views in Dorsetshire," is about to be re-issued in a handsome form by Mr. Frank Murray, of Moray House, Derby, who has sent us a prospectus of the work. The book will contain twenty-nine well-executed copper-plate engravings by W. B. and George Cooke, after original drawings by Sir Francis Chantrey, together with introduction and brief topographical and historical descriptions by Mr. James Croston, F.S.A.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

###### 3,220, Water-closet. J. Friend.

The closet discharge-pipe is closed by a plunger fitting into the conoidal seating. The overflow-pipe is made of metal, and trapped at the top by a cap. A crank is attached to the plunger to work the flushing valve.

###### 6,978, Sewage Receptacle. W. R. Lake.

Sewage enters the receptacle by a pipe being strained through a diaphragm. To allow the liquid to run into the sewer an arrangement of levers, &c., is provided by which the air in one of the pipes is compressed, and this pressure causes the liquid to flow into the sewer.

###### 7,499, Hack Covers for Bricks. W. S. Codner.

The covers are made of sheet iron, either plain or corrugated. They are bent at an angle, and have flat-bottomed stretchers of sheet iron spanning the open space underneath. If preferred, the covers may be bent over in a curved form instead of at an angle.

###### 7,723, Hot-water Heating Apparatus. P. Dalton.

The pipes are intended to sustain a high internal pressure, and are joined by forcing the coned end of one tube into the flattened end of the other by means of sockets, with right and left handed screws. A small portion of the system is contained in a furnace, and the pipes are disposed variously as may be required. The whole is maintained full of water, and is fitted with relief valves, &c., connected with the filling cistern.

###### 8,256, Concrete Walls. B. Reynard.

The faces of the walls are composed of thin slabs, on the inner face of which dove-tailed grooves are formed to receive the edges of vertical bonding slabs. The wall is built without the use of temporary boarding, the concrete being filled in as the sides rise. Additional dovetailed grooves may be made in the slabs to act as a further bond if wished. In retaining or dock walls, faced with a single layer of slabs, the bonding slabs are held by being widened out in the concrete.

###### 9,782, Decorating Mirrors. M. T. Sharpe.

A design is pencilled in reverse on the back of the mirror and the silver within the outline scraped off; the clear part is then rubbed with sand-paper and the design is painted in oils. The design is looked at through the glass and cannot be injured from the front.

###### 12,712, Felt for Roofing, &c. S. Frankenberg.

Woolen rags or manilla rope made into a pulp and mixed and boiled with mastic resin, beeswax, ground leather-cuttings, ground cork, and pitch which has been rendered inodorous by adding resin-oil, varying according to the quality of felt required. The pasty mass is passed through heated rollers, to form it into strips or sheets, which are then sprinkled with ground slag and finished by passing through wooden rollers.

###### 12,787, Raising and Lowering Windows. W. Corteen.

Cords are attached to the sashes and carried over pulleys at the top. They are then brought round so as to form a continuous band which may be moved by turning the pulleys round by a handle from outside the frame. A toothed wheel may be fixed on the same axle as the pulley, a detent pressed down by a spring engaging with it and stopping the sash at any required point; or a spring bolt may be used entering a hole in the sash and being withdrawn by pulling the cord.

###### 16,968, Wrought-iron Window-frames. J. Griffin.

The bars are united together and to the window frame by means of angle pieces or b-uses of malleable iron, steel, and secured by copper rivets.

10,290, Cathead Hoist. J. Formby and C. Keizer.

The cathead is extended or withdrawn by means of a screw actuated by reversing bevil gearing.

#### APPLICATIONS FOR LETTERS PATENT.

Aug. 28.—10,197, T. Robbott, Revolving Screens for Screening Stone.—10,211, H. Glendinning, Springless Locks and Latches.—10,213, A. Feist, Swivel Joint for Pipes.—10,224, F. Baxter, Apparatus for Automatically Shutting off the Supply of Water to Cisterns, &c.

Aug. 29.—10,235, G. Kyte and A. Williams, Gully Grids and Sewer Traps.—10,249, J. White, Water-waste Preventing Cisterns.—10,263, G. Walker, Laying Wood-flooring or Pavement Staircase Treads and Landings.  
Aug. 31.—10,282, T. Severley, Improvements in Blowing, Ventilating, Exhausting.—10,288, W. May, Flush Sash Lifts.—10,314, E. Douglas, Gritting Marble.—10,321, B. Mills, Improvements in Ventilators or Blowing Machines.

Sept. 1.—10,322, H. Thomas, Joints of Stonework and other Similar Pipes.—10,339, M. Shalbourne, More Efficiently Carrying Water off Roofs.—10,344, J. Rowbottom, Improvements in Water Motors.—10,347, G. Blake, Improved Sash-fastener.—10,349, J. Scholes and E. Hall, Ventilating Water-closets, &c.—10,356, W. Barlow, Improved Construction of Portable Forges.—10,362, G. Butcher, Manufacture of Cement.—10,365, T. Glover, Stench Traps or Gullies.

Sept. 2.—10,379, J. Peachey, Sanitary Urinal and Disinfectants.—10,409, H. Gardner, Compounds for Preventing Rust or Decay in Wood, Metal, &c.

Sept. 3.—10,411, W. Bruce, Fixing Rain-water Waste and Soil Pipes of Iron and Composition.—10,416, R. Kistner, Improvements in Water-closets.—10,446, G. Bird, Paving Bricks.—10,464, W. Lake, Cement for Paving and other purposes.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

7,647, A. Bingham, Improvements in Locks, Catches, and other Fastenings.—8,490, F. Holloway, Ventilated Water-closet Basin.—8,655, V. Kidd and R. Kistner, Improvements in Brick Windows.—8,874, R. Stanley, Improved Method of Preparing and Burning Bricks, Tiles, &c.—9,021, J. Spence, Construction of Roofs.—9,097, D. Macdonald, Improved Bricks.—9,222, A. Fullicks, Blocks and Slabs for Structural and Ornamental purposes.—9,469, W. Macfarlane, Closets and Urinals.—9,625, J. Kanyon, Securing Knobs or Handles to the Spindles of Locks or Latches.—9,703, W. Youton, Sliding Window Sashes.—9,759, J. Ostine, Fastenings for Windows.—339, J. Lorrain, Heating, Cooling, and Ventilating.—8,877, J. Sturrock, Apparatus for Finishing Water-closets.—8,154, W. Joy, Manufacturers of Cement.—9,616, C. Wynn, Water-closet Apparatus.—9,616, F. Gibbons, Manufacture of Tessera and Mosaic.—9,617, J. Morrell, Improvements in Dustbins.—9,917, C. Longbottom, Securing Door Knobs or Handles.—9,942, G. Beadon, Improvements in Doors and Door Fastenings.—9,998, C. Wharton, Self-acting Window Sash Fasteners.

#### COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

13,738, J. Carruthers, Folding Shutters for Shop Windows, Doors, &c.—14,324, P. Justice, Furnace for Burning Cement, &c.—14,896, T. Walter, Flushing Apparatus for Water-closets.—15,017, H. Williams, Mechanism for Raising, Lowering, and Securing Sliding Window Sashes.—15,314, J. C. and P. S. Spooner, Supplying Water Cisterns with Disinfectants.—15,728, W. Cliff, Constructing Glazed Brick Walls.—505, M. Syer, Syphon Water-waste Preventers.—9,210, W. Frost, Improvements in Window Sashes and Frames.—9,220, W. Scott-Moncrieff, Construction of Water-closet Apparatus.—14,316, R. Willis, Preparation of Wood before Varnishing, Polishing, and Painting, &c.—17,062, J. Whitehouse, Metallic Handle for Cabinet and other Furniture.—2,731, E. Deacombe, Door Locks.—8,202, W. Hunter, Damper for Regulating the Draught in Fireplaces, Brick Kilns, &c.—8,087, A. Reddie, Compounds for Preserving Stone.

**Quarry House, Frindsbury.**—With reference to this interesting house, of which we gave a view a fortnight ago [p. 307], the *Chatham and Rochester News* says,—"All country and visit this little-known house before it is destroyed. It is a very great pity that so interesting a building as this should be doomed to destruction, and it is only right to raise voice against it; but if it must go,—and, on account of its position, there seems little hope of saving it,—would it not be possible for the materials to be preserved and set up again as a museum, which Rochester does not possess, the shame be it said of so venerable a city. The property belongs to the Bridge Wardens. Surely so important a body could do something towards saving from utter destruction so interesting a relic of former days."



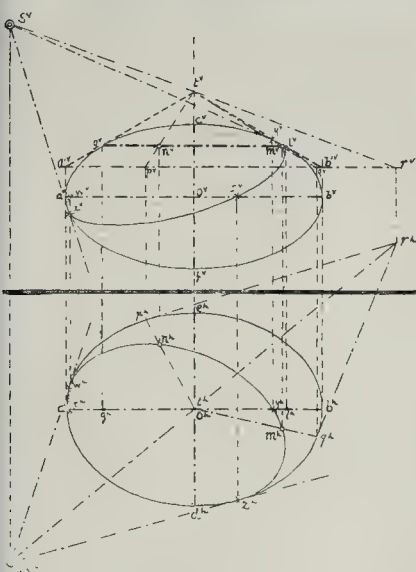
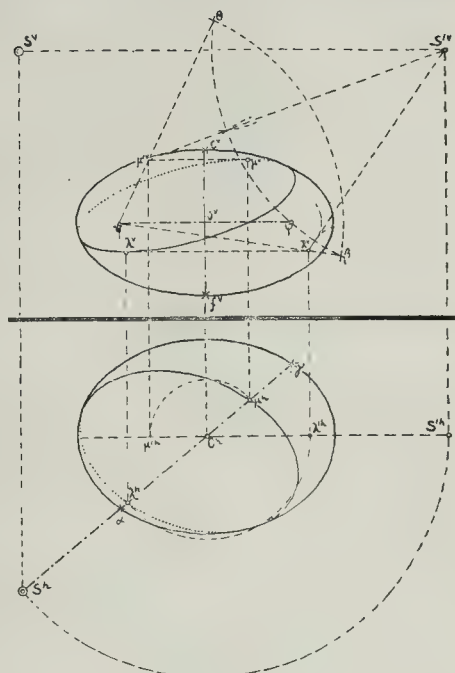


Fig. 158.



*Fig. 160.*

The Student's Column.

DESCRIPTIVE GEOMETRY.—PART II.

XVI.

XVI.  
and the curve of contact of any surface of the second degree with a circumscribed cone of which the vertex S is given.

**T**HIS problem has to be solved when delineating the shade of a surface of the second degree lighted by a candle.

Surfaces of evolution such as the ellipsoid of the preceding paragraph are but special cases of the surfaces of the second degree, and, in strictly logical sequence, we should have begun by considering the more general class of surfaces before studying a special case. We have not done so for two reasons: firstly, because surfaces of revolution are far more commonly met with in architecture than the more general class of surfaces to which they belong; secondly, because in order to be able to thoroughly comprehend the methods used in dealing with surfaces of the second degree in their general form, it is requisite to be well acquainted with the science of conic sections: we must, therefore, omit, for our readers' sake, the scientific reasons of the methods employed, and content ourselves with giving only the practical operations.

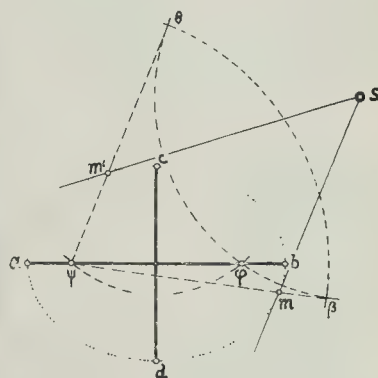
We shall assume that the surface we have to deal with is an ellipsoid in its most general form (see fig. 158). The largest section of this surface parallel to the elevation plane is the ellipse we see on the elevation; the largest section parallel to the plane of the plan is the ellipse we see on the plan; a vertical section of the surface passing through the centre *O* and perpendicular to the elevation plane will give us another ellipse. The axes *a, b, d, e*, and *c, f* of these three ellipses are the three axes of the ellipsoid. The only difference between this surface and the ellipsoid of revolution already studied consists in the three axes being of unequal dimensions, whereas in the ellipsoid of revolution two of the axes are equal, so that one of the directing ellipses becomes a circle.

Any horizontal section of the ellipsoid, such as the one projected in elevation on the straight line  $g^1 h^1$ , is an ellipsis *similar* to that on the plane, but, of course, smaller. Any sections of the surface by planes passing through the vertical axis  $f c$  are also ellipses, and it could be proved by algebraical calculation that the tangents to all these sections on points at the same level meet in a point  $t$  of the axis  $f c$ . In other words, the point  $t$  in our drawing is the vertex of a cone tangent to the ellipsoid all along the horizontal section  $g l$ .

Now, if we are asked to find on the horizontal



*Fig. 159.*



*Fig. 161.*

section,  $g l$ , the points of contact of the cone of vertex  $S$  with the given ellipsoid, we can use the same method as when we had to deal with a parallel of a surface of revolution. If we take from the given point  $s$ , planes tangent to the cone of vertex  $t$ , these planes will be also tangent to the ellipsoid on some points of the section  $g l$ , which is the base of the cone  $t$ .

To avoid drawing the section  $g$ , we prolong the generators of the cone to the level of the horizontal plane  $a^0b^0$ , because then the base of the cone will be an ellipse identical to the one we have already drawn on the plan. We remind our readers that to find the tangent planes, we must join the point  $s$  given with the vertex  $t$  of the auxiliary cone; this line prolonged to the plane of the base of the cone gives us the point  $r$ , through which the traces  $a^0r^0$  and  $b^0r^0$  of the tangent planes will pass. We get thereby the cone's generators of contact  $tq$  and  $tp$ , the elevations  $q^0q'$  and  $p^0p'$  of which intersect the horizontal line  $g^0b^0$  in the points  $n^0m^0$ , which are the elevations of the points of contact with the ellipsoid. From  $n^0m^0$  we can deduct the planes  $n^0a^0$  and  $m^0b^0$ . By repeating this operation for a series of hori-

zontal sections, we would get a number of points which would allow us to draw the curve of contact, or, say, the shade of the ellipsoid when lighted by a candle placed in  $s$ . To avoid confusion, we have shown the constructions for finding some points of the curve in fig. 158, and we have given apart the shaded ellipsoid in fig. 159.

The points of the curve of contact which touch the outlines of the elevation, such as  $xy$ , or the outline of the plan, such as  $wz$ , are at once determined by tangents from  $s''$  or from  $s^A$ , as seen in fig. 158.

The highest and the lowest points of the curve are on the section of the ellipsoid by the vertical plane standing on the line  $g^h c^h$  (see fig. 160). We could draw this section, and then the tangents to it; but as we have the axes  $a, \gamma$ , and  $j^c c^c$  of this ellipsis, there is a methodod based on the properties of conic sections which allows us to find the points of contact  $\lambda$  and  $\mu$  without drawing the ellipsis. We have carried out this construction by rotating the point  $s$ , as shown in fig. 160, so as to render the plane of the section parallel to the elevation.

As this method of finding the point of contact

to a conic section may be found useful hereafter, we give it to the reader in fig. 161.

From a point  $s$  draw a tangent,  $s m$ , to an ellipse the axes,  $a b$  and  $c d$ , of which are given, and mark the point of contact,  $m$ , of the tangent.

Firstly, from  $c$ , with an axis equal to half the axis  $a b$ , we draw an arc of a circle, which gives us the foci  $\phi$  and  $\psi$  of the ellipse.

Secondly, with radius  $s \phi$  we draw a circle; from focus  $\psi$  as centre, and with a radius equal to the axis  $a b$ , we draw another circle, which cuts the former in the points  $\theta$  and  $\beta$ . The tangent  $s m$  will bisect the arc  $\phi \beta$ , and the point of contact  $m$  will be at the intersection of the tangent  $s m$ , with a line joining focus  $\psi$  to point  $\beta$ . Another tangent  $s m'$  bisects the arc  $\phi \theta$ . (See fig. 161.)

In applying the above method of drawing the tangents to the figure 160, so as to find the highest and the lowest points of the curve of contact, the point  $s$  is replaced by  $s^h$ , the axis  $a b$  is replaced by the axis  $a y$ , the point  $m$  of contact is either the point  $\mu^h$  or the point  $\lambda^h$ . The highest point  $\mu$ , and the lowest point  $\lambda$ , are found by rotating back the plane of the section to its former position,  $\mu^h$  comes then to  $\mu^h$  and  $\lambda^h$  to  $\lambda^h$ ; the same occurs for  $\lambda^h$  which comes to  $\lambda^h$  and  $\mu^h$  comes to  $\mu^h$ . (See fig. 160.)

The same method we have used in this problem for determining the shade of an ellipsoid when lighted by a candle, can be applied to a hyperboloid, and to a paraboloid with only slight modifications.

Find the curve of contact of any surface of the second degree with a circumscribed cylinder parallel to a given straight line.

This problem has to be solved when delineating the shade of the surface when lighted by the sun's rays.

The method to be followed is identically the same we have employed in the former problem, the only difference is that from the vertex  $t$  of the auxiliary cone a parallel to the given line or the ray of light is produced to get the point  $r$  on the base of the cone; we can therefore leave the reader the task of delineating this shade without giving him any further figure. Students who are well acquainted with conic sections will do well to find also the shades of hyperboloids and paraboloids, but what we have given will suffice for practical purposes.

#### RECENT SALES OF PROPERTY.

##### ESTATE EXCHANGE REPORT.

| AUG. 25.                                                                                                                    |        |
|-----------------------------------------------------------------------------------------------------------------------------|--------|
| By WORSFOLD & HAYWARD.                                                                                                      |        |
| Kent, Monks Horton—Higham Hill Farm, containing 32a. 3r. 27p., freehold.....                                                | £1,400 |
| Cockshill Farm, containing 7a. 0r. 22p., freehold.....                                                                      | 410    |
| Stanford—Gymminge Brook Farm, containing 20a. 0r. 22p., freehold.....                                                       | 1,110  |
| An Enclosure of Freehold Land, containing 4a. 3r. 10p.....                                                                  | 350    |
| AUG. 31.                                                                                                                    |        |
| By JAMES STRAVERS & Co.                                                                                                     |        |
| Flumstead—Nos. 15, 16, and 17, Slade Cottages, 33 years, ground-rent 6l.....                                                | 165    |
| By PATRICKSON, KERR, & Co.                                                                                                  |        |
| Bones Park, Southgate-road—Freehold residence, "Belle Vue".....                                                             | 1,000  |
| SEPT. 1.                                                                                                                    |        |
| By MARCH, MURPHY, & Co.                                                                                                     |        |
| Doctors' Commons—No. 42, Knight-riding-street, 13 years, ground-rent 70l.....                                               | 165    |
| SEPT. 2.                                                                                                                    |        |
| By RICE BROS.                                                                                                               |        |
| St. Giles's—22, Great St. Andrew's-street, freehold Peckham—Ground-rents of 24l. 10s. per annum, reversion in 42 years..... | 1,200  |
| Poplar—162a, Chiswick-street; 1, Cording-street; and the "Anchor" Beerhouse, freehold.....                                  | 615    |
| Bethnal-green—1 to 6, Peel-grove, 953 years, ground-rent 18s.....                                                           | 1,000  |
| 86, 98, and 100, Cyprus-street, 10 years, ground-rent 6l.....                                                               | 1,815  |
| By FULFORD, HOBBS, SONS, & CASSILL.                                                                                         |        |
| Bermondsey—208, 211, and 213, Weston-street, and the Soap and Oil Works adjoining, freehold.....                            | 425    |
| SEPT. 3.                                                                                                                    |        |
| By DAVIES & Co.                                                                                                             |        |
| Chingford, High-road—Freehold Building Land, containing 3a. 2r. 6p.....                                                     | 5,000  |
| Forest-road—A Corner Plot of Freehold Land.....                                                                             | 125    |
| By PHILLIPS, LEE, & DAVIES.                                                                                                 |        |
| Oxford-street—10, Winsley-street, 26 years, ground-rent 22l. 10s. per annum.....                                            | 450    |

**Proposed artisans' Dwellings at Liverpool.**—At a recent meeting of the Insanitary Property and Artisans' Dwellings Committee, the following resolution was adopted:—"Al- though some of the plans submitted show considerable merit, not one of them is in complete accordance with the conditions of the competition, requiring that the buildings must in all respects comply with the building regulations in force in this city, and the committee regret that they cannot recommend that either prize be awarded by the Council."

#### Miscellaneous.

**The Liverpool Water Scheme.**—Considerable discussion has taken place at Liverpool with regard to the relative positions of Mr. Thomas Hawksley and Mr. Deacon in the construction of the Vyrnwy waterworks, and on Wednesday last, at the adjourned meeting of the City Council, Sir James Picton moved:—"That it be an instruction to the Water Committee immediately to arrange with Mr. Thomas Hawksley to take the entire superintendence and responsibility of the works at Vyrnwy and the pipe line, according to the agreement between him and the Corporation dated the 2nd of March, 1881." The Chairman of the Water Committee (Mr. Bower) having stated that Mr. Hawksley is recognised by the Committee as engineer-in-chief of the waterworks, Sir James Picton withdrew his motion, on the assurance of Mr. Bower that the duties of Mr. Hawksley and Mr. Deacon would be defined to the satisfaction of the Council. It appeared, in the course of the discussion on the subject, that Mr. Deacon was appointed engineer of the works "in conjunction with" Mr. Hawksley, and the question arose whether Mr. Deacon was or was not "joint engineer" of the works. The Chairman of the Water Committee answered this question in the negative, and said that the agreement was that Mr. Deacon should give him the work in the supervision and carrying out of the time in conjunction with Mr. Hawksley, but not as joint engineer.

**The Willesden Infectious Hospital Huts.** At the present moment, when sanitary authorities are being pressed to make arrangements for isolating cases of cholera should that disease make its appearance in our midst, the Willesden portable hospitals, consisting of a framework covered with the well-known Willesden paper and canvas, deserve notice, as offering very substantial advantages in connexion with the provision of temporary buildings for isolation purposes. They can be erected with great rapidity, and they are, compared with certain other means of isolation, by no means costly. They can be well ventilated, and may be regarded as adapted to by far the greater number of months in the year in our climate. With regard to all temporary hospital provision, we cannot omit to point out that those authorities and other bodies who intend to resort to them must remember that a site has to be in readiness, that drainage and water-supply and other requisites are needed, and that these cannot be provided on the spur of the moment, although the hospital itself may be ready for erection.—*Lancet*.

**Liverpool Architectural Society.**—The eighth meeting of the Junior Debating Club in connexion with this Society was held on Monday evening last, the 7th inst., Mr. J. S. A. Mercer in the chair, there being a fair attendance. After the election of a new Secretary and other business connected with the Club, it was unanimously decided to hold a winter session. An animated discussion then took place as to the most advantageous way of varying the proceedings, it being finally decided for the present to confine the meetings to papers and discussions. The next and final meeting of the session will be held on the 21st inst., when Mr. Goodall will read a paper entitled "A Few Notes on Plaster Work."

**The Proposed Undercliff Drive at Bournemouth.**—With regard to this competition (see p. 311, ante), it was resolved at the last meeting of the Bournemouth Commissioners:—"That Sir Joseph Bazalgette be employed to assist the commissioners in deciding upon the merits of the plans for the undercliff drive, with the view to the award of the premiums offered, and further to advise the Board as to the most suitable plan for the Board to adopt either in part or as a whole for Bournemouth, at a fee of 200 guineas; and that a copy of this resolution, under the seal of the Board, be forwarded to him."

**University College, London.**—The Gilchrist (Entrance) Engineering Scholarship at the College is open for public competition on the 28th of September and following days. The Scholarship is of the value of 35l. per annum for two years, and candidates must be under nineteen years of age on the 1st of October. The subjects are mathematics, mechanical drawing, use of tools, &c., several of them being optional. Full particulars can be obtained on application to the secretary of the College, Gower-street, W.C.

**Dordrecht.**—In Dordrecht there is something new, or rather something very old, every street. The houses are tall and fantastically gabled, and as the streets are mainly very narrow, one can take a walk in the grand old shade on the hottest summer day. Nineteenth of the houses are at least two hundred years old, and many of them are a century or a half older. In many of the busier streets, and along most of the canals, the old gables lean tottering forward, as though to meet their venerable friends on the other side of the way. The builder's men were very gingerly demolishing a fine gabled old place, coloured mellow russet-brown, which was in danger of falling down, owing to some settlement in the sandy shifting soil. Every now and then, in the streets of Dort, I came upon a house large enough to have looked well in English park. A double flight of steps, wide enough for the passage of the traditional coach-and-six, led up to a massive front door, behind which, when it was occasionally open, I caught a glimpse of a hall ample enough to hold an "eligible detached villa residence." Sometimes a coat of crowded quarters was floridly sculptured above the broken pediment of the door; sometimes a bit of allegorical carving ornamented the windows. There were a few very old towns anywhere which have retained the olden homes of the departed merchant princes in such numbers or in such admirable preservation as Dordrecht.—*J. Pendrell-Brookhurst in Cassell's Family Magazine* for September.

**Changes in Rome.**—In order to open another wide street, to lead from the Argiletum Theatre to the Bridge of the Regola, which is now in building, the Roman Municipality has already announced that the sum of 1,721,500 lire is to be expended on the requisite expenditure of the houses to be demolished, which are those in the Via Arco dell' Annunziata, di Muro Nuovo, the church of St. Anna di Falegnami, with the adjacent Hospice of St. Giovanni, for orphan boys, established in 1311. The church dates from the time of Leo X., as also the dwellings in the street and square St. Elena. The little church of St. Eleonora Imperatrice will likewise be demolished, but compensation it is proposed to re-consecrate the ancient church of SS. Cosma e Damiano belonging to the Guild of Barbers. It further proposed to construct large barracks near the late Roman College to cover the entire inlet of land between the Via Pia Marmo, Via del Gesù, and the Altieri Palace, consequently the Church of St. Marta, of the Augustinian nuns, which has not been open for public worship for many years, and the convent itself will be swept away, as will also the Church of St. Stefano del Cacco, a very antique structure. The barracks for the gendarmes in the Prati di Castello, are nearly ready for occupation. The edifice is composed of four immovable buildings, enclosing a large courtyard, isolated one from another. The architecture is in the Lombard style, with large double windows and embattled roof.—*Tablet*.

**Lighthouse Illuminants.**—After twelve months of experiments at the South Foreland the Trinity House Committee have made the report upon the relative merits of electricity, oil, and gas as lighthouse illuminants. The committee sum up their opinion thus:—

1. That the electric light as exhibited in the experimental tower at the South Foreland has proved to be the most powerful light under all conditions of weather, and to have the greatest penetrative power in fog.
2. That for all practical purposes the gas-light as exemplified by Mr. Wigham's multifurn system in B experimental tower, and the oil-light as exemplified by the Trinity House Douglas six-irradiant burners in multifurn arrangement up to trifurn in C experimental tower, were shown through revolving lenses, are equal light for light in all conditions of weather; but that quadrifurn gas is little better than trifurn oil.
3. That when shown through fixed lenses, as arranged in the experimental towers, the superiority of the superior gas-light is unquestionable. The larger diameter of the gas flames, and the lights being much nearer to each other in the gas-lantern, give the beam a more compact and intense appearance than that issuing from the more widely separated oil-burners.
4. That for lighthouse illumination with gas the Douglas patent gas-burners are much more efficient and economical than the Wigham gas-burners.
5. That for the ordinary necessities of lighthouse illumination mineral oil is the most suitable and economical illuminant, and that for salient headlands, important landfalls, and places where a very powerful light is required, electricity offers the greatest advantages.

**Surveyorship, Bootle.**—At the meeting of the Bootle Town Council on Wednesday, Mr. John Alexander, Borough Surveyor, tendered his resignation, which was accepted.



PRICES CURRENT OF MATERIALS.

Table with 4 columns: Material Name, Unit, Price per Unit, and Remarks. Includes items like Timber, Iron, Copper, Lead, Tin, and various oils.

Table with 4 columns: Material Name, Unit, Price per Unit, and Remarks. Includes items like METALS, COPPER, LEAD, TIN, and OILS.

Table with 4 columns: Material Name, Unit, Price per Unit, and Remarks. Includes items like BUSHEY (Herts), CLAPHAM, EAST HAM, HULL, ISLINGTON, LEE-ON-THE-SOLENT, and LONDON.

COMPETITIONS AND CONTRACTS.

Epitome of Advertisements in this Number.

Table with 5 columns: Nature of Work, By whom required, Premium, Designs to be delivered, Page. Includes competitions for Public Abattoirs.

CONTRACTS.

Table with 5 columns: Nature of Work, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes various construction contracts.

TENDERS.

Table with 3 columns: Tenderer Name, Amount, and Remarks. Includes tenders for Ashton-under-Lyne, Blackheath, Burnley, and London.

Table with 3 columns: Tenderer Name, Amount, and Remarks. Includes tenders for Lee-on-the-Solent, London, and various other projects.

**LONDON.**—For re-instatement of No. 27, Leigh-street, Burton-terrace, Mr. J. Hamilton, architect:—  
S. J. Scott.....£320 0 0  
W. Sharnum.....297 0 0  
B. Hayworth & Son.....264 0 0  
Woolveridge Bros.....204 0 0  
G. Beaulands.....175 15 0

**LONDON.**—For sanitary improvements and other alterations at No. 1, Prince's-gate, Hyde Park, for Mr. J. Francis Austen, Mr. Mark B. Judge, architect:—  
Harward Bros. (accepted).....£327 0 0

**LUTON.**—For the erection of two houses, Melson-street, Luton, for Mr. A. Johnstone, Mr. A. E. Smith, architect, Luton:—  
Slough.....£1,225 0 0  
Sanders.....1,189 0 0  
Rasch.....1,142 0 0  
Neville.....1,125 0 0  
Linsfield.....1,109 0 0  
Cox (accepted).....800 0 0

**POPPIAR.**—For erection of parsonage house and Sunday schools, East Indis-road, Poplar, Messrs. Spalding & Auld, architects:—

L. H. & R. Roberts.....£2,212 0 0  
Martin, Wells, & Co.....6,2 2 0  
W. & F. Crocker.....5,963 0 0  
J. Woodward.....5,890 0 0  
W. Shurman.....5,881 0 0  
J. Outhwaite & Son.....5,889 0 0  
Wall Bros.....5,663 0 0  
Hearle & Son.....5,692 0 0  
Atherton & Latta.....5,457 0 0

**RIPLEY** (near Derby).—For the erection of billiard-room, stable, and carriage-house, at Green-hill House, Ripley, for Mr. J. B. Slack, Mr. R. Argile, architect. Quantities supplied:—

|               | Section 1. | Section 2. |
|---------------|------------|------------|
| Clover.....   | £33 0 0    | £45 0 0    |
| Warren.....   | 112 14 0   | 394 6 0    |
| Fletcher..... | 92 12 4    | 394 6 4    |

\* Accepted for both sections.

**SOUTHERND.**—For road and sewer on the United Land Company's Estate at Southend:—

S. J. Sanders.....£335 0 0  
A. Oliver.....325 0 0  
Wood & Co.....325 0 0  
W. Schofield.....320 0 0  
Cuming & Bennett.....315 0 0  
W. Harris.....314 0 0  
W. Nicholls.....275 0 0  
J. E. Howard.....269 0 0  
J. W. Steward.....255 0 0  
G. Osenton.....263 0 0  
K. Nicholas.....269 0 0  
J. Bullock (accepted).....235 5 1

**STAMFORD-HILL** (Middlesex).—For the erection of St. John's Church, Varsity-road, Stamford-hill, inclusive of boundary-walls and gates, Mr. Spencer W. Grant, architect, Finsbury-parsonage. Quantities by Mr. C. W. Brooks:—

Dowse, Walworth.....£2,575 0 0  
Wall Bros., Kentish Town.....6,515 0 0  
Williams & Son, Barnsbury.....6,450 0 0  
Dove Bros., Islington.....6,150 0 0  
Tongue, Plumstead.....6,080 0 0  
Shurman, Clapton.....5,985 0 0  
Cox, Hackney.....5,984 0 0  
Smith & Sons, Norwood.....5,777 0 0  
Holloway, Lavender-hill.....5,645 0 0

**STAMFORD-HILL** (Middlesex).—For the erection of new hall and rooms, for the Bible Christian Connexion, Mr. J. Kingwell Cole, architect, Mount-street, Grosvenor-square. Quantities by Mr. P. Pieterman, Messrs. Batten & Co., surveyors:—

J. H. Mills, Stamford-street.....£2,740 0 0  
W. W. T. Kelland, Stoke Newington 1,880 10 0  
Dunford & Langham, Holloway.....1,849 0 0  
Benjamin Brown, Highbury.....1,820 0 0  
Paine Bros., Stamford-hill.....1,705 0 0  
Wall Bros., Kentish Town.....1,553 0 0

**SWANWICK** (Derbyshire).—For the erection of store at Swanwick, for the Ripley Industrial Co-operative Society (Limited), Mr. R. Argile, architect, Ripley, Derby. Quantities supplied:—

Brenhall.....£363 13 3  
Clark.....801 10 0  
Warren.....800 0 0  
Roe & Son.....672 12 9  
Perry (accepted).....668 10 4

**WATFORD** (Herts).—For the erection of a cottage hospital in the Vicarage-road, Mr. Charles P. Ayres, architect, Watford:—  
T. Turner.....£1,894 0 0  
W. B. Neal.....1,863 0 0  
Judge & Baines.....1,740 0 0  
Clifford & Gough.....1,710 0 0  
Andrews & Sons.....1,697 0 0  
G. Wiggs.....1,687 0 0  
H. S. Allen.....1,655 0 0  
G. & J. Waterman.....1,674 0 0  
H. W. Chadwick (accepted).....1,500 0 0  
[All of Watford.]

**WATFORD** (Herts).—For the erection of stables, &c., St. John's-road, for Mr. Wm. George, Mr. Charles F. Ayres, architect:—  
T. Turner.....£360 0 0  
Clifford & Gough.....318 5 0  
Chadwick (accepted).....308 0 0  
[All of Watford.]

**Sanitary Works at Royal Infirmary, Windsor.**—Mr. J. Knight, of Marham-street, Westminster, writes to say that his tender for these works (see p. 345, ante) was withdrawn.

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# The Builder.

Vol. XLIX. No. 2221.

SATURDAY, SEPTEMBER 19, 1885.

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### A Colonial Discussion on Art.



**C**URIOS and certainly very interesting document has recently come into our hands. It is no less than an official discussion between the Government of New South Wales

and the Colonial Architect, on the question of the real and ideal in sculpture. The subject is interesting enough in itself; it becomes doubly so when raised in relation to work executed in one of those great new dominions in which the English race and the English language have taken root afresh, and where a new English civilisation has sprung up and flourished mightily. It has often been a subject of conjecture with those interested in the progress of art, what further development of the artistic material of the Old World may be looked for among people of the same race as ourselves, who started afresh in another climate and under other surroundings. In general, those who prophesied a new birth of art have been disappointed. American architectural fashions for the most part follow in the wake of English, as far as the artistic side of architecture is concerned. Australian architecture, as far as we get any illustration of it, seems to run also mainly on the old lines. But incident to which the official correspondence before us refers seems to have given to colonial aesthetics a little jolt out of the orthodox path, which may have further consequences.

It came to pass that the Colonial Architect, Mr. J. Barnet, who appears to be a gentleman of no ordinary attainments and ability, and who has carried out an immense number of works in the colony, engineering as well as architectural, with great satisfaction to his government and the public, was in the fullness of time commissioned to design and carry out the new Post Office at Sydney. The building, which is not yet completed, is in the main a grand and orthodox structure in what we have all agreed to call the Italian style, containing nothing calculated to startle any one. It was on February 22nd, 1882, that a disturbing element was introduced in a letter from the architect to Messrs. McCredie, the contractors, asking for an estimate for substituting for the mural panels in the Pitt-street front a series of bas-reliefs representing "Telegraphy, professions, Physics, Agriculture, Literature and the Press, Mining and Commerce, Science and Art, the Post Office, and Banking." The contractors undertook to furnish such bas-reliefs,

"in best artistic manner by approved artists," for 800*l.*, a sum which does not give a very high idea of the calibre of talent which was to be employed on so many subjects, with "at least two life-size figures" in each spandrel. The idea was "approved," and the estimate accepted. But, alas! the next letter (February 8, 1883) is one from the Postmaster-General to the Secretary for Public Works, headed "Post-Office Reliefs," requesting his hon. colleague to "kindly inform him whether anything has been done towards deciding whether the grotesque carvings on the Pitt-street frontage of the General Post-Office are to remain, or something more presentable to be substituted," as he is "frequently asked" respecting them. After some formal correspondence, the Cabinet appoints five gentlemen as a Board to examine and report, of whom two, for sufficient reasons, declined to act, and the other three were empowered to investigate. They requested photographs of each separate spandrel, to be taken from a stage opposite the work: to which the architect urged that the sculptures were intended to be seen from the ground, and that the point of view suggested was, therefore, not the proper one for giving a correct idea of the work. This appears to have been overruled, and, apparently, the Commission obtained the photographs from their own point of view. This was in December, 1883. On the 15th February, 1884, comes a letter from the Under-Secretary for Public Works to the architect, requesting him to give effect to the Report of the Commission, and, in the first instance, to give a plan of what he proposes to substitute for the carvings when removed. Then follows the Report, dated February 6.

The Commissioners were the Hon. H. C. Dangar, Mr. du Faur, and Mr. W. W. Wardell, the latter a Fellow of the Royal Institute of British Architects and M.Inst.C.E. The Report proceeds to state that the Commission has held several meetings and carefully considered the question. The following are the main paragraphs of the report:—

"We find that the carvings are the result of a design on the part of the Colonial Architect to portray, in realistic fashion, some of the arts, sciences, and customs of this age and country; and that he is satisfied with the manner in which the idea has been carried out.

Whilst we entirely commend the intention of Mr. Barnet in desiring to obtain a durable record of the subjects intended to be illustrated, we cannot but regret the place and manner in which he has sought to perpetuate them.

We consider, in the first place, that they are unsuited in character and design to a building distinguished throughout by much chasteness and excellent execution in other subjects selected for its ornamentation.

These carvings are in high relief, and they consist almost without exception of stiff upright figures.

In all pure and good examples, whenever the spandrels of arches are decorated, the subjects are almost invariably in low relief, certainly not more than half relief, and the grouping is generally suggested by the contour of the arch.

Viewed only as fit subjects for the decoration of the Post Office, it is not perhaps a part of our duty to express any opinion as to the success of these carvings as realistic productions; but we cannot refrain from expressing the opinion that they fail to be a true record of the subjects they represent, and that they approach far more to the unnatural and burlesque than they do to the real.

It is only due to a clever sculptor (such as the carvings of the key-stones of these arches prove Signor Sani to be) that we should state we consider he could hardly be expected to satisfactorily realise the difficult subjects submitted to him for execution."

The Commission add that they find that no risk to the stability of the structure will result from the removal of the carvings, and they recommend that this be done, and blocks of stone inserted which may be decorated or not as may be thought desirable. This is followed by a minute from the Secretary of Public Works stating that the Government concur, and that the architect "will take the necessary steps to carry this out."

The architect, however, seems to have had no idea of "knocking under" to this military-like word of command. He replies by a long and very spirited letter, putting his ideas on the subject of what decorative sculpture should be, and telling the authorities very plainly that he considered the opinion of the Commission was a foregone conclusion, they having been appointed to sum up in favour of "the ideal," and that they did not understand what they were talking about. After complaining of the manner in which the photographs were taken, and recapitulating the list of subjects illustrated, the architect continues:—

"As it was not possible to represent all the subjects selected by ideal, allegorical, sham classic figures, lying in unnatural attitudes, on the backs of the arches, in the usual manner of the old masters, I adopted the realistic style or natural manner, treating them as if seen through openings of the spandrels, the various figures being represented as at their usual employments, with the necessary accompaniments; and the result, in my opinion, is admirable, both as to decoration and as illustrative of the customs and costumes of the present day. The superiority of the bold and dashing stroke of the chisel in work which is to be seen at a distance, shows the artist's power of producing a masterly effect of life and reality with a few touches, and is evidence of fine handling. I may here mention that the questions of realism and idealism in art have given rise to a great deal of speculation, which is likely to remain unsettled while the world lasts. Both of these styles are adopted in the Post-office carvings, and they have been used side by side from the time of the Parthenon. Realistic art is at the present time largely in vogue throughout Europe, and specially encouraged at South Kensington;



moreover, it is easily understood by the people generally, which is particularly the case with the Post-office carvings in question.

As to the regret expressed by the Board in its report, respecting the plan and manner in which the idea is being carried out, I think it sufficient to say that the Board admitted to me there was great difference of opinion by the public as to the fitness of these carvings, and their retention or removal, but no mention is made of this fact in the Report.

The Board considers that these carvings are unsuited to the character and design of the building, that is to say, they are unrealistic, and not in keeping with the architecture. The style of the architecture is Italian Renaissance, examples of which exhibit details and decorations from Gothic on the one hand, to extreme Classic on the other; and of it is said that it not only admits of, but insists on, progress, and knows no guide but common sense; it owns no master but true taste, and more than this, it demands thought, and courts originality—therefore realistic decorative carvings are not only fitting, but demanded, to show true progress.

The objection that these carvings are in high relief, stiff, &c., and the assertion that all pure and good examples are invariably in low relief, &c., show how unacquainted the Board is with these matters, and how little qualified it is to deal with the subject under consideration; for the contrary is the fact. Spandrel sculpture is invariably in the highest relief; reference need only be made to examples of the old masters in St. Peter's, St. Maria Maggiore, and other churches and buildings in Rome; Santa Maria della Salute, and other churches, as well as numerous palaces, and especially the Ducal Library in Venice, with many other examples, in Italian and other cities. I have already said that these figures are realistic and natural in their pose, which could not be if distorted into positions, as suggested by the Board, to suit the contour of the arch.

The letter proceeds to say that the work could not be cut out without some risk of damage to the building, at least that the operation, to ensure safety, must be a very costly one, and that in justice to himself and the sculptor he considered no further steps should be taken till the building is complete and the scaffolding removed; and that then photographs of the whole of the building, showing the general effect of the carvings and decorative work, should be taken, and submitted for the opinion of the best authorities on modern decorative carving in England, Paris, Milan, and Rome, adding that it was doubtful whether competent and independent opinion on works of this kind could be obtained in the colonies.

The nature of the attempt which has thus been made to give realistic interest to architectural sculpture may be partially gathered from the architect's description of the intention of some of the subjects:—

"Telegraphy is represented by an operator at work, with his right hand on the instrument, while reading a telegram. On the lower part of the spandrel is a little boy trying to prepare a battery. At a counter a young woman, with a pleasant look, is writing a message, and, in the distance, a mounted messenger, conveying telegrams.

Banking is illustrated by a Bank clerk paying money over a counter to a young woman who is presenting a draft. In the lower corner of the spandrel is a little boy with money in a bag, and crying because he has lost some of it while bringing it to the bank.

Post Office Business.—This is represented by a letter-carrier, heavily laden, as on a mail day, giving to a young woman a letter, which she gladly receives. Below is a little girl reading a letter."

We have before us two sets of photographs of the portions of the buildings in which the sculpture is included, sufficient to give a very good idea of them, but not sufficiently large or clear (owing to the figures being partly in shadow) to be adequately reproduced in our illustration pages by the process we usually employ for reproducing sculpture. Taking the general question of the view of the subject as put by Mr. Barnett in the quotation from his letter, we should say that they do appear very incongruous in the position in which they are placed, owing to their juxtaposition with decidedly Classic detail, with which they do not harmonise either in spirit or in line; besides which, although showing a certain dash and cleverness, they are vulgar in conception. Between these very realistic sculptures, are large Classic capitals on the Jupiter Stator model, alternating with large consoles carved with ideal heads in a very different style from the

spandrel figures, and about three times the scale. The spandrel figures appear in fact, as what they actually were,—an afterthought. The architect has taken well-known Classic models for the adjoining architectural details, and interpolated between them work which appears to come from another world of art entirely. It appears to us that if the attempt be made to do anything so original, and what may be called anti-Classic, as these sculptures, the same spirit of movement and originality should have pervaded the architectural framework. The instance of the Parthenon is hardly to the point. There is no doubt that the frieze of the Parthenon is realistic as compared with the metopes and the tympanum sculptures, but there is no such clashing of different elements as in this case. The figures may represent nearly the actual figures of the procession, but their arrangement is highly conventionalised, and they are in low relief. Beyond this there comes the question whether the realistic method of representing various arts or professions is really the best or the most artistic. That it is most easily "understood of the people" may be granted. But a higher and more intellectual form of sculptural art is that which would convey, not the realistic accidents of dress and circumstance, but the abstract symbolising of the essential and central idea. Thus, a sculptor or a painter who was also something of a poet would be able to represent, through an abstract figure, the idea of the electric telegraph apart from the unimportant incidents of the frock-coat and cravat of the operator. It is very difficult to do this effectively and intelligibly; but a sculptor who could do so would evince higher powers than one who merely modelled a portrait figure in every-day dress. The uneducated public would understand the latter treatment better, no doubt; but the uneducated public are not the best judges of so intellectual an art as sculpture. As a typical instance, take Carpeaux's celebrated group, "The Dance," on the facade of the Paris Opera House. Here the idea of the excitement and abandon of the dance is splendidly conveyed in figures which represent no special period or country, but are the abstract and poetic expression of human feeling and action. Can any one possibly maintain that this subject would have been of more interest if treated, with whatever ability, as a representation of the waltz danced by figures in swallow-tail coats and costumes by Worth? None but children and simpletons could think so. Nor, again, is it anything to the purpose to say that many bad and ludicrous quasi-Classic allegorical figures are to be found, as in many of the monuments in St. Paul's (which are cited by Mr. Barnett as terrible warnings). Symbolic sculpture requires very high powers for its successful treatment, and accordingly it has often been unsuccessfully treated; but that is no proof that the aim in itself is a mistaken one. Then, to come to the actual work which has given rise to this discussion, we fear we must coincide with the members of the Commission in concluding that it is not at all good as realistic work. It is, in fact, not sculpture, but stone-cutting. The expressions of the faces are exaggerated,—in one or two instances to a grotesque extent,—and the figures appeal rather to the interests of children than of grown-up persons of education.

The attempt, however, was a spirited one, and may lead to something better; and we are glad to find, from the concluding documents of the State paper in question, that the Government, on the recommendation of the Postmaster, finally consented to leave the sculptures untouched until the building is complete and the scaffold removed, and their result as a portion of the whole fairly considered. We should be inclined to think that, being executed, they should not be removed. They will form a record of a well-meant, though not very successful, attempt to give more than merely conventional interest to the sculptural decoration of a building, and the best lesson to be drawn from the incident would be to endeavour to do the thing better and more artistically at the next opportunity, and, if possible, to obtain the assistance of a

sculptor of higher powers. We may perhaps be pardoned for adding the suggestion that there are more, clever young sculptors in this country at present than can find room for a profitable disposal of their works, and that, perhaps, mutual benefit might ensue if the Government of New South Wales could offer some of them congenial employment in the new country.

## THE PREVENTION OF WASTE OF WATER.



IN circumstances where the consumption of water has reached the limits of supply, a means for the prevention of waste becomes at once the most important of all items. The possibility of increasing the dimensions of tunnels or other forms of aqueduct that may exist cannot be entertained, as the time required for such alterations is not frequently at the disposal of the engineer. The evils attending an intermittent supply are too well known to require enlarging on here. In the construction of reservoirs provision is always made for the periodic closing of the aqueduct for purposes of examination and repair; but not usually for the ultimate enlargement. It is not considered necessary to anticipate a period of more than thirty years in making provision for the probable demands of the future. When that has been done, little more can be expected. The time comes for the consideration of a means for obtaining an increased supply. In order to obviate the expense of new works on the one hand, and intermittent supply upon the other, a careful analysis of the sources of waste has led to the perfecting of a system, not less interesting than complete, which, by careful working, has obtained in Glasgow and elsewhere excellent results. In an article upon the Glasgow Corporation Water-works, which appeared in our issue of the 13th of June of this year, we state the result obtained in the following terms:—"The saving of water in this way has averaged 13 gallons per head but, taking it at 10 gallons, the saving on the whole city would be 7½ million gallons per day, or about one-fifth of the whole water supply, and at an expenditure of one-third the capital represented by this saving." I now propose to put the details of this system before our readers.

Waste, as the word will be frequently used in the context, must not be understood as referring to extravagance in the use of water, but as applying only to the water lost in consequence of defects in distributing and service pipes and bad fittings. The quality of the distributing pipes is supposed to be insured by the water company specifying, and superintending the making and testing of them. But block-joints and splits will occur, and in ways always capable of explanation; but usually from local subsidence of the pipe-track, the water does not rise to the surface, it finds its way into the street sewers; and the presence of such a defect is discovered by want of pressure in the locality; but, as it affects a large area, it was long found difficult to locate it sufficiently to discover its exact whereabouts until the system subsequently described was introduced. It may be remarked in this connection, that in Glasgow, before the water meter system had reached its present stage of development, cases occurred where leaks from 3-in. and 4-in. pipes had carried away sufficient material to bring about a falling in of a street. In one case, five cart-loads of material were required to fill the cavity. How long this leak had been going on could not be ascertained. In regard to service-pipes, as they are situated for the most part underground, except where they rise to the surface, a burst is discovered by want of pressure on the property supplied. The complaints of want of water made by householders, 30 per cent. is not an uncommon average to find due entirely to the bursting of lead service-pipes. Of course this must always be attributed to lightness or inferior material. These can be discovered by inspectors from the water company, and



insist upon examining them before they are covered up, but splits may and often do occur on the inside of the pipe during manufacture which causes them to give way before a high pressure of water. Service-pipes must always be provided with stop-cocks at 6 ft. from where they leave the main, and about 2 ft. 6 in. below the surface of the ground. Where service-pipes are exposed they must be protected from frost, and with that object it is recommended that they be placed a short distance from the outside wall.

Of the waste due to the use of defective water-fittings much may be said. Unless it becomes a source of annoyance to the occupants of a house, either in the form of noise or escape in undesired places, it may go on for a long period of time without being discovered by the officers of the water company. This waste, not being confined to one house or half

and in 1880 only 3.92 per cent. were disallowed. As a result of the careful supervision which formed part of the system, such an improvement in the manufacture of fittings, effected within three years, showed pretty conclusively that some such protection was one of the most practical of the requirements upon the programme of reforms to be carried out. Water-closet cisterns are examined by the inspectors as soon as they are placed in position. They may give a flush of from 1½ gallon to 2 gallons, but not more, and this flush must take place within three or four seconds after lifting the handle. Fittings which are found wasting water twice within three months are removed, and are not allowed to be fitted up again in any position. Before leaving the question of fittings it may here be observed with advantage that, in spite of the exercise of every precaution and economy, increased consumption per head in-

Of the methods which have been in use in Glasgow for the detection and prevention of waste, the oldest is house-to-house inspection. A town is divided into districts, and one of these is allocated to each inspector. It is his business to examine all the fittings in each house regularly, and report any waste that may be going on. A notice is thereupon sent from the office of the water company requiring the repair to be executed within a given time, usually six days. At the expiration of that time, if the repair has not been done, the water is thereupon shut off, which proceeding invariably proves an effectual appeal to the parties concerned. When the stop-cock closed supplies several parties, it would appear somewhat arbitrary to make the unoffending suffer for the negligent; but, it need not be added that this fact is in itself an additional guarantee that the repair will be executed without further delay. The system of house-to-house inspection is very satisfactory so far as it goes, and is a means of preventing a considerable waste of water. It may be at once seen how satisfactory it has proved by the remark that in Glasgow an addition of four inspectors was the means of saving per day 800,000 gallons of water; or, in other words, after such increase of the staff, the average consumption of water per day was 800,000 gallons less than during the previous year. It will be obvious, however, that where equal operations are being carried on in every district, there is a great loss of power, as a large percentage of the waste going on may be confined to one district. This eventuality is effectually met by the use of waste-water meters, which indicate very clearly, by means of diagrams, where the consumption is beyond the average; and in this way, the day inspectors are enabled to devote their whole energies to those districts where it is known that serious waste is really going on. The meter for this purpose in common use is Deacon's Differentiating Waste-water Meter, a sketch of which is given, fig. 1. The sketch will explain itself. The whole meter, except the outside case and the clock-springs, is of brass. As a consequence of the fewness of its working parts, the possibilities of wear and tear are not great. Experience has gone to show that ten years of constant use does not even suggest their disconnection from the main. At the end of that time they have been found in as good repair, practically, as when they were first put down. The only two parts which give any trouble are the clocks and the pulley-wires, which are of comparatively little moment, as they may be adjusted within a very short space of time. But it happens occasionally that the wire breaks or the clock stops, and this may occur when a night inspection is being taken. In that case, of course, no night inspection diagram can be obtained. It would not affect the subsequent day inspections, but it would affect the report, where the extent of the results obtained from such inspections could not in consequence be stated. The possibility of the wire breaking is one which cannot very well be provided against; but the matter of the clocks stopping may be attributed to various causes, the principal of which is perhaps the very nice adjustment which they require. In fig. 1 the clock is shown at C, the upper half of which is hidden, as it passes into the drum upon which the diagram is attached. Whatever is done with regard to other departments, it is imperative that the matter of the clocks and other details connected with the meter be put into the hands of a conscientious mechanic who is thoroughly familiar with his trade. Otherwise, from the two causes above detailed, annoyance to the engineer is not likely to be an unfrequent occurrence. The trial of these meters in Glasgow was very encouraging. The first night inspection being taken, and repairs accomplished, it was found that the consumption of water fell from 65½ to 41 gallons per head per day, and the rate from 1 a.m. to 5 a.m. from 57 to 31 gallons per head. On the strength of this result a much larger area was experimented upon, when the results continuing to be satisfactory, Mr. Gale, the engineer, advised the extension of the system, until now 77 meters have been laid down.

When it has been decided to put a new

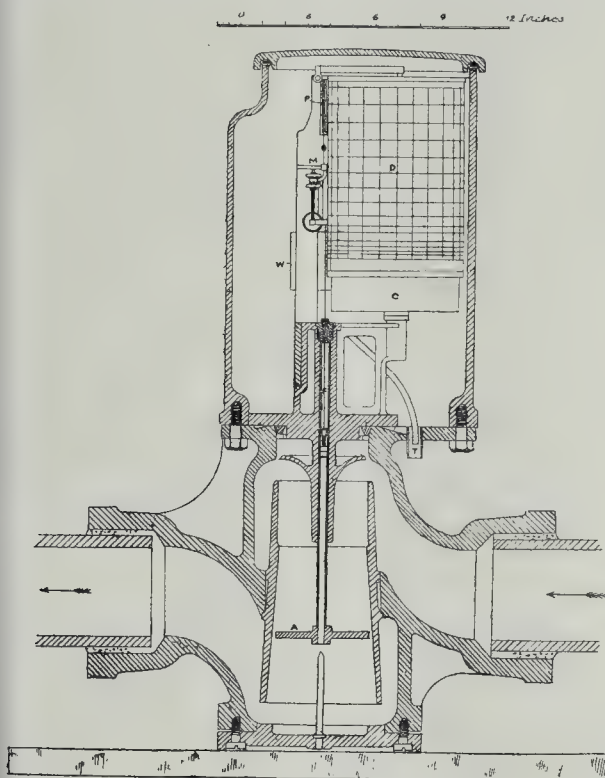


Fig. 1.

- A. Brass Disc equal in diam. to top of Cone.  
C. Lever Clock.  
D. Drum revolving once in 24 hours, and carrying the diagram paper.  
F. Hard brass wire connecting Disc to Pencil-carriage.

- M. Metallic Pencil and Carriage.  
O. Metallic Cord.  
P. Pulley.  
T. Waste Tube.  
W. Weight pulling Disc to top of Cone.

dozen, but extending over whole streets, becomes, therefore, a very serious matter. It is necessary that the water company have powers to compel the removal of imperfect fittings. In Glasgow, Liverpool, Manchester, and Dublin, all new fittings which have not previously been tested and stamped with the company's mark are rejected. The process of testing consists in subjecting the cocks to three times the highest pressure they will have to resist when in use, for which trouble a small fee is charged. This has led to the rejection of almost every cock which is not constructed in the screw-down principle. The testing pressure is 300 lb. per square inch for cocks supplied direct from the main, 150 lb. for ball-cocks to cisterns, and 25 lb. for lavatory and other fittings supplied from cisterns. In 1877, when the system of testing was introduced in Glasgow, 14,600 per cent. of the fittings submitted were rejected,

variously follows improved or altered domestic arrangements. The quantity of water used per head in every important manufacturing centre is constantly upon the increase; and in one sense so much the better. If we consider the average consumption per head over districts which consist for the most part of three kinds of property, taking the night-rate as the standard in every instance, we shall then obtain some idea of the extent to which improved domestic and other arrangements affect the consumption of water. In the case of property consisting of houses with a rental averaging 6l., the consumption per head per twenty-four hours was 4½ gallons; of property where the houses were about 18l. rental, and a large number of shops with a rental varying from 30l. to 100l., the consumption was 16 gallons; and in the case of high-class houses, with a rental of from 80l. to 300l., the consumption was 48 gallons per head.



district under the water-waste meter system, the following is the manner of proceeding:—A skeleton tracing is made, showing all the pipes within the proposed area to be put under. An approximate estimate of the number of people supplied off each pipe is obtained from the surveyor's books, and noted in each case upon the tracing. It is then easy to determine the sub-districts, always taking into consideration the public works supplied by ordinary meter, so that the consumption through a water-waste meter shall not exceed the limit of its indicative capacity,—viz., 10,000 gallons,—at any one time. As a matter of fact, in Glasgow, the trade consumption in some districts is so uncertain as to bring the pencil up to and run it along the 10,000 line; and, in consequence, a correct day diagram cannot always be plotted. In such cases, the night rate must be depended upon. In a few instances, the alteration of piping necessary is considerable; but in many cases it amounts to very little more than altering the position of cleansing cocks and valves. Drawings to a larger scale are then made of the parts where alterations have to be carried out, and these are put into the hands of the manager of the pipe-layers. While the work is being done, and the meters placed in position, day inspectors are engaged in taking a careful census of each sub-district, and, at the same time, other day inspectors are at work obtaining the position of every stop-cock in the district, and the nature of the property or properties supplied off each. The description of property as detailed in the census-book is compared with that given in the stop-cock book, by a clerk in the office, and in that way an insurance is obtained against the possibility of any omissions in either. Every case of a stop-cock in bad repair is carefully noted and reported at the office, where orders are immediately given to repair it. In that way, the night inspectors are enabled to get over the district upon which they are making an inspection without delay. In a new district, it is usual to take a series of one-day diagrams before proceeding to make a night inspection, and in this way obtain an idea of the consumption per head before serious operations are commenced. When a diagram is put upon a meter, the intermediate valve is closed, and the meter valve opened (see fig. 2). As the meters

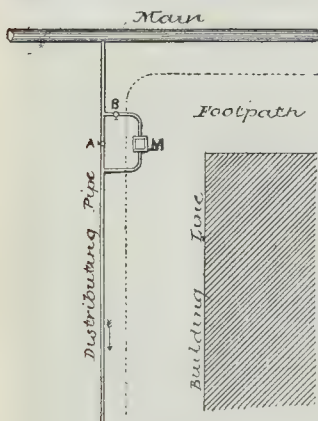


Fig. 2.

A. Intermediate Valve.  
B. Meter Valve.  
M. Meter.

used are all 4-in., it is clear that when they are placed upon larger mains than 4-in. the intermediate valve being closed, and all the water having in consequence to pass through the meter, a considerable want of pressure would be felt in case of fire. To obviate this, the manager of the fire-brigade is furnished regularly with the date when a meter is to be in use; and, as he is also carefully informed as to the exact position of every intermediate, in the emergency of fire, he has only to open the valve, when he at once obtains his full pressure.

The most important part of the whole system is centred in the night inspection. A diagram is put upon the meter four or five hours before the night inspectors commence work. A few minutes before 1 a.m. the two night men are upon the ground ready to begin their round. They first sound all the meter valves and meter stop-cocks in the district. If the works or shops supplied through these meters are not working overtime, and the valve or stop-cock, as the case may be, is heard to sound when the key is placed upon it, it is noted whether it sounds when open or when shut, and the nature of the noise as simple, loud, or extra loud. The inspector takes a note of the time, which he also enters into his book. This book is made out in the office by a clerk immediately a night inspection has been decided upon by the engineer, and then put into the night inspector's hands, when all he has to do is to go to the properties in the order in which they are written, and enter in the space allowed for each the particulars of his observation. When this is compared with the diagram upon the following day, the defect, if serious, is immediately recognised, the effect of opening and closing being clearly defined. If water is found passing, whether for legitimate use or in the form of waste, the valve or stop-cock is closed, and the cover lifted, and placed on one side. It might be supposed that in the former case inconvenience would be caused to the works, shops, or others deprived of water, but it is understood that these places have tanks always filled which will enable them to go on for at least four hours should the water be withdrawn either during the day or night. Notice, however, is given if such withdrawal is to be continued for a longer space of time than one hour. If no water is passing, the valve or stop-cock is left open. The same operations are next gone through with all the stop-cocks supplying domestic dwellings, and in each case, where found sounding, the cover is lifted and placed on one side. In some cases where waste is going on, no sound is heard when the stop-cock is full open, but, on gently closing it, the increased velocity of water through it gives rise to a distinct sound. It requires a practised ear to make a perfect inspection, as many sounds indicative of waste are not recognised by those unaccustomed to the work. Having sounded all the stop-cocks in a district, and shut those found sounding, an interval of half an hour is allowed to elapse before opening operations are commenced. The object of lifting the cover and leaving it on one side is to show at once where a stop-cock has been closed, and in that way save time. The inspector then makes up a list of his observations, which is put into the hands of a clerk at the office, who fills up a printed form for every property the stop-cock for which was found sounding. These are handed to the day-inspectors, who proceed to examine the premises. If several stop-cocks near one another are discovered by the day-inspector to sound when shut, he notes the loudest of them, and in that way determines the position of the waste going on, which in almost every such instance is taking place between the main and the stop-cock. If he finds that when a particular stop-cock is closed, the others cease to sound, then he presumes that the waste is going on from the service-pipe after it has passed that stop-cock. By the simple process of syphoning, he decides at once if it is taking place underground. Syphoning consists in shutting the particular stop-cock, and proceeding to the tap in the ground-floor house, first assuring himself, if there is a cellar or underground place provided with a crane, that this is securely closed. By placing the tap in water and turning it on, the suction caused by a vacuum created in the pipe in consequence of the water passing away through a defect underground, shows clearly that it is between that tap and the stop-cock; and its position may be accurately calculated by a man who is thoroughly familiar with his work, by the time taken by the air to fill up the vacuum thus created.

When a district meter has been got into working order and the waste reduced to a

minimum by three or four night inspections, the one-day diagram is discontinued, and a three-day diagram is substituted. This latter is put on every meter in use once during each month in order that a monthly report showing the condition of all the districts may be made out. In this way an average of the consumption for each meter is arrived at, and, when it rises much above that average, a night inspection is ordered. The diagrams are calculated and plotted into a book, which shows at glance what improvement has taken place after a night inspection, and which district requires to have a night inspection made. More reliance, as it has been previously stated, is placed upon the night rate, taking it from 1 a.m. to 5 a.m., especially where much water is used for trade purposes.

Out of fifty districts, with an average population of 1,637 persons, the cost for rearranging the pipes in order to isolate each district, including the fixing of the meter, was about 37*l.*; for repairing the stop-cock boxes, 21*l.*; for the preliminary inspections to bring the districts to working order, 13*l.*; and the meters themselves costing 29*l.* each, making up a total of 100*l.* per district. The above is the cost for laying out a district, but the cost of working the whole seventy-seven districts, omitting, of course, the salaries of the day inspectors who would be employed in any case, reaches the figure of 300*l.*; 132*l.* representing the salaries of two night inspectors, 132*l.* for two men who attend to the clocks and diagrams, 26*l.* for the time occupied by a draughtsman in reducing and plotting the diagrams; and 10*l.* for incidental expenses.

## NOTES.

**W**HATEVER may be our shortcomings with regard to the housing of the poor, other Continental countries are not blameless in this respect. The latest Embassy and Legation Report, just published, gives a melancholy account of the condition of some of the Italian labourers, both urban and rural, and particularly in Rome and that extensive and unhealthy fringe of coast known as the Campagna. In ancient times this district contained many of the rich and prosperous Roman cities, whereas now it is a picture of malarious desolation, having but 12,734 inhabitants, for whose accommodation there are only 556 houses. The greater number of the labourers in the Campagna are strangers from other districts, who for the eight months of their sojourn dwell in huts or wigwags, of which there are 469; the remainder live in caves and grottoes, or in the ruins of ancient buildings and tombs, while many have no roof but the heavens, and no bed but the grass. In almost every part of the whole district, the scarcity of houses in proportion to the number of labourers is startling and well nigh incredible. In one commune there are 456 houses to 3,127 persons, in another 316 to 1,604 inhabitants, and in a third, 704 peasants without a single dwelling. To render the anomaly more striking, there are places which contain many uninhabited houses, which have been purposely unroofed to avoid the heavy house tax. Indeed, a wealthy proprietor near Rome, the Prince Torlonia, has numerous farm buildings unroofed and going to decay, while the labourers on the estate are living in wretched hovels, or in holes cut in the tufa rock. Those English politicians who are so enamoured of the proposal to make peasant holdings, will be interested in learning that there are in the province of Rome no less than 122,633 peasant proprietors, whose individual holdings are less than 2½ acres in size. The result is, that those who labour expend their entire force in tilling the ground, while those who do not manually labour soon lose their property. More than half of the workers are attacked annually by sickness, and no wonder, when we find that maize, vegetables, and thin cheese, all of very inferior quality, are their chief and often their sole food, while the water is usually bad and scarce. In the city of Rome itself, the conditions are almost as unhygienic. Many rooms



are below the level of the street, and never get a ray of that sunshine of which the Italian proverb says, "Dove entra il sole, non entra medico," or, in other words, "No doctor wanted where there is plenty of light and air." The smallest apartments are occupied by ten, fifteen, or twenty persons, and under these circumstances, four cubic yards of air is all that can be relied on per head. Consumption, fever, and immorality are the natural sequences. A single speculator recently built in a central and populous part of Rome no less than fifty mud hovels, 7 ft. high by 9 ft. wide, in each of which four or five persons were huddled for warmth and shelter. It is true that a society exists for the improvement of the dwellings of the poor, but it is not well supported and its means are quite inadequate.

**THE** strike at the Elswick Works, which has been fortunately terminated by the common sense of the majority of the men, would, if persisted in, have been a serious menace to the material efficiency of English manufactures. Apart from the broad questions of, first, the justice, and secondly, the wisdom, of this unhappy method of fighting out questions of the rate of pay, there were special features in the present case which would have rendered submission on the part of the masters a suicidal act. Let us for a moment assume that the managers against whom the movement was directed were men unfit for their posts. Proof of such unfitness must then be readily attainable; and if such proof were submitted to the directors in a quiet and business-like manner, the result could hardly be doubtful. But to be reduced, when asked to state causes for a personal objection, to so vague and sentimental a complaint as that of "the introduction of an unkindly and domineering spirit," is to admit that there is no case for the complainants. Every one who has had the management of large bodies of men is aware of the fact that the qualities in the foremen and managers which are necessary to insure business success, and which thus conduce to the permanent welfare of the whole industrial community, are very rarely combined with great suavity of manner. The more the good foreman identifies himself with the excellence of the workmanship and the cheapness of the output of a factory the more intolerant is he, naturally, of idleness, insubordination, and all those qualities on which the misleaders of the working classes found their appeal to the passions, rather than to the good sense, of their auditors. To give up a foreman, even if a somewhat harsh and dictatorial one, at the bidding of the men working under him, without trial or even distinct accusation, would be to invert the relations of labour and of capital, to the ruin and downfall of both. Of that the employers, as a rule, are fully aware.

**PROFESSOR L. LEVI** endeavoured to persuade the section of the British Association that deals with economic science and statistics that there was nothing new in the occurrence of even a somewhat protracted depression of trade. He admitted, however, that the general condition of trade was certainly considerably altered, and was much more precarious than it was fifteen or twenty years ago. He held that Royal Commissions could not improve trade, and prophesied that that "summoned, if possible, to reverse the verdict of the nation as to free trade would, like Balak of old, not only reject the appeal, but confirm it as irrevocable." (We conclude that the error as to the personage cited must be that of the reporter.) What Professor Levi omitted to mention was the prodigious change which has occurred during the last forty years, in the relative prices of each average ton of imports into, and exports from, the United Kingdom, as measured by the ton of cargo-carrying shipping. During the decade 1840-49 we paid 16.8l. for every ton of imports, and received 16.9l. for every ton of exports. During the decade 1870-79, we paid 18.7l. for every ton of imports, and received 12.7l. for every ton of exports. This shows a depreciation of 24.8 per cent in the price of exports, and an increase

of 11.3 per cent. in the price of imports. An acknowledgment and an explanation of this unfavourable statistical fact would have been better worth the attention of the section than confident predictions as to what the Royal Commission on the Depression of Trade will or will not do.

**THE** dispute between Mr. Whitworth, M.P., and the Chairman and Directors of the Metropolitan Railway is one which has some public interest, for the efficient working of this line affects the comfort and convenience of most dwellers in the metropolis in a less or greater degree. Into the merits of the dispute between Mr. Whitworth and his co-Directors the public have not yet been admitted, but certainly, for the interests of the shareholders, the sooner both parties lay their cases before this body the better, for no Company can be regarded as in a satisfactory position when a director retires and makes grave charges against the management of the Company. It is to be hoped that the dispute may, at any rate, help to bring about, sooner or later, some kind of working arrangement with the District Company and likewise put an end to any more extension schemes, such as the absurd proposed pushing of the Metropolitan Railway into the agricultural county of Bucks. The object of the Metropolitan Railway should be to serve the metropolis as efficiently as possible, not to seek speculative advantages in the country. The line is overweighted with traffic as it is.

**AMONG** the more reasonable and sensible resolutions passed at the Trades' Union Congress was one urging the Legislature to confer power upon the Board of Trade to compel the adoption of an improved system of coupling for railway vehicles, such as will render it unnecessary to pass between them in coupling and uncoupling them. We have before adverted to the subject, and considering that there are a number of inventions for this purpose, two or three of which at least are practicable and not costly, it becomes a matter of absolute and wilful wrong to continue the present dangerous and murderous system. The percentage of injuries and deaths to railway servants from accidents in coupling during shunting is an appalling one, and the railway companies ought to be compelled to give the matter their attention without delay.

**WE** hope that the decision given by Mr. Bridge in a case under the Metropolitan Building Act, as reported in another column, will have the effect of inducing the Board of Works to reconsider their conservative and obstructive position in regard to the employment of concrete as a building material. The defendant was summoned for using concrete for the walls of a block of artisans' dwellings, having been previously served with a notice to discontinue it. The defendant said, "under advice," he should proceed with the building. The Magistrate ruled that concrete, properly constructed (and there appeared to be no contention that this was not so), was a good material for building purposes, and dismissed the summons. Concrete building was introduced since the Act was passed, and the Board of Works apparently "cannot find it—'tis not in the bond." It is absurd at this time of day that special licence should be required for using concrete walls. The Board should confine their action to seeing that the concrete is properly made and of the proper materials; they will then be doing valuable work. To put concrete building under an official ban is what cannot reasonably be allowed any longer; and the Magistrate's decision was in accordance with common sense.

**A FEW** of the unpleasantest words that ever blotted paper, in a scientific point of view, are to be found in the opening address of Mr. Baker, the President of the Mechanical Science Section of the British Association, and the worst of it is that the subject is one on which the speaker is probably the highest living authority. "Hundreds of existing railway bridges," said Mr. Baker, "which

carried twenty trains a day with safety, would break down quickly under twenty trains an hour." With a growth of traffic which, on prosperous railways, exceeds 3 per cent. per annum, year after year, this announcement is very ominous. As a result both of his own investigations and of communications with leading Continental and American engineers, as to the admissibility of stress on iron and steel bridges, Mr. Baker declared that "at the present time absolute chaos prevailed." He could cite cases, he added, where the working stress on the iron had exceeded, by 250 per cent., that considered admissible by German and American engineers. A bridge that would be passed by the Board of Trade would require to be strengthened by from 5 to 60 per cent. before it would be accepted by the German Government, or by any of the leading companies in America. In that state of things passengers may be comforted by being told that the large railway companies are strengthening their iron bridges, but the prospect is less cheering for the shareholders.

**IN** the last number of the *Statist* there is a retrospective account of the condition of Welsh railways, which will be of melancholy interest to all those who love the Principality. There are the two great trunk lines, which have appropriated a considerable portion of both North and South Wales, viz., the London and North Western and the Great Western, to which, of course, the remarks do not apply; but they are the chief cause of the unproductiveness of the Welsh lines proper, as they have secured for themselves the most valuable portions of the country, leaving the dry bones of the remaining districts to their unfortunate competitors. The consequence of this one-sided division is that there are at least twenty-one different railways of greater or less length which are almost entirely non-dividend paying. The invested capital is nearly 14 millions sterling, of which over 4 millions are in ordinary shares and 5 millions in preference stock. But one line, and that a very small one, running from Ruthin to Cerrig-y-druidion, is earning anything on the ordinary shares, this solitary exception being at the magnificent rate of 1½, while, in the case of preference stock, there are about half a dozen lines which do a little more than pay their way. These, however, are only where special manufacturing advantages are to be found, as, for instance, the Brecon and Merthyr, which has an iron and coal traffic to and from the iron works of Dowlais and Merthyr Tydvil, and which earns a dividend of 5, as also does the Swansea and Mumbles, a very short line with a watering-place traffic. The Pembroke and Tenby is a similar line, although it only earns from 2 to 3. The Cambrian, Central Wales, and Mid Wales are the only systems which can be considered trunks, and were it not for these, a large proportion of the Principality might as well be in the American backwoods, as far as accessibility goes. They all run through more or less barren districts, in which populous towns are few and far between. In the summer months, they obtain a fair share of tourist and seaside passengers, but once the season is over, empty carriages are the rule. The only apparent way of improving this doleful property, is for the Welsh railways (which, after all, only amount to 854 miles) to amalgamate. This would have a good effect in two ways. First, a united concern of this magnitude would be able to meet the two big companies with something like a bold front; and secondly, the enormous expenses of so many divided managements would be saved. This is no light matter, seeing that, at present, these separate companies have 184 directors and 101 principal officials for 584 miles, whereas the Great Western Railway, with 2,286 mileage, has only nineteen directors and eighteen chief officials.

**AT** the last meeting of the Archaeological Society of Berlin Dr. Fürtwaenger read a paper on the recent excavations of Mr. Ohnefalsch-Richter in Cyprus. A sanctuary of Aphrodite, "Idalian Aphrodite beautiful"



has been laid bare at Dali (ancient Idalium). A great number of votive images of the goddess have been found, and the series represents successive phases of Cyprian art. Some are of the Egypto-Phœnician style, some purely Egyptian, others archaic Greek. This is only fresh witness to the receptive, imitative nature of the Phœnician artist. We have almost ceased to look for work that shall bear the impress of his individual hand. All we now hope for is to make out more clearly the chronology of his apt pupillage. A quantity of archaic pottery was found with the figurines. Details of the excavation will probably appear in the *Mittheilungen* of the German Institute at Athens.

**A**T the School of Art Wood-carving (which is now established in its new quarters in the City and Guilds Technical Institute in Exhibition-road) there is on view for the next few days a large carved mantel and over-mantel which has been executed by the pupils of the school for the library of Ingestre Hall, the seat of Lord Shrewsbury. The practical work has been done by Mr. Upham, the artistic work (panels, terminal figures, and ornaments) having been executed (under supervision) by the members of the school. It is a good piece of work, and should lead to the school obtaining other work of the kind from architects. The school is under the immediate supervision of Miss Rowe, and includes pupils of both sexes. The effort is made to give individuality of style and feeling to the work, and to avoid mere routine and mechanical style. Instruction is also carried on by letter with pupils in the country, who receive roughly-shaped pieces of wood, sent by post, to work on, accompanied by drawings and description of the manner of working; these are sent back usually at an intermediate stage for criticism, and then returned for completion. The number of pupils has been steadily though slowly increasing since the school was started in rooms at the Albert Hall five or six years ago. It deserves the support and attention of architects.

**PAUSANIAS**, walking through the precincts of the sacred Altis at Olympia, saw, he tells us, a statue of "Sophius, a Messenian boy," who "vanquished boys in the course." Dr. Pargold has just given back to us, not the statue,—that, probably of bronze, has perished,—but the very base of the statue, with the name and country of Sophius. The Altis is fast getting re-peopled with its ancient throng of stone inhabitants. If many more of these inscribed bases still lie undiscovered we may, indeed, be glad that the Greek Government is about to resume the unfinished German excavations.

**A**S the many holiday-makers return to town they will, when they visit Piccadilly-circus, rub their eyes like so many Rip Van Winkles. There has probably been no recent metropolitan improvement which makes itself felt more vividly than the demolition of the block of houses which stood at the junction of Regent-street, Piccadilly, and Coventry-street. The sudden appearance, so to say, of the decidedly striking building into which the rather disreputable-looking London Pavilion has been turned, aids considerably in making the improvement very obvious. When the plot in the centre has been laid out with grass and flowers, and with, we may hope, a well-designed fountain,—it may be, in time, some sculpture-worthy of the site,—no spot in London will show better what may be done in the way of improving the metropolis. The effect produced by this opening out of the space makes it more to be regretted that a fine street has been spoiled in Northumberland-avenue by the erection of buildings so high as to be out of proportion to the width of the street, and actually to darken it.

**T**HE development of that branch of science which deals with explosives is increasing so rapidly that we may shortly expect it to assume distinctive features as a manufacturing trade. The new agent just announced is hellhoffite, a

term not derived, as might reasonably be supposed, from any connexion with the infernal regions, but merely from the name of the inventor, Herr Hellhof. Chemically speaking, it is a solution of a combination of naphthalene, phenol, and benzene in fuming nitric acid. Its claims are that, when ignited with fulminate of mercury, it is more powerful than nitroglycerine, and that it can be stored and transported without the least danger as regards concussion, neither blow, shock, nor open flame having any effect upon it. On the other hand, it has certain disadvantages attending its use,—principally that it is a liquid, and of so volatile a nature, that it can only be stored in perfectly-closed vessels. By mixing it with water, it is rendered completely inexplosive, which, so far, is an additional element of safety; though, *per contra*, this very fact prevents its employment in sub-aqueous works.

**F**ROM a correspondence in the Liverpool *Daily Post* it should seem that two of the Liverpool gentlemen who have been most active in promoting the interests of the annual picture exhibition there, of which we spoke last week, have assumed the position of irresponsible judges and hanging committee, with no professional artistic advice of any kind. That is not the way to increase the confidence of artists in the exhibition, or to promote its continued success in future years. The name of one member of this dual amateur hanging committee is known in artistic circles beyond Liverpool, and it is known that he possesses some knowledge of art, a great deal of zeal, and a considerable leaven of eccentricity; but this combination of qualities is not altogether favourable to commanding the confidence of professional artists, especially of those whose paintings are rejected.

#### AUTHORS IN LONDON.\*

*Fruit etas.* It were formerly possible for the wayfarer to picture to himself a celebrated man as deriving some degree of individuality from the street wherein he resided, or to invest any particular thoroughfare with the idiosyncrasies and occupations of its inhabitants. The Grub-street garrets were marked by a borrowed character of their own as distinctive in its kind as that of the coffee-houses in St. James's. But the altered aspect and uses of London streets, the hurry and bustle of daily life, forbid indulgence in these fancies at the actual places which inspire them. We may awhile share that reaction of temperament which provoked Charles Lamb to shed tears of joy amidst the motley tumult of the Strand. To linger in meditation is only to be jostled by the crowd. Passing onwards with the throng, we are fain to reserve our remembrance of things past until the sessions of sweet silent thought can be held in the retirement of home. There we scarcely could desire a better aid to reflection than the volume before us. To our own reproach, it is a kinsman from across the Atlantic who gives us so agreeable a companion. Where much is supplied it were graceless to complain that much is withheld. Mr. Hutton limits his researches to London as a home of men of letters. We cannot demur, then, that men like to St. John and Arbuthnot find no place with their chosen intimates, Swift and Pope, or that the amiable compiler of the "Reliques" appears only in a scrap of his memorable account of a visit, in March, 1759, to Oliver Goldsmith at No. 12, Green Arbour-court. On the other hand, we follow the authors of "The Mill on the Floss" and "Clarissa" from their child-homes to their graves at Highgate and St. Bride's in Fleet-street.

We bear a ready and personal tribute to the extent of the labours that go to the making of so minute a record. That a vast amount has already been written on the subject in no degree removes the obstacles which lie before the conscientious inquirer. As Mr. Hutton remarks in his preface, "The difficulties met with in the preparation of the following pages have been many and great. Old houses have disappeared, streets have been renamed and renumbered, and in many instances entire streets have been swept away in the dreadful march of improve-

ment. It is easier to-day to discover the house of a man who died 200 years ago, before streets were numbered at all, than to identify the houses of men who have died within a few years, and since the mania for changing the names and numbers of streets began . . . . The confusion caused by this renumbering and renaming can hardly be expressed in words." In apt illustration of this he might have cited the recent interference with St. James's-square, where the original numbers of the houses have become closely connected with their historical associations. In the *Antiquary*, for March last, it was announced that the house, No. 10, Brook-street, Holborn, where Chatterton died, had just been pulled down. Now, as a matter of fact, No. 10 was then untouched, and was tenanted by a local mission; nor was it the house in which Chatterton closed his life. No. 10 was not dismantled until two or three months ago, together with its neighbours as far northward as Greville-street. Mr. Hutton, quoting both Howitt and Peter Cunningham, cites No. 4 as the house in question. He is correct as to the postal number: Mrs. Angel lived at what was No. 4; but he does wrong to follow them in identifying the house as portion of the furniture shop, latterly Chas. Meeking & Co.'s,\* at the street's south-eastern angle with Holborn. The fact is that the street was re-numbered; No. 4 of Chatterton's day became No. 39, being on the western side of Brooke-street and a few doors from Holborn. This is evident from an inquiry which was made some years ago. In 1857 one Clifford, a plumber, occupied No. 39; the annoyance he suffered from visitors suggested that Mr. Hollingshead one of Mr. J. L. Toole's most popular farces, "The Birthplace of Poldags," the house remained unchanged, save that its one attic had been converted into two. Thus the view of St. Paul's shown in H. Wallis's painting of the "Death of Chatterton"† was at that time quite possible. No. 39 was demolished in 1881; higher up the street, by Brooke's Market, is the sole memorial to Chatterton in London,—a coffee-house called by his name.

Mr. Hutton refrains from the cheap sentiment that has become too common of late. He treats us to no silly vapouring about this revered form that may often have been seen on its own doorstep, or regaling in its favourite tavern corner. Going directly to his point he claims completeness and exactitude for his novel results. In equal justice to our author and readers alike, we have been at the cure,—with no sinister intent,—to investigate some of those statements which the topographical reader will regard in the light of a revelation. It is no small gain to learn what we read about Walker's Hotel in Soho; or to know that a relic yet remains of Charles Lamb's home in Little Queen-street. But the "tree standing in what had undoubtedly been Lamb's back garden" is one of two fig-trees planted long after Lamb left Little Queen-street, and the garden was soon absorbed by the new buildings between that thoroughfare and Newton-street. If that house he witnessed the tragedy which saddening the whole of his after-life, left him with the anxious charge of his sister, Mary. Yet Mr. Hutton is not quite correct in what he says about the sign as being still *in situ* of the Feathers Tavern in Hand-court, High Holborn (not Holborn) hard by. That sign,—being the Prince of Wales's crest and motto on a shield,—is not there, and was taken down, we are credibly informed, some three or four years since. There are other slips of a less trivial kind, some of them indeed being repeated in different pages of the book. For instance, under date E. J. H. (East-India House), 21st November, 1823, Charles Lamb writes to Southey: "I am at Colebrook Cottage, Colebrook-row, Islington. A detached whitish house, close to the New River, end of Colebrook-terrace, left hand from Sadler's Wells." Whilst giving this passage, and not without a material error of punctuation, Mr. Hutton deceives his readers. For Charles Lamb never lived in what is, or was, No. 19, Colebrook-row. Twenty years ago Colebrook-row (named from the Colebrookes, Lords of Highbury Manor in 1723-91), included twenty-nine houses, i

\* Nos. 141-2, Holborn, and Nos. 1-5, Brooke-street, destroyed by fire. A large building on the site of the premises was built, 1878-9, by Mr. Waterhouse, for the Prudential Assurance Company, which Mr. Hutton confuses with the extinct Universal Building Society.

† Lent by the late A. L. Eger to the Manchester Exhibition, 1867. This subject had also been depicted by Singleton in 1764.

\* "Literary Landmarks of London." By Laurence Hutton. London: T. Fisher Unwin. 1885.



one of which, by the way, that adjoining the eagle, Colley Cibber died. Bat, within eight years afterwards at most, No. 19 was converted to No. 49; and at this day the row (which consists of seven houses, and New-terrace) comprises the seventy-five houses on the eastern side of the covered New River, and on the right and from Sadler's Wells. Lamb's house, then it is called "Elia," and not "Elia Cottage," and is not a "two-storied" but four-storied if no basement be reckoned), is the last on the eastern side, and now semi-detached, being No. 19 (New-terrace), at the remote end of the row, styled but as yet unnamed Camden-terrace. No may yet see the steps having a return on the right of one descending, from which George Dyer walked into the river,—this was scarcely possible from any other house here,—the very steps which Lamb himself, "o'er all the ills of life victorious," must at times have found to be very awkwardly constructed, and similarly with Lord Macaulay. His boyhood's home in Great Ormond-street is given as No. 50. It has no postal number at all. It forms part of the premises of the London Homoeopathic Hospital, whereof the governors, in October, 1857, bought what were then Nos. 50-2, in this street. Nearly all the numbers along the northern side have been lately recast, so that he who, under our author's guidance, goes to No. 50, the Hospital of St. John and St. Elizabeth, as being Macaulay's birth-place and that of his father, is in effect directed to what in their time was No. 47. Moreover, it is inaccurate to say that Macaulay, then in chambers at No. 8, South-square, near the Inn, occupied "a building that has since been torn down to make way for the extension of the library." The new addition to the library (1883-4) was erected over ground which no chambers had ever previously occupied. Nos. 8 and 9, South-square, were pulled down, circa 1840, for the then new stairway, and what has since become the old library. The existing parish church of St. Mary-le-towen, in Marylebone-road, built by Thomas Hardwick 1813-7, is only in name the successor of the original parish church. This latter, existing by statute as the parish chapel, stands in High-street. At its foot were baptised Lord Byron, carried thither from Holles-street; and Lord Nelson's daughter (the late Mrs. Ward) Lady Hamilton, with the names of Horatia and Nelson Thompson.\* It was erected in 1741 in place of one dedicated to St. Mary the Virgin, wherein Francis Lord Verulam was christened, and rendered familiar to us as the scene of the marriage in Hogarth's "Rake's Progress" as well as of the churchyard episode in his industry and idleness. That church, to complete the tale, had been established there, and still near to the Aye brook orbourne, in 1800, to succeed the old and decayed Tyburn church of St. John the Evangelist, which stood by the first court-house and pound at the northern end of Marylebone-lane. Moreover, the old church, Lincoln's Inn-fields, is re-named, and absurdly enough, Sardinia-street; and that we would gladly credit that Milton-street commemorates Milton's residence and death in the neighbouring Artillery-walk, now absorbed in Bull-row, the truth is that Grub-street took its fresh style from one Milton who resided there.

Most people will heartily concur with him who averred that he dreaded to awake each day to some new discovery should be made about Shakespeare. Mr. Hutton rehearses almost all that may be learned or conjectured about the poet's sojourn in London; though he seems to get that there was more than one Bull-row by Bishopsgate. He cites the letter,—only one extant addressed to him,—which Richard Quinny wrote to his "loving good friend and countryman Mr. William Shackerley," from the Bell Inn, Carter-lane, Blackfriars. The modern public-house of that name on that site has been marked, by the bye, for destruction for the extension of the Government Savings Bank in Knight-riders-street. It would also be observed that on the wall of Nos. 65 and 67, opposite to St. Nicholas Cole Abbey Church, in the latter thoroughfare, is a sign of a bell, with initials and date,—T.A. 1688. The notices of De Foe, Sir Isaac Newton, any Burney, Leigh Hunt, and Keats are highly interesting and valuable. Mr. Hutton

This lady married the Rev. Philip Ward, vicar of St. Peter's, and died at Pinner, 1861.

describes as being still there the wooden bench at the lower end of Well-walk, Hampstead, whereon Keats was wont to rest. There he was last seen by Howitt "sobbing his dying breath into a handkerchief, glancing parting looks towards the quiet landscape he had delighted in so much, and musing, as in his 'Ode to the Nightingale.'" The landscape and the Well itself, with their memories of Constable, Turner, and Clarkson Stanfield, are sadly changed. One can just trace through the brickfields the path along which Coleridge came from Highgate to meet Keats, and parting from whom at this very seat, Coleridge whispered to Hunt that there was death in that hand. But the seat itself, and we can recollect many like to it about Hampstead and the Heath, is represented by one of the iron benches so dear to the Wells Charity trustees. At No. 76, Cheapside, over Bird-in-Hand-court, leading to the Queen's Arms tavern (locally known as Simpson's), Keats wrote his sonnet upon reading Chapman's translation of Homer, together with nearly all his first volume of poems published in 1817. No. 76 was rebuilt eighteen years ago. We may direct Mr. Hutton's further attention to an announcement of death in the supplement to the *Gentleman's Magazine* for June, 1812. "June 25: In Burrow's-buildings the wife of Mr. Keats, of Cheapside." Keats lost his mother in 1810, when at John Clarke's school, Enfield. His father, according to W. M. Rossetti's memoir, died in 1804. The obituary advertisement is worthy of notice, nevertheless. Mr. Hutton cites, with Rossetti and others, the 29th of October, 1795, as the date of Keats's birth. He was born,—a seven months' child,—on the 31st of that month. This mistake arises from the circumstance that he mentions his birthday in a letter which he heads the 29th of October, but which he did not finish, though with no indication of a pause, until two days afterwards. Amongst those whom, either by their unsettled mode of life or other causes, it is unusually difficult to trace, Mr. Hutton includes Sheridan, who, of course, falls within the former category. We can supplement his list of Sheridan's addresses by reference to a plan of 1794, in the British Museum. R. B. Sheridan is named thereon as occupant of a large house just north of the Opera House (Her Majesty's), Haymarket. The entrance appears as between Nos. 75 and 76, Haymarket, western side, where is now Charles-street. The Royal Comedy Theatre in Pantion-street should, we believe, be instanced as marking the situation of Addison's Haymarket lodging, which Pope showed to Harte as being the garret wherein Addison wrote "The Campaign." Theodore Hook is here stated to have gone to a school in Soho-square; he was also at Harrow. To the probably unauthentic description, quoted for what it may be worth, of Dryden's funeral in Westminster, it may be added that the charges amounted to 451. 17s., and that one Russell was undertaker.

A set of block plans done to a large scale (the Ordnance 25 in., say) would materially enhance the value of this compilation as an authority in the future. Failing these, Mr. Hutton is solicitous to indicate by its present postal number or otherwise the position of each existing house he names. It were greatly to be desired that the Society of Arts could complete their inchoate enterprise for the setting up of memorial tablets in well-ascertained positions; for we despair of the London Topographical Society, which in nearly five years has given us but two old maps. The apathy of those who succeed to the heritage whereof Mr. Hutton proves so sedulous an expositor has its worse counterpart in Paris. There the once-honoured titles of many a thoroughfare are exchanged day after day for names which only serve to remind us of those who filled its streets with riot and bloodshed. Here, we retain very little of that spirit which prompted the inscription to Dryden on the curious little house over Fleur-de-Lys-court, Fetter-lane, or the invocation to him who passes by Dante's home in Florence.

**Birmingham.**—St. George's Church, Edgbaston, was re-opened on Saturday last, after extensive alterations and additions under the superintendence of Mr. J. A. Chatwin, architect. The greater part of the interior fittings, including a brass eagle lectern, was supplied by Messrs. Jones & Willis, of Birmingham and London.

#### THE VENTILATION OF THE NEW MUNICIPAL THEATRE AT NICE.

Nearly two years ago\* we published illustrations of the new theatre built by the Municipality of Nice. It will be remembered that a terrible fire destroyed the old structure, and many lives were lost on that occasion. In the article accompanying this illustration we had the pleasure of congratulating the architect, M. Anne, for the taste, skill, and promptitude with which he had raised a magnificent new theatre almost as rapidly as the ashes of the old ones were cleared away. But at the same time we lamented the absence of any scheme of ventilation. This was left to the accident of doors and windows, and we further pointed out that in a town like Nice, where so large a proportion of the visitors are invalids, good ventilation in places of public resort was of more than usual importance. Finally, we suggested that Nice might follow the example set by Geneva, where the Grand Theatre is a model of efficient ventilation.

All these remarks, we have been informed, were faithfully translated into French, and brought to the knowledge of the Mayor and Municipality. With commendable energy letters were at once written to the firm who had so successfully ventilated the theatre of Geneva, and whose work met with the approval of the Fourth International Congress of Hygiene, held at Geneva in September, 1884. Messrs. Geneste & Herscher were forthwith invited to Nice, and entrusted with the ventilation of the new theatre. The building was opened for the first time last season, and the result proved most satisfactory.

A few years ago the grand theatre of Vienna was the only establishment of the sort on the Continent which could be described as scientifically and successfully ventilated by the aid of a motive power yielding exactly the volume of air required. The comfort attained by such a method was so great that, at Frankfurt, Brussels, Geneva, and finally Nice, the example has been followed, and in some respects improved upon. Remembering the suffocation endured in the old theatre of Nice, nothing could have been a greater and more agreeable surprise than the ease and fresh air enjoyed in the new structure. The ventilation is based on the principle that the air must not be supplied irregularly and from particular points, but should be admitted in horizontal layers, which, rising gradually from the entire surface of the floor, travel slowly up to the roof without occasioning any currents likely to disturb the spectators. But, further, the air must be so prepared as to be in a proper condition for breathing before it is admitted into the theatre. In other words, it must be warmed in winter and cooled in summer.

On visiting the theatre of Nice we found that these conditions had been realised in the following manner. Over the entire surface, occupied by the stalls and the pit, the air is admitted by means of four hundred apertures. These are made under each chair and protected by iron gratings. They measure about 6 in. by 10 in. The openings therefore present a large surface evenly distributed; the air consequently travels slowly, in spite of its abundance. All these openings are fed by means of shafts into which the air is pumped by a mechanical ventilator. A small gas-engine suffices to put the fan or wheel into motion. In winter the air is previously warmed by a number of hot-water coils. Care is taken, however, not to allow any portion of this air to attain a temperature exceeding 62° to 65° Fahr., and thus it does not lose any of the qualities of fresh air. There is in fact a mixing-room where the warmed air is diluted with cold air that has not passed over the hot-water coils; and with a little personal superintendence it is easy to obtain precisely the required temperature. During the summer, the air is cooled by means of a water-pulveriser, which also adds a pleasant moisture to the atmosphere.

The theatre, it is important to note, is not warmed by the air pumped in for breathing purposes. If this were done, the air to combat the refrigerating effects of the windows, walls, and other cold surfaces would have to be heated to a higher degree than pleasant or wholesome for breathing purposes. All the parts surrounding the auditorium, the passages behind the boxes, vestibules, &c., are carefully warmed by hot-air flues.

\* See *Builder*, Jan. 5, 1881.



The surrounding temperature is thus maintained at about 65° Fahr. No system of ventilation is provided for this part of the house, nor, indeed, are there any special air-shafts to supply the boxes.

The ventilation is not so elaborate as at Vienna or Geneva; but, on the other hand, it is less complicated and not so expensive. For a theatre of moderate size the success achieved at Nice shows that it suffices if the entire floor of the house admits an up-current of air. This will ventilate sufficiently the front portion of the boxes, the part precisely where the spectators are sitting during the performance. By carefully separating the warming and the ventilating the attendants remain master of the one and the other. More air or more heat can be supplied according to the necessities of the moment; but if the one could not be given without the other, very awkward difficulties might occasionally arise.

The theatre itself is illuminated by 727 gas-jets; but with the passages, crush-room, &c., we have a total of 1,700 gas-burners. During the representation, for instance, of "Faust," 78½ cubic metres of gas were burned per hour; and, as the entertainment lasted from 7.30 to 12.30 in the night, 393 cubic metres of gas were consumed. The gas required for the engine, which is only of six-horse power, amounts to one cubic metre per horse power per hour. The ventilating-fan generally pumps 14,000 cubic metres of air into the theatre per hour during the winter, and 18,000 cubic metres in the summer.

As there are 1,500 seats in the theatre, this would amount to nine cubic metres per head per hour in winter, and 12 cubic metres in the summer. We must also allow for the fact that every seat is not always occupied, and there is a certain amount of accidental and supplementary ventilation due to the opening of doors, windows, &c. To prevent this accidental ventilation becoming in any way unpleasant, care is taken that the passages and outer rooms should always be two or three degrees warmer than the theatre; thus any current caused by the sudden opening of one or more doors is always a warm, and therefore not an unpleasant, current.

The observations made during various performances show that on an average the temperature of the stalls and pit is equal to 63° or 64° Fahr. during the whole evening. In the gallery the temperature is the same during the first hour, but during the second hour it rises to 65° Fahr., and towards the end of the performance it may go as high as 67° or 69° Fahr. At the same time the passages, vestibule, and various annexes had a temperature varying from 65° to 67° Fahr. The fresh air coming into the theatre underneath the chairs in the floor of the house travels at the rate of 15 to 18 centimetres per second, according to the atmospheric pressure and the amount of gas burning at the time. In summer the speed increased to 20, or even 25, centimetres per second, but the current is so evenly diffused that it is not felt by the spectators.

Under these circumstances, the beauties of the new theatre can be enjoyed without any inconvenience. There need be no fear of taking cold, or of enduring the pain of a "theatre headache." For a health resort like Nice such advantages, we repeat, are of the greatest importance, and will not fail to attract people to the town and augment the receipts of the theatre.

In the decoration and ornamentation of the theatre, which were not complete when we described its main architectural features, a great deal has also been done to attract the admiration of visitors. The staircases and vestibules are most capacious and highly ornamented. Two handsome statues representing female forms holding up lamps at the foot of the principal flight of stairs are due to J. Coutant, who won the competition for the Jeu de Paume de Versailles, and the Gambetta statues. In the crush-room there are some fine paintings representing views of Nice and the Bay des Anges, with angelic nudes bathing and rising from the foam of the blue waves. These paintings are by M. Costa, a native artist; but for the scenery and stage machinery it was necessary to employ Messrs. Dussan, of Lyons and Geneva. Altogether, what with the painting, the sculpture, the decorations, the white stone and the red columns of Verona marble, the ample space, the broad passages, majestic staircases, and, above all, the fresh, pure air supplied in such abundance, even in the hottest weather,

the theatre of Nice may be considered one of the most attractive places of entertainment in Europe. It remains to be seen whether in the selection of his performers and performances the impresario will prove himself equal to the exceptional advantages afforded in this model theatre. In all cases, the architect, M. Aune, and the ventilating engineers, Messrs. Genest & Herscher, have most fully and satisfactorily fulfilled the difficult and important task with which they were entrusted.

#### THE ANTIQUITIES OF TONG, SHROPSHIRE.

THE interesting Guide,\* which Mr. G. Griffiths has just completed, will be read by a large number of English antiquaries, who are probably at present unaware of the many points of history which are enshrined within the walls of Tong Church. Eytton has written eloquently in his "Antiquities of Shropshire" upon the parish, but Mr. Griffiths has made more extensive researches, and been thereby enabled to add a considerable amount of new facts to the hitherto published notices of this ancient place. The name itself, at the outset, requires a little elucidation; by some attributed to the sound of a large bell, by others to the grant to Hengist, the Saxon warrior, by a grateful king, of as much land as an oxhide cut into thongs would encompass. A much more likely derivation of the name is suggested by its situation, which is upon a triangular tongue of land, formed by two streams, which unite immediately below the western tower of the castle. The descent of the manor has been traced consecutively from Earl Morcar, who forfeited it to William I., who conferred it on his kinsman, Earl Roger de Montgomery. The possession afterwards devolved on the family of Belmeis, then on that of Zouche, and eventually it formed part of the property of the Pembruges, Vernons, Stanleys, Pierpoints, and Durants. From the latter, the father of the present possessor, the Earl of Bradford derived it.

Tong Church fortunately has escaped restoration; hence its value to the archaeologist, who may study with advantage the alterations and additions which have been constantly made to the fabric. Earl Roger, described by the chroniclers as a very prudent and moderate man, founded a church here within eight years of the Domesday, and it is believed that a few traces of this original church may yet be observed in the appearance of some of the walls and pillars; but there are no records extant to show when this early church was taken down to give way to the present edifice, which, however, tells its own tale to those who can read stones. Several curious discrepancies of design have been noticed; among them, the not unusual difference in the north and south ranges of arches in the nave; the varied mouldings at the bases of piers, although the capitals resemble one another; the unequal width of the aisles; and the east window not placed in the true centre of the front. The base of the tower is not quite square, nor the octagon equilateral. The spire, however, is very nearly correct in its measurement, and this has rendered necessary a peculiar construction at the junction, which has been illustrated in the *Archæological Journal*. The south porch is furnished with ancient stone seats on either side, and has a fine old carved ceiling of oak-wood. In the south aisle the pillars, carrying the arches forming the arcade between the aisle and nave, are probably older than any other part of the church. The cap of the westernmost pillar is ornamented with the dog-tooth; and the labels of two other arches have the same design. These features have been justly referred to the thirteenth century by Petit, who conjectures that the present south aisle originally formed the nave of the earlier church founded by Earl Roger de Montgomery, as the south side of the pillars is more ornamental than the north, which, perhaps, faced the north aisle of the older edifice. The present floor, on which several of the old caken benches still remain, probably covers a tiled floor of much older date, portions of which have been discovered in the north aisle, when the new organ was erected some years ago. The old oak roof of the nave, with carved bosses at the intersections, is worthy of notice. The font at the north-east corner of the church is

octagonal and of simple design. The doorway and the north doorway are closed, should, for obvious reasons, be opened again. In the latter stands the fragment of a tomb not identified. The wooden screen of the north and south aisles, forming chapels of rich workmanship, with the colours preserved, mellowed and toned down by time.

The tombs form a striking feature of the Church. The oldest, that of Sir Fulke Pembroke, of Tong, and Dame Elizabeth, wife, daughter and heir of Sir Ralph Lingard Wigmore, is chiefly of alabaster. It is originally under the roof-loft, or "rode-be," as Chaucer terms this honourable place of sepulture,—but is now placed under the arch of the tower. Sir Fulke was Lord of Tong in 1371, and died in 1408 or 1409. The armour in which he is represented is a mail and partly plate. Dame Elizabeth died in 1447, and is represented in widow's attire, with a wimple on her chin; at her feet a deer's head, collared and chained. Her head rests on a double pillow, supported on each side by a small angel. On this tomb was placed one summer-day a chaplet of roses as an ornament for large privileges in Tong granted to the family of De Huford. Dugdale and Leland appear to be in conflict as to the person represented on the tomb, but Mr. Griffiths considers that the remains of the crest,—a Tudor woman's head with long hair,—determines the effigy. Other tombs worthy of the notice of the antiquary are those of Sir Richard Vernon and his wife Benedicta, 1452; of Sir William Vernon and Margaret his wife, 1467; a Sir Henry Vernon and his wife Anne T. 1515. Among later monuments, that of Thomas Stanley, second son of Edward, Earl of Derby, deserves mention. We must not conclude, however, that the monument is without a few words on the subject here preserved,—a sacramental vessel of the time of Henry VIII., believed to be the one of the celebrated Holbein, and regarded as unique of its kind. This stands 11 in. high and is of silver gilt and richly chased.

furnished with a crystal barrel 2 in. diameter. This part was fractured in 1824, but has been carefully repaired. It probably belonged to the ancient college of Tong, then used to contain the consecrated elements. It does duty now as a communion cup, vestry, a detached building with carved work of the fifteenth century; the li tower, and belfry, with eight bells, are fully described by the author, who has spared no pains in collecting every record of interest relating to the church. For this the "Guide to Tong Church" will be read with attention, notwithstanding its modest dimensions, by all lovers of British archaeology.

#### ENGINEERING TOPICS AT THE BRITISH ASSOCIATION MEETING.

MR. B. BAKER, in his address as President of the Mechanical Science Section of the British Association meeting at Aberdeen, he should ask his hearers to consider the existing practical rules respecting the strength of metallic bridges as "foundations, how far on custom, and how on error?" He proceeded:—The first question obviously is, What are the rules adopted by engineers and Government departments at present time?—and it is one not easily answered. I have for some time past been receiving communications from leading continental and American engineers, asking what is my practice as regards the admittance of stress on iron and steel bridges in replying I have invited similar communications from themselves. As a result, I am to say that at the present time absolute prevails. The old foundations are shaken, engineers have not come to any agreement respecting the rebuilding of the structure, variance in the strength of existing bridges such as to be apparent to the educated without any calculation. If the wheel miniature brougham were fitted to a heavy incident would excite the derision of our street boys, and yet equal want of method is to be found in hundreds of bridges in all countries. It is an opinion that nearly all the large railway companies strengthen their bridges, and necessitate for I could cite cases where the working on the iron has exceeded by 250 per cent.

\* A Guide to Tong Church, Shropshire. By George Griffiths. Oswestry: Woodall & Co., 1885.



considered admissible by leading American and European bridge-builders in similar structures. The case of old bridges, the variance in length is often partly due to errors in hypothesis and miscalculation of stresses. In the present day engineers of all countries are in accord as to the principles of estimating the magnitude of the stresses on the different members of a structure, but not so in proportioning the members to resist those stresses. The practical result is that a bridge which could be passed by the English Board of Trade would require to be strengthened 5 per cent. in some parts, and 60 per cent. in others, before it would be accepted by the German Government or by any of the leading railway companies in America. This undesirable state of affairs arises from the fact that in our own and some other countries many engineers still persistently ignore the fact that a bar of iron is broken in two ways, namely, by the application of a heavy stress, or by the repeated application of a comparatively light stress. An athlete's muscles have often been used as a bar of iron, but, if "fatigue" be in question, the simile is very wide of the truth. The intermittent action—the alternative pull and push of the rower, or of the labourer turning a winch—is what the muscle likes, and the iron abhors. Troopers dismount to rest in horses, but to relieve a bar of iron from the strain of load only serves to fatigue it. Half a century ago Brailhaute correctly attributed the failure of some girders, carrying a large heavy vat, to the vessel being sometimes full and sometimes empty; the repeated deflection, though imperceptibly slow and wholly free from vibration, deteriorating the metal, until, after the course of years, the girders broke. These girders were of cast iron; but it was equally well known that wrought iron was similarly affected, for in 1842 Nasmyth called the attention of this section to the fact that the "altercations" in axles rendered them weak and brittle, and suggested annealing as a remedy, having found that an axle which would snap on one blow when worn, would bear eighteen blows when new, or after being annealed. So important a matter as the action of intermittent stresses could not escape the attention of the Royal Commissioners appointed in 1849 to consider the application of iron to railway structures, and some significant and sufficiently conclusive experiments were made by Captain Thomas Galton and others. Cast-iron bars, 3 in. square and 13 ft. 6 in. span between the supports, were deflected, both by the slow action of weight, and the percussive action of a swinging adulum weight. When the deflection was due to one-third of the breaking-weight, at 50,000 successive bendings by the cam the one of the bars, and about 1,000 blows in the pendulum another. When the deflection was increased from one-third to one-half, about 600 applications of the cam, and 1,000 blows, sufficed to rupture two of the specimens. Slow-moving weights on bars and a small wrought-iron box girder gave analogous results; and the deduction drawn by the experimenters at the time was that cast-iron bars scarcely bear the reiterated application of one-third the breaking-weight without injury, hence the prudence of always using beams capable of bearing six times the greatest weight that could be laid upon them. Although these experiments were entirely confirmatory of all previous experience, they would appear to have little influenced the practice of engineers, since Fairbairn, more than ten years later, in a communication to this section, said that opinions were still much divided upon the question whether the continuous change of load which many wrought-iron structures undergo has any permanent effect upon their ultimate powers of resistance. To assist in settling the question he communicated to the Association the results of some experiments carried out by himself. Professor Unwin on a little riveted girder, 20 ft. span, and 16 in. deep. Once the same important but disregarded results were enforced on the attention of the engineers. About 5,000 applications of a load equal to four-tenths of the calculated breaking-load fractured the beam with the small amount of deflection of three-eighths of an inch, subsequently, when repaired, the beam was broken with one-third of the load, and a deflection of a quarter of an inch, which sufficiently indicated how small a margin the factor of safety of four, then currently adopted, allowed

for defective manufacture, inferior material, and errors in calculation. Still nothing was done, and the general practice of engineers and the Board of Trade regulations continued unaltered. Hundreds of existing railway bridges, which carry twenty trains a day with perfect safety, would break down quickly under twenty trains per hour. This fact was forced on my attention nearly twenty years ago by the fracture of a number of iron girders of ordinary strength under a five-minute train service. Similarly, when in New York last year, I noticed, in the case of some hundreds of girders on the "Elevated Railway," that the alternate thrust and pull on the central diagonals from trains passing every two or three minutes had developed weaknesses which necessitated the bars being replaced by stronger ones after a very short service. Somewhat the same thing had to be done recently in this country with a bridge over the Trent, but, the train service being small, the life of the bars was measured by years instead of months. Although, as already stated, many more experiments are required before universally acceptable rules can be laid down, I have thoroughly convinced myself that, where stresses of varying intensity occur, tension and compression members should be treated on an entirely different basis. If, in the case of a tension member, the sectional area be increased 50 per cent. because the stress, instead of being constant, ranges from nil to the maximum, then I think 20 per cent. increase would be a liberal allowance in the case of a compression member. I have also satisfied myself that if a metallic railway bridge is to be built at a minimum first cost, and be free from all future charges for structural maintenance, it is essential to vary the working stress upon the metal within very wide limits, regard being had not merely to the effect of intermittent stresses, but also to the relative limits of elasticity in tension and compression members even under a steady load. Engineers must remember that if satisfactory rules are to be framed they, and not Governmental departments, must take the initiative. In former days the British Association did much to direct the attention of engineers to this important matter, but, so far as I know, the subject has been dropped for the past twenty years, and I have ventured, therefore, to bring it before you again in some detail. Mr. Baker then referred to the fact that the labours of the present generation of engineers are lightened beyond all estimate by labour-saving appliances. To prove how much the world is indebted to students of this branch of mechanical science and how rapid is the development of a really good mechanical notion, it is not necessary to refer to the numerous hydraulic appliances of the kind first introduced forty years ago by a distinguished past President, Sir W. G. Armstrong. It would not only be impossible to build a Forth Bridge, but it would be equally impossible to fight a modern ironclad without the aid of hydraulic appliances. In conclusion, he said—Members of this section who visited the United States last year not for the first time could hardly have failed to notice that American and European engineering practice is gradually presenting fewer points of difference. Early American iron railway bridges were little more than the ordinary type of timber bridge done into iron, and the characteristic features, therefore, were great depth of truss, forged links, pins, screw bolts, round or rectangular struts, cast-iron junction pieces, and, in brief, an assemblage of a number of independent members more or less securely bolted together, and not, as in European bridges, a solidly-riveted mass of plates and angle-bars. At the present moment the typical American bridge is distinctly derived from the grafting of German practice on the original parent stock. Pin connections are still generally used in bridges of any size, but the top members and connexions are more European than American in construction, while for girders of moderate span, such as those on the many miles of elevated railway in New York, riveted girders of purely European type are admittedly the cheapest and most durable. From my conversations with leading American bridge-builders I am satisfied that their future practice and our own will approach still more nearly. We should never think of building another Victoria tubular bridge across the St. Lawrence, or repeat the design of the fallen Tay bridge, nor would they again imitate in iron an old timber bridge, or repeat the design

of the fallen Ashtabula bridge. In one respect the practice in America tends to the production of better and cheaper bridges than does our own practice, and it is this: each of the great bridge-building firms adopts by preference a particular type design, and the works are laid out to produce bridges of this kind. It is an old adage that practice makes perfect, and by adhering to one type, and not vaguely wandering over the whole field of design, details are perfected and a really good bridge is the result. Engineers in America, therefore, need only specify the span of their bridge, and the rolling load to be provided for, with certain limiting stresses, and they can make sure to obtain a number of tenders from different makers of bridges varying somewhat in design, but complying with all the requirements. With us, on the other hand, it is too often the privilege of a pupil to try his "practise hand" on the design for a bridge, and it is no wonder, therefore, that many curious bits of detail meet the eye of an observant foreigner inspecting our railways. The magnificent steel wire rope suspension bridge of 1,600 ft. span, built by Roebling, across the East River at New York, well marks the advanced state of mechanical science in America as regards bridge-building. It is worthy of note that at the second meeting of the British Association, held so long back as 1832, there was a paper on suspension bridges, and the author entreated the attention of the scientific world, and particularly of civil engineers, to the serious consideration of the question, How far ought iron to be hereafter used for suspension bridges, since a steel bridge of equal strength and superior durability could be built at much less cost? "I earnestly call upon the ironmasters of the United Kingdom," said he, "to lose no time in endeavouring to solve this question." In this, as in many other engineering matters, Americans have given us a lead. America is, indeed, the paradise of mechanics. When the British Association was inaugurated, years ago, there was, I believe, no intention to have a section for the discussion of mechanical science. Possibly it may have been considered too mean a branch. Even the usually generous Shakespeare speaks contemptuously of "mechanic slaves, with greasy aprons, rules, and hammers," and our old friend Dr. Johnson's definition of "mechanical" is "mean, servile." We have lived down this feeling of contempt, and the world admits that the "greasy apron" is as honourable a badge as the priest's cassock or the warrior's coat of mail, and has played as important a part in the great work of civilising humanity and turning bloodthirsty savages into law-abiding citizens.

Mr. W. H. Barlow moved and Professor Thomson seconded a vote of thanks to Mr. Baker for his address, and this was cordially passed.

Mr. C. Barlow read a paper on the new Tay Viaduct. Considerable interest was attached to this undertaking, because of the comparatively few viaducts of such a length crossing tidal water in such an exposed position, and also because of the fact that it was to replace the Tay Bridge, which was rendered useless by the memorable disaster of December, 1879. The Tay Viaduct was being constructed at the side of, and 60 ft. distant from, the bridge. Its total length was 3,600 yards; the number of spans 85, varying from 50 ft. to 230 ft. in width; and the greatest height of rails above high-water, 83 ft. At the navigable channel in the middle of the river there was a clear headway of 77 ft. for shipping. The southern end of the viaduct consisted of four arches of 50 ft. span, with their abutment and piers, all built of brick. In plan this arching was wider at the southern than at the northern end, to accommodate a junction of the Newport branch with the main line. The northern pier or Dundee and consisted of seven spans over the Dundee esplanade and the proposed extension of the same. The two first spans were wrought-iron skew arches, to suit the direction of the intended esplanade, and the remainder were girders on brick piers and cast-iron columns. The centre portion of the viaduct, over the tidal water, had 74 spans, consisting of wrought-iron girders resting on piers. The piers were constructed as follows:—The cylinder foundations (with the exception of a few of cast-iron) were constructed of wrought-iron caissons up to low-water level, lined with brickwork and filled with concrete, above which was a brick shaft filled with concrete; the diameter of their bases varied from 10 ft. to



23 ft., according to the spans. Except in a few cases where rock was met with, the cylinders were sunk to a depth between 20 ft. and 30 ft. below the bed of the river, so as to be out of reach of the scouring action of the tide; and before building the upper part they were tested with a weight of 33 per cent. more than the maximum load which could come upon them. At the top of the cylinders and above high water was a strong connecting-piece 8 ft. high, and nearly as wide as the diameter of the cylinders, constructed of cast-iron girders, wrought-iron ties, brickwork, and concrete. Above this was the wrought-iron superstructure or shaft of the piers, consisting of two octagonal shafts rising from each cylinder, and attached to the same by long bolts. These shafts are joined together near the top of the pier by a semicircular arch, forming at the top one structure. The whole is constructed of wrought-iron plates riveted together with channel, tee, and angle irons. The dimensions of the girders were very various. The present state of the works was then described.

Mr. A. S. Biggart read a paper on the proposed method of erecting the main steel piers and approach viaducts of the Forth Bridge. In view, he said, of the near completion of the caisson piers, the difficulties met with in founding them were practically relegated to the past, while those in connexion with the erection of the superstructure now in progress were in the near future. The superstructure immediately over the three groups of four caissons were the first parts to be taken in hand. The portions which were known as the steel piers consisted of four rising columns connected at the top and bottom, thus forming, as it were, two sloping and two vertical planes, in which the various diagonal, bracing members lay. The internal viaducts and other lesser parts completed the steel piers. The approach viaducts, with the exception of a few new features to meet the universal requirements demanded of them, were of ordinary design. Coming to the erection of the steel piers, difficulties were at once encountered. A pier to be carried to a height of 360 ft., and requiring during its erection the simultaneous lifting of a platform weighing over 400 tons, demanded that exceptional means should be employed in its construction. Various methods of accomplishing this were proposed. That now fixed upon by Mr. Arrol, with the full approval of Sir John Fowler and Mr. Baker, consisted in carrying from near the base a rectangular platform surrounding the whole pier, supported by and lifted from off four rising columns. From this platform, which was raised from time to time as the work of construction proceeded, there would be carried on the building of the columns, the bracing girders, and other parts. On arrival at the top the connexion member between the columns would then be built and riveted while resting on the platform. The lower and upper bed-plates were riveted inside by a special machine, which consisted of two girders, one placed above and the other below the bed-plate, while on each of the girders a sliding hydraulic cylinder was used for closing up the rivets. While the approach viaduct on the south side was well in hand, that on the north side was still further advanced, being nearly complete. Thus far all had gone well, no difficulty having arisen which could be said to have taxed the ability of either the engineers or contractors, and judging the future from the past he had every reason to conclude that in the near future the successful erection of the Forth Bridge would be a matter of history.

In the discussion which followed, Mr. W. H. Barlow observed that the Forth Bridge, when erected, would be notable as containing the largest span ever erected. It would also be famed for its capability to bear heavy strains, every possible test having been applied to insure its stability.

Professor W. G. Unwin said that in all his experience as an engineer he had never seen anything so extraordinary as the Forth Bridge. Professor Thomson, of Glasgow, and other gentlemen also made a few general remarks concerning the Forth and Tay Bridges.

The Chairman replied to the remarks which had been made, so far as they related to the Forth Bridge. He explained the extraordinary tests which had been applied to determine the question of expansion, and the calculations which had been made. They had assumed the impossible condition of a wind pressure of 56 lb. to the square inch blowing down the

Forth on the one side and up it on the other. If such a cyclone as that could be imagined, the whole of the slack they had provided in their bolt-holes would be required, but not otherwise. With regard to the stresses on the bridge, each member had been considered separately and individually in the light of the experiments carried out on the material actually being used. The maximum strain was  $7\frac{1}{2}$  tons, but there were many instances in which the stresses were not more than  $3\frac{1}{2}$  tons, and even less. He pointed with satisfaction to the fact that bridges on the model of the Forth had been built in America, and that two were about to be erected in India.

The thanks of the meeting were accorded to Mr. Barlow and Mr. Biggart for their papers.

## Illustrations.

### THE JAMAICA TAVERN.

**WE** publish this week an illustration of the new Jamaica Coffee-house and Tavern, St. Michael's-alley, Cornhill, now in course of erection from the designs and under the superintendence of the architect, Mr. Banister Fletcher.

The building is a free adaptation of Renaissance, to suit the confined nature of the site. It is being erected in red brick facings with Mansfield stone dressings.

The builder is Mr. Oldrey, the stained-glass is from the studio of Mr. Evans, and the carving is by Mr. McCulloch.

The celebrated "coffee-house" which this building replaces was for many years a principal rendezvous of the shipowners and merchants of London. Some record of the past will be kept by the painted windows of the buffet, which will represent scenes in the past history of the building.

### NAWORTH CASTLE, CUMBERLAND: RESTORED PORTIONS.

The disastrous fire which occurred here in 1844 completely destroyed the interior of this building, except that known as Lord William Howard's tower. The fire necessitated a remodelling, which was carried out by Mr. Salvin, but the exterior still happily preserves its face much as left by Lord William (the "Balto Will" of Sir Walter Scott). Such parts of the fabric as the walls, which were sound, were restored at the time of the fire by the then Earl of Carlisle, under the direction of Mr. Salvin. The rooms which were restored by Mr. Salvin have now been refitted in hard woods, and a small new court has been added in the place of some modern buildings, so as to gain the necessary accommodation for a large family without tampering with the ancient part of the castle.

Our illustrations, which are from drawings which were exhibited at the Royal Academy this year, show these additions, which were described in the *Builder* for March 10, 1883, when we published a two-page view of the Stanley Tower. The whole of these works have been carried out from the designs and under the superintendence of Mr. C. J. Ferguson, F.S.A., architect, Carlisle.

We may add that some historical and architectural particulars of the old buildings were given in the *Builder* on the date previously mentioned, and that fuller details may be found in papers read before the Cumberland and Westmoreland Antiquarian and Archeological Society in 1879 by Messrs. R. S. & C. J. Ferguson.

### REMINISCENCES OF THE ARCHITECTURAL ASSOCIATION EXCURSION.

#### THE REINDEER INN, BANBURY.

THE detailed door and panelling we illustrate this week are from the room referred to in the report of the Architectural Association's excursion, when describing this old inn at Banbury [p. 252, ante]. It is a most interesting and complete bit of work, and, considering its present use (a sort of market-room attached to the inn), is in as good a state of preservation as can well be expected. The cornice seems to have suffered most, and some portions of the ornamental detail are missing here and there. The room is not large, but has a fine fireplace at one end, the

bay window (a view and measured detail of which were given in the *Builder* for August) being on one side, and a long low stone-mullioned window opposite to the bay. The room entered from the angle doorway shown in the view and a tiny lobby is formed by the inner doorway being set across the angle of the room, a similar doorway across the angle on the opposite side of the bay forming a cupboard. The detail is very refined and delicate, and beautifully executed. The plaster ceiling of this room unusually fine, an ornamental band forming geometrical patterns, the spaces within it being filled with well-designed little raised ornament, nearly all of them being different. A ceiling almost the counterpart of this as regards the bandwork is over one of the rooms at Compton Wynyates, but the ornament is quite different.

#### ADDERBURY CHURCH: ROOF OVER NAVE.

This is a very simple form of roof, but very pleasing and substantial-looking, the abutment principal rafters and struts telling with a good effect. The four principals eastwards, having a cusped enrichment to curved portions, are very much to the appearance. There are principals altogether, including the two against the east and west walls, the length of the nave being about 71 ft., and the span about 18 ft. 9 in.

#### SHUTFORD CHANCEL SCREEN.

There were some much more elaborate screens seen on the excursion than the one at Shutford, but it is a good example of a simple treatment which could be well repeated where funds are limited, the general effect being better than is shown by a mere elevation. Lower panels are modern, as is also the capital to cornice.

#### STAIRCASE IN PARSONAGE HOUSE, DEDDINGTON.

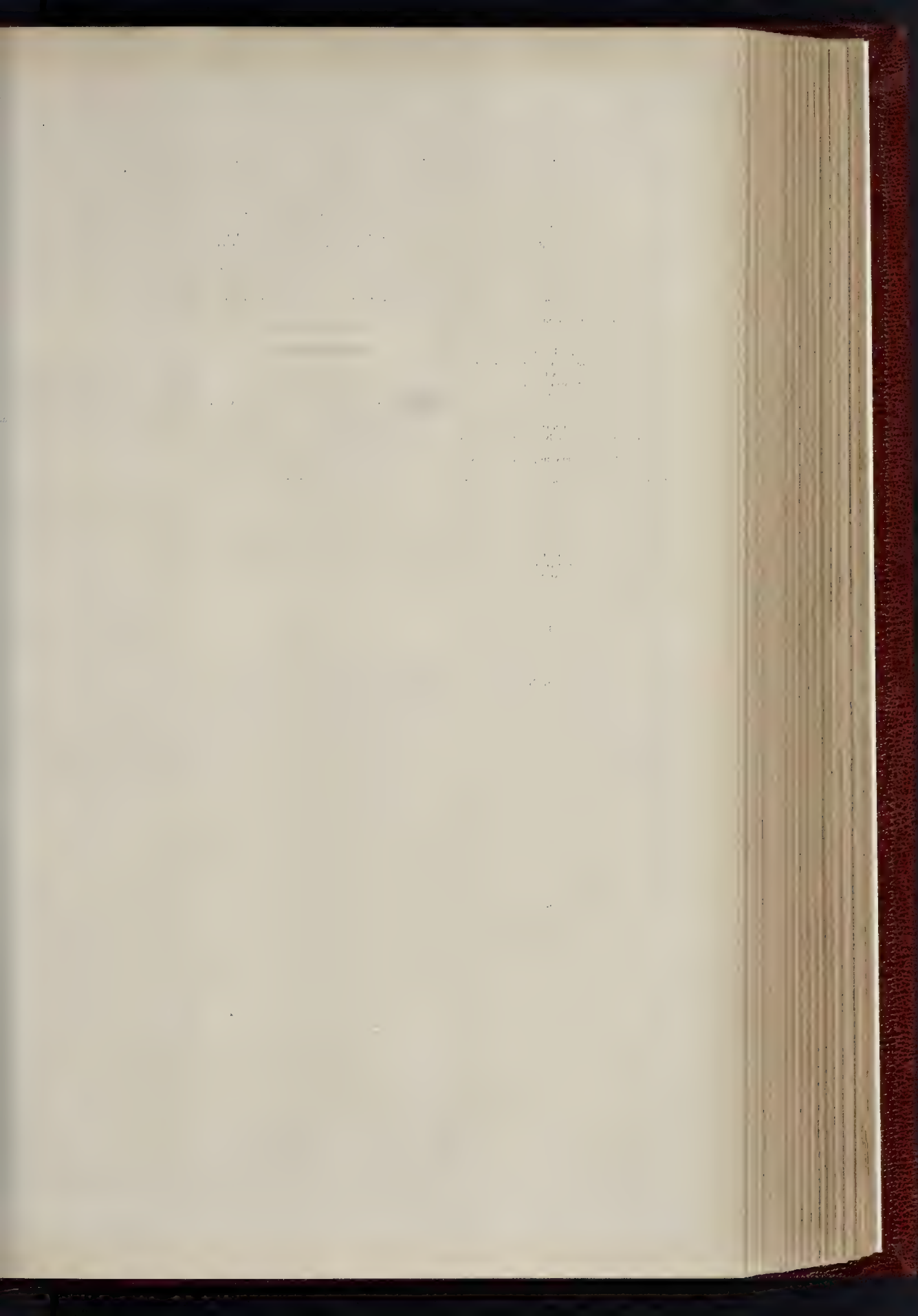
The upper portion of the staircase sketched here (which we promised to give in a forthcoming number) is very freely treated, and has unusual points; wherever an opportunity of varying the treatment has occurred it has been lost. It goes up three floors, and the general framed portions have a somewhat heavy appearance, much of the detail is refined.

#### DEDDINGTON CHURCH.

The groining of the north porch to this church is very striking. The porch is square on plan and the vault has the effect of being an enriched flat dome, the circular rib touching four sides of the square within which the ribs radiating from a central ring are ornamented with cusped tracery, the spandrels being filled up with a trefoil. The section is four-centred almost flat at the top, and the section of the rib is the same throughout, excepting the trefoil in spandrels, which is smaller.

**Fatal Accident with a Steam Tramway Engine.**—A terrible accident occurred Saturday last at Bradford. One man and two horses were killed on the spot, and another man died subsequently from injuries received. The fatalities occurred through the engine from some unexplained cause, starting off of the shed in which it was standing, rapidly attaining speed down the incline of Manchester-road, it came into collision with the ordinary traffic, with the results mentioned. At the Board of Trade inquiry, held on Wednesday, it was stated that the brake had been connected to allow of repairs. The steam engine, only at 30 lb. pressure when the engine suddenly started off; 45 lb. of steam were required to start it on a dead level. The foreman of the yard could assign no reason for the engine suddenly starting off. The steam brake would not act, because the steam pressure was too low. The driver seemed to do all in his power to stop the engine, and when it was brought to a standstill the first time he was unconscious. The engine started off the second time because of the straightening of the hook of the coupling by which it had been attached to another engine on the first stoppage. John Umpleby, engine-driver, at the conclusion of his evidence was complimented by Major-General Hutchinson, who said it was clear he had done everything he could to stop the engine, even at risk of his life. The inquiry was adjourned until the 24th inst.





THE BUILDER. SEPTEMBER 19. 1886.







C. F. Kell Photo Lith & Printer

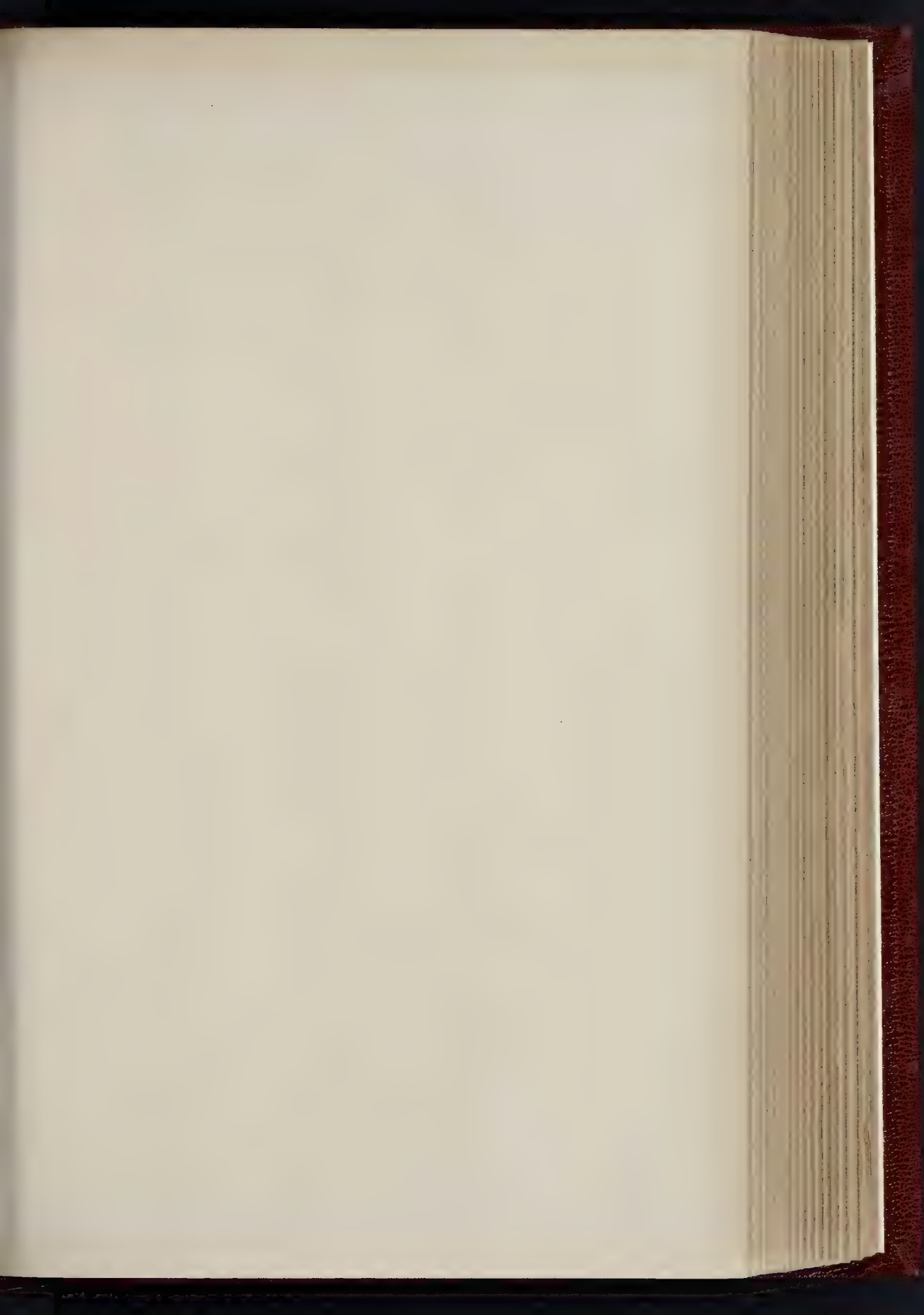
THE "JAMAICA" COFFEE TAVERN.

MR. BASISTER FLETCHER, F.R.I.B.A., ARCHITECT.

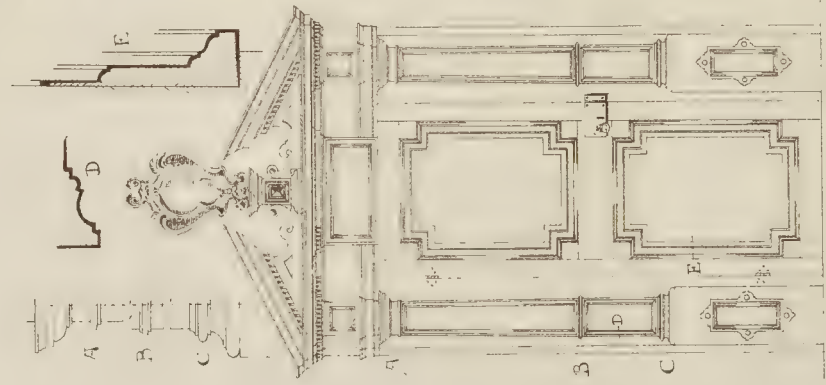
4 Castle St. Holborn London E.C.



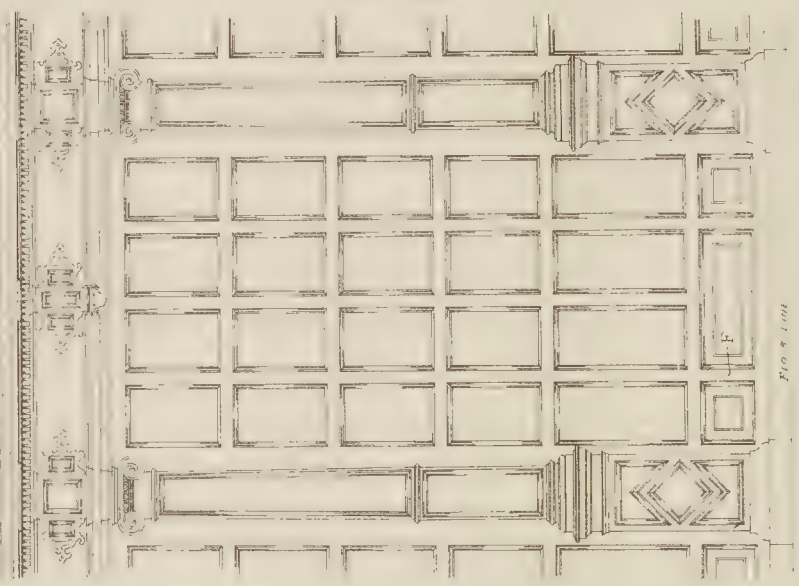




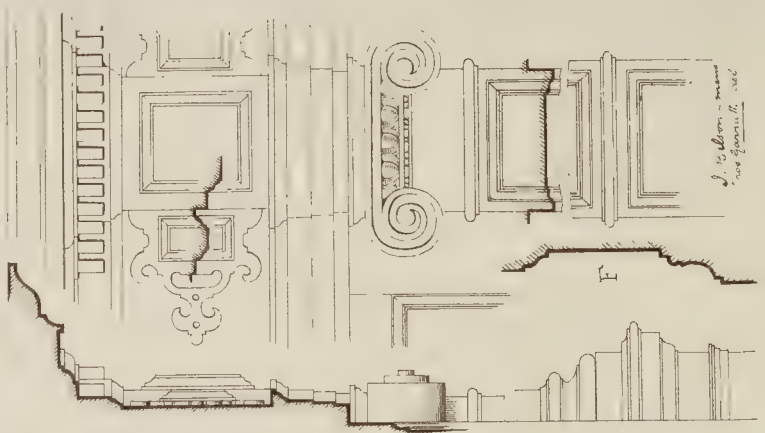
# RENDERING



Corner Doorway.



Panelled Room.

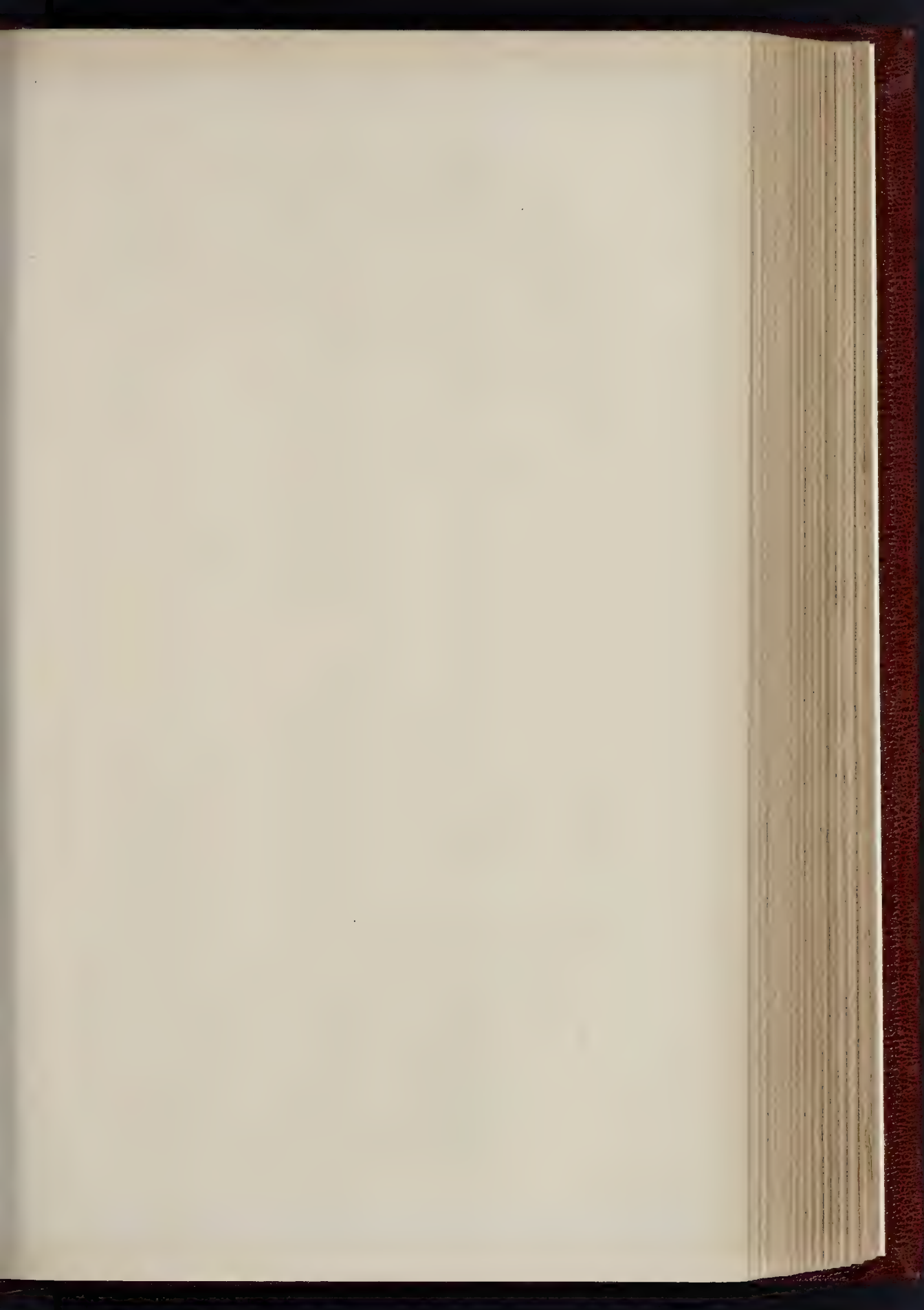


Section.

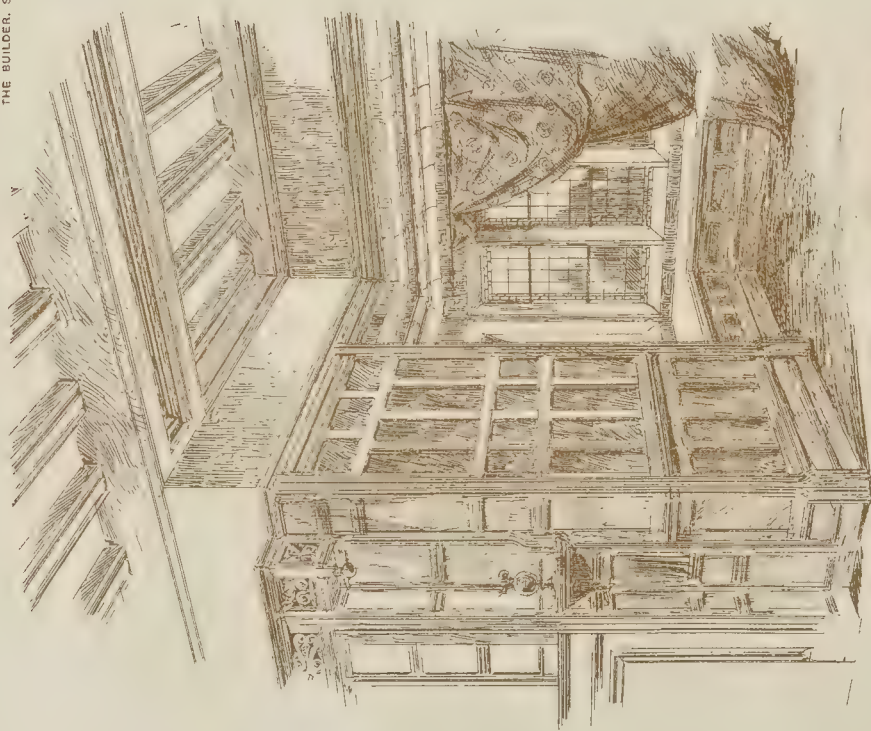
Elevation.

J. H. Brown, Architect.  
New York, N. Y.

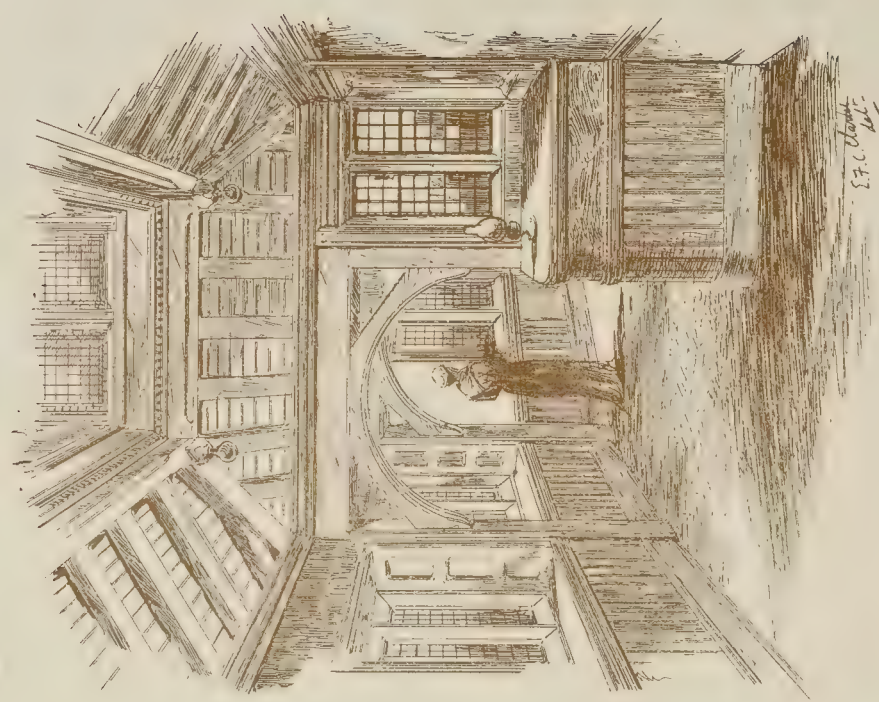




THE BUILDER, SEPTEMBER 19, 1885

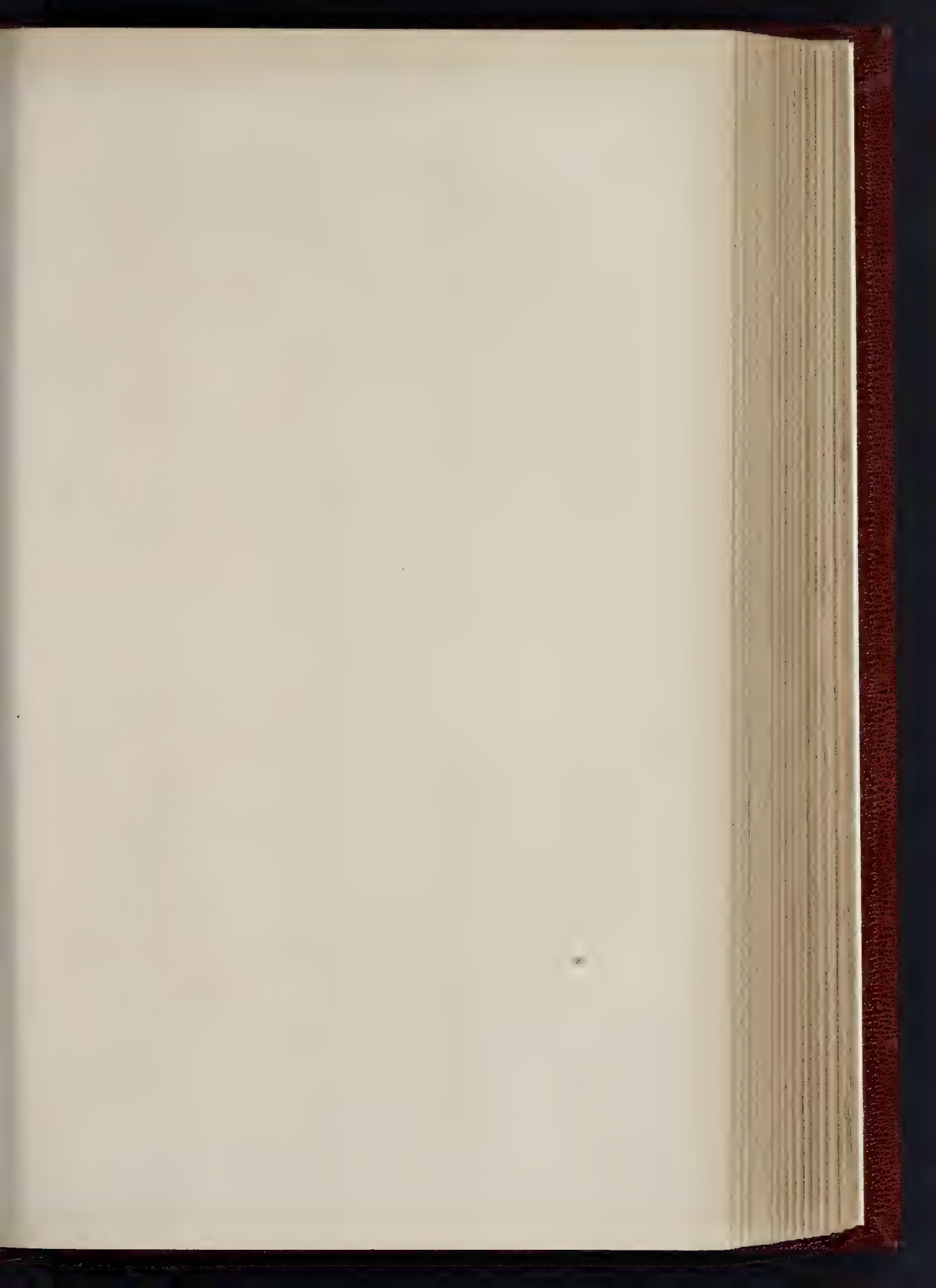


The Stanley Town Dead Room

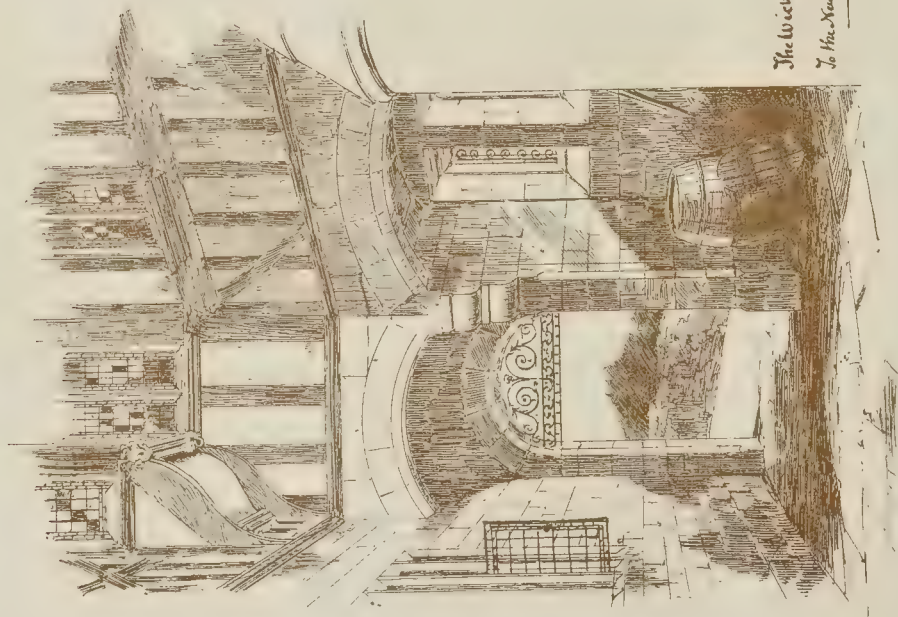


The Bridge

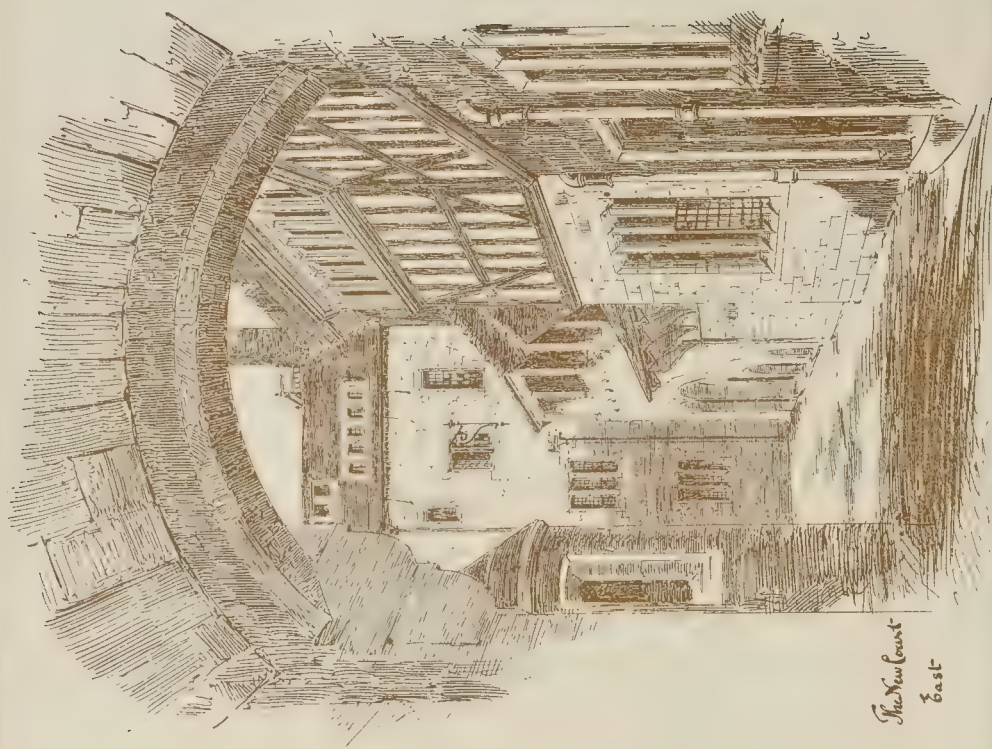




THE BUILDER, SEPTEMBER 19, 1885.

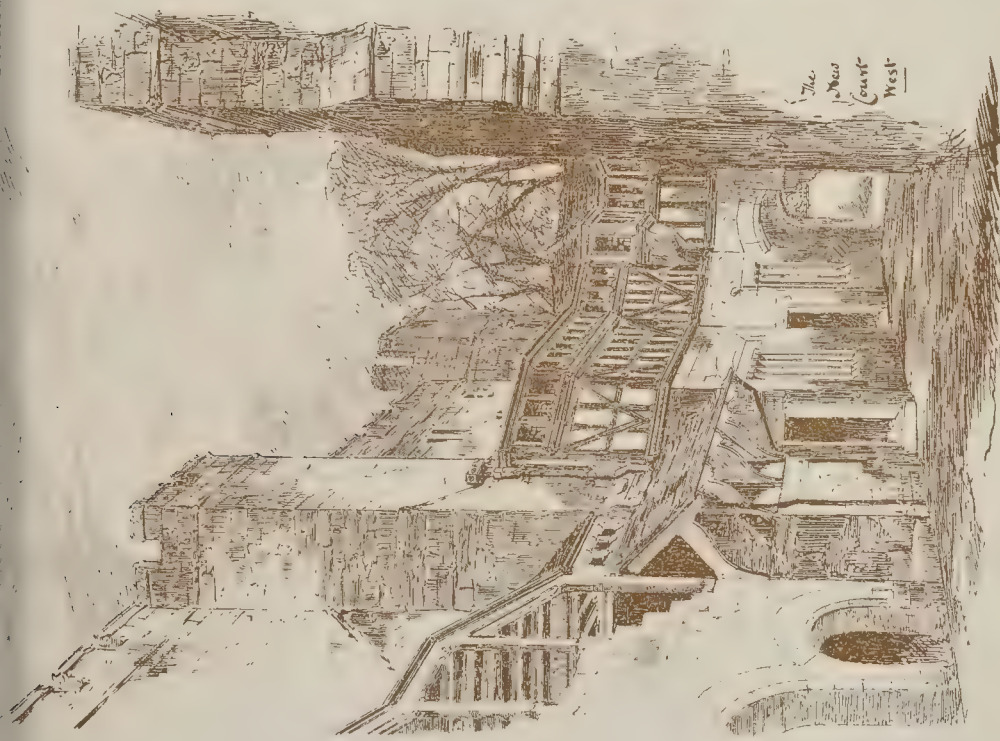


*The Wicket  
to the New Court*



*The New Court  
East*



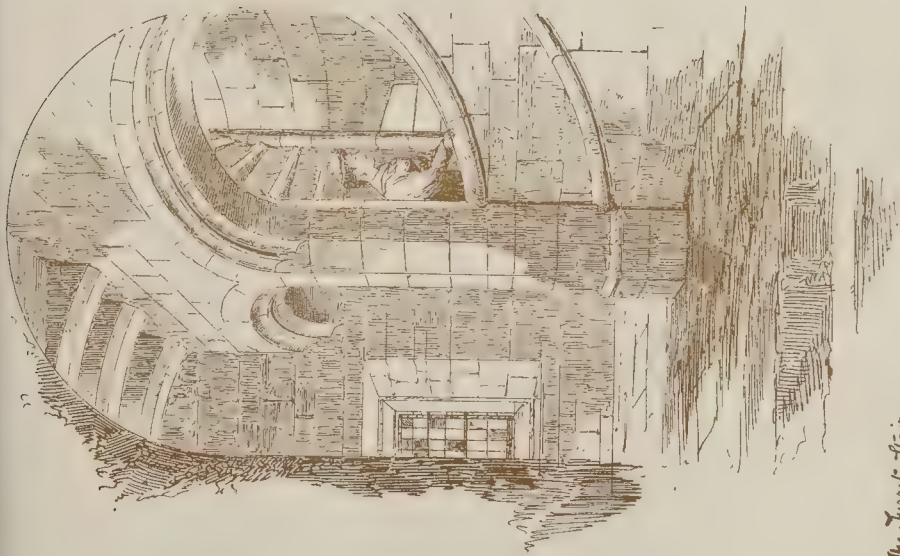


SKETCHES OF RESTORED PORTIONS: NAWORTH CASTLE. MR. C. J. FERGUSON, ARCHITECT.

J. Kell Photo Lith. "The Herald" Glasgow, F. S.

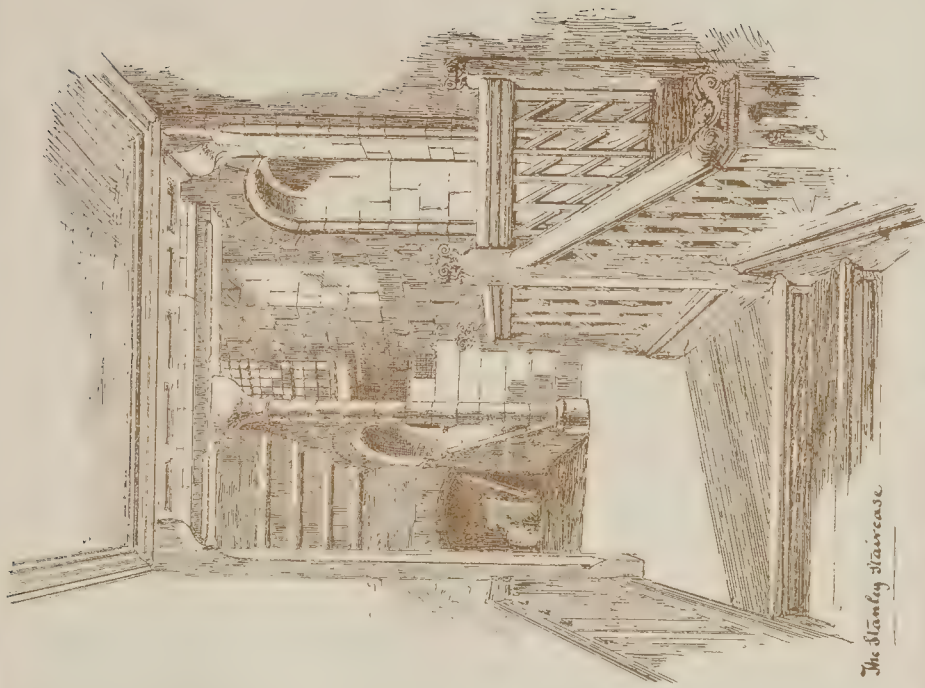






The Turret Stair

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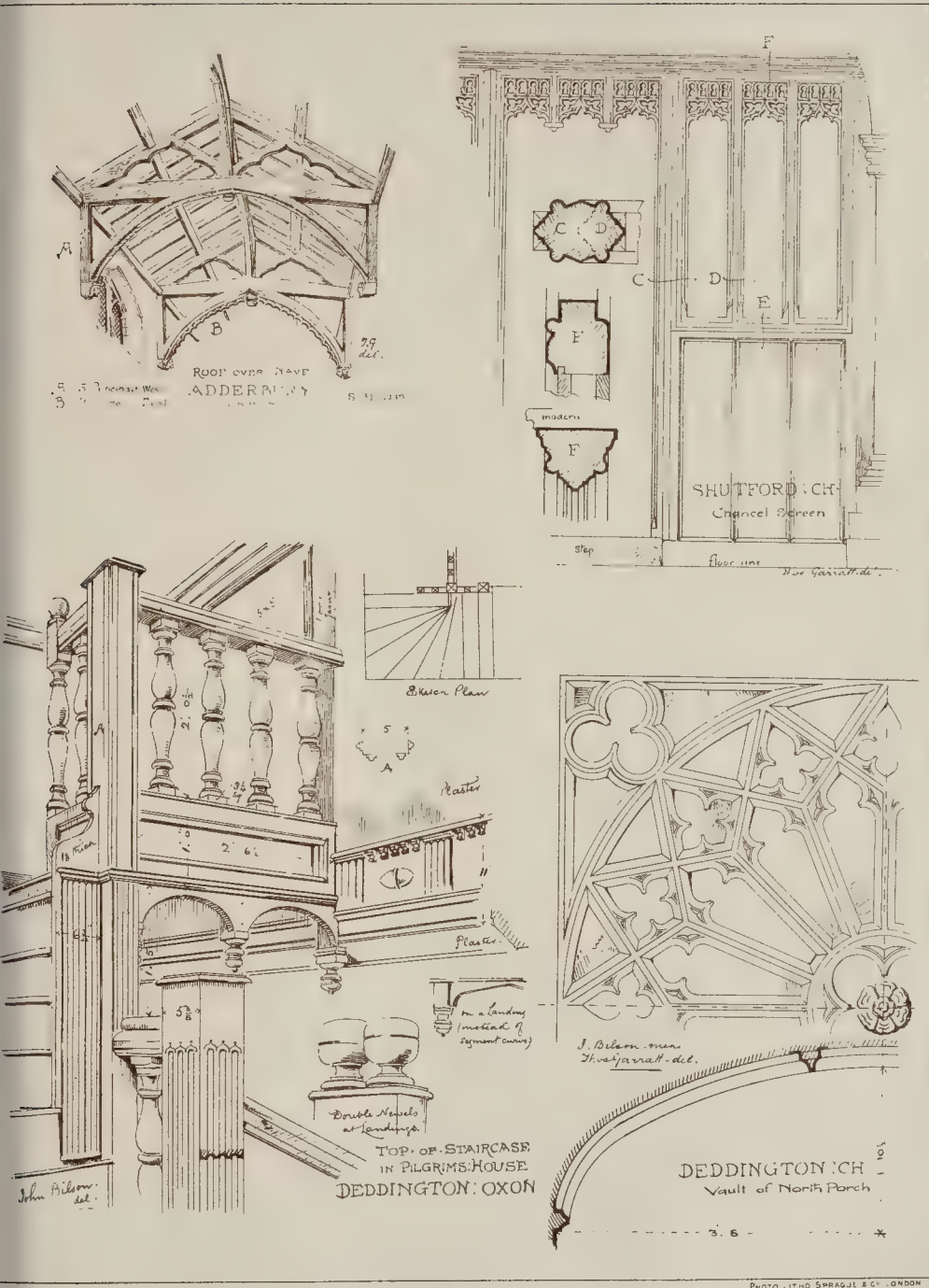


The Stanley staircase

SKETCHES OF RESTORED PORTIONS: NAWORTH CASTLE. MR. C. J. FERGUSON, ARCHITECT.











## THE TRADES' UNION CONGRESS.

CONTINUING our notes of the proceedings at this Congress,\* we may first of all mention that Thursday, the 10th inst., was mainly occupied with the discussion of political questions.

On the subject of co-operation, Mr. Sedgwick (Leicester) moved,—

"That this Congress views with satisfaction the appointment of a joint committee, consisting of representative trades unionists and co-operators, with power to take such steps as may from time to time be deemed necessary in order to (firstly) promote the extension of the principles of co-operation, and (secondly) maintain intact cordial relations between both bodies on all questions affecting the status of the workpeople employed in co-operative manufacturing."

He said they had two systems running on pretty nearly parallel lines, but for some reason or other they had both been pulling against the stream. If only a proper understanding could be arrived at, and a firm basis of agreement established, the members of trades unions and co-operative societies would both be greatly benefited.

Mr. Watters (Manchester) seconded the resolution. He said it had been remarked that co-operation and trades unionism could not work together. He was there to deny that statement. He was employed by a co-operative firm started by trades unionists. To his mind co-operation and trades unionism were the two masterpieces for the improvement of the working-classes, and if they could get the two to work together they should accomplish a great deal.

The discussion was continued by Mr. Knight (Newcastle), and Mr. Cameron (London); and Mr. Bland and Mr. Percival, members of a board of directors of a co-operative society, at the invitation of the President, addressed the Congress, urging that co-operation was calculated to confer great benefits on the working-classes.

Mr. Coote (London) gave Mr. Slater credit for bringing about a better understanding between trades unionists and co-operators, and said he believed that so long as co-operators were content to work on trade union principles every working man would be ready to say "God speed," but when they went outside those principles, as in some cases they were trying to do, many men would protest emphatically against such action.

The resolution was carried unanimously.

On the fifth day of the Congress (Friday, the 11th inst.), the question of the next meeting-place for the Congress next came up for discussion. Three towns were proposed,—Hull, Norwich, and Swansea,—and on a vote being taken, the first-named place was adopted by the Congress.

The following resolution appeared upon the agenda paper, Mr. Smith (Sunderland) proposing, and Mr. Forbes (Glasgow), seconding it:—

"That this Congress recognises the hardships entailed by the use of the 'character inquiry note,' and expresses its disapproval of the continuance of the same, and further requests the Parliamentary Committee to endeavour to have clause 7 of the Conspiracy and Protection of Property Act, 1875, so amended as to deal with this question."

Mr. Judge (Leeds) opposed the motion, which he regretted to see had been brought before the Congress. If they were to do what was asked of them,—to support the resolution,—they would, so far as the union was concerned, put weapons into the hands of their employers, by whom they would be unmercifully attacked. He thought the matter was entirely in their own hands, and they had no need of Parliamentary interference.

On being put to the vote, the resolution was passed by 64 votes to 27.

With regard to the Sunday opening of Museums, Mr. T. E. Powell moved the adoption of the following resolution:—

"That, in the opinion of this Congress it is desirable to support the opening of the national museums and art galleries on Sundays, wherever they exist, as an educational, elevating, and recreative advantage to the working classes."

He argued in favour of the motion on the ground of the educational value of such institutions, and contended that on that ground the working classes ought to be allowed all reasonable opportunities of visiting the public collections.

Mr. Freck (London) seconded the motion.

\* See p. 354, ante.

† It appears, therefore, that among other special privileges which artisans arrogate to themselves is that of having no inquiry made about their character by those who engage them!

Mr. Hunter (Glasgow) proposed the following amendment:—

"That, in the opinion of the Congress, it is undesirable to augment Sunday labour by opening the national museums and galleries, but approves of their being opened on three or more days during the week between the hours of 6 and 10 p.m., to give the working classes facilities for visiting them."

He did not oppose the opening of museums on Sunday from a religious, but from a trade union point of view. He believed such an innovation would be detrimental to the best interests of the working classes, and that a vast amount of evil would be done by the introduction of Sunday labour.

Mr. Drummond (Glasgow) seconded the amendment, observing that with the advance of science and the improvement in the electric light they would soon be enabled to have museums and other places of recreation opened for the benefit of the masses on weekday evenings.

Mr. Hope (Edinburgh) was surprised to hear working men who had a half-holiday on Saturdays asking for places of amusement to be thrown open on the Sabbath.

Several other delegates having spoken on the question,

Mr. Broadhurst, M.P., said the Congress was instituted to protect workmen, and to do its utmost to lessen the hours of labour, and at all times and under all circumstances never to give countenance to any proposal likely to increase their labour. If houses were so bad that workmen could not possibly live in them on the Sunday, the duty of the Congress was to see that those houses were made better, and not open museums in order to oblige jobbers in property in London. Neither was it their duty to take lessons of labour from their friends across the Channel. God save Great Britain from ever adopting the French system of labour!

Mr. H. Slater (Manchester) said that in that city the experience had been that, instead of an increase in hours of labour, there had been a diminution, inasmuch as the attendants, for the few hours they sacrificed on Sunday, received a day's holiday during the week.

After further discussion, the amendment was put to the meeting, when 67 voted in its favour and 51 for the original resolution.

With regard to harbours of refuge, Mr. Bevan proposed and Mr. Kelley seconded the following resolution:—

"That this Congress approves of the effort that is being made to expedite the construction of national harbours of refuge at the dangerous portions of the coast of the United Kingdom, with view to prevent, as far as possible, such great loss of life and property, and to add to the commercial and national security. It also desires to express the opinion that these and similar works of national utility and value may legitimately and advantageously be made the means of assisting to provide employment for the working population of the country, especially during periods of trade depression."

This was agreed to by the Congress without discussion.

The inspection of slate quarries was the next subject brought forward, and the following resolution was moved by Mr. Parry (Carnarvon), and seconded by Mr. Abraham:—

"That this meeting begs to express its surprise that such extensive works as the slate quarries of North Wales that are worked in the open,—the limestone quarries and workshops connected with the mining industry,—should have been left outside the proper Government inspection, and hereby begs most respectfully and earnestly to impress upon the Government to take those steps that might be found necessary to remedy this glaring defect in the supervision of this important industry."

The mover of the resolution drew attention to the fact that out of some 14,000 men employed in the Welsh slate quarries only about 5,000 came under Government inspection, while 9,000 odd were outside it, as they worked in the open. He hoped the Parliamentary Committee would draw the attention of the Government to the matter, and so rectify the inequality.

The resolution was unanimously adopted.

The following members were elected to serve on the Parliamentary Committee for the ensuing year, viz.:—Messrs. A. W. Bailey, Amalgamated Tailors (15,378 members); T. Birtwistle, East Lancashire Weavers (40,000); J. Burnett, Amalgamated Engineers (51,000); W. Crawford, Miners' National Union (40,000); J. Inglis, Associated Blacksmiths of Scotland (2,513); J. M. Jack, Associated Iron Moulders of Scotland (5,500); J. Mawdsley, Amalgamated Cotton Spinners (16,115); J. S. Murchie, Amalgamated Carpenters and Joiners (25,700); G. Sedgwick, Boot and Shoe Riveters' National

Union (10,317); and H. R. Slater, Typographical Association (6,388).

Saturday, the 12th inst., was the last day of the Congress. With regard to sanitary inspectors, Mr. T. Anderson moved the adoption of the following resolution:—

"That, in the opinion of this Congress, it is advisable that the number of sanitary inspectors be largely increased; but that no man be appointed without previously passing a thoroughly practical examination."

Mr. Forbes (Glasgow) in seconding the resolution, dwelt upon the necessity for the appointment of thoroughly practical men to the post of sanitary inspector, for the condition of the dwellings of the poor very much depended upon the technical knowledge possessed by the inspectors. The recent Royal Commission had shown the necessity for appointments such as those suggested.

Mr. Matkin (Liverpool) complained of the hardships which the present system imposed upon the working plumbers of this country. In Liverpool there were ten thousand houses in an insanitary condition, and he contended that there ought to be some thoroughly qualified inspectors appointed who possessed technical knowledge to inspect the drains of new houses before they were closed in. Unless this question was taken up, and some practical men appointed, the great evils attaching to the present system would not be recognised until some great calamity occurred.

Mr. Harris (Preston) said that from his experience persons appointed to the inspection of new houses were quite incompetent to say whether their sanitary condition was satisfactory.

On being put to the vote, the resolution was adopted.

The next question brought before the Congress was that of working-men magistrates, and on this subject the following resolution was moved by Mr. Rowland (London):—

"That while thanking the Government for the appointment of workmen as J.P.s, this Congress urges that the principle be adopted of workmen assessors to assist in all stipendiary magisterial courts when workmen's questions are before them, much in the same way as the constitution of the Wreck Commissioners' Court of the Probate Division of the High Court of Justice."

Mr. Richardson (Bolton) seconded the motion, which was carried.

Another resolution which was agreed to was the following:—

"That, in view of the conflicting opinions expressed by the magistracy to what is known as 'The Saving Clause' of the Conspiracy and Protection of Property Act, 1875, it be an instruction to the Parliamentary Committee, should any case arise in which the spirit of the said clause has been set aside, to take such steps as may by them be deemed necessary in order to obtain a legal definition of the said clause, by this means affording reliable information to the various trades affected."

The following resolutions were adopted without discussion:—

"That, seeing the increased amount of unemployed labour in the country, the Parliamentary Committee be instructed to induce the Government to bring in a Bill to regulate the hours of labour to all workers in the employ of the State and other public bodies, and that eight hours be the maximum working day in all their departments and workshops."

"That, in the opinion of this Congress, any one holding the office of agent to the Employers' Liability Assurance Corporation is not a fit and proper person to hold the office of coroner or his deputy; and it be an instruction to the Parliamentary Committee to take steps as early as possible to bring about an alteration of the law with regard to the election of coroner or the appointment of his deputy, or to take such steps as the committee may consider necessary for the carrying out of this resolution. Believing that the present system of inquiry into the causes of death by courts presided over by district coroners is in many instances unsatisfactory, to ask the Parliamentary Committee to make a full inquiry into the subject, with a view of having the composition of the courts altered."

"That the Parliamentary Committee be instructed to take the necessary steps, by deputation to the Lords of the Treasury in conjunction with the Registrar-General, or by other means, to secure the same charges for certificates of death to members of trade unions as are charged to members of friendly societies."

"That, in the opinion of this Congress, the adoption of the eight hours system would largely benefit the working classes, by giving work to many of those presently unemployed, and thereby relieving the existing depression of trade."

With the adoption of one or two other resolutions, the work of the Congress was brought to a close.

**Lifts.**—Messrs. Archibald Smith & Stevens have just completed, for the Countess de Torre Diaz, at her residence, 21, Devonshire-place, one of Stevens' and Major's Patent Hydraulic Lifts, worked from a tank in the roof, so that it is available night and day. This lift is perfectly noiseless.



## A NEW SURVEYING INSTRUMENT.

From time to time announcements are made of the discovery of new scientific instruments which profess to perform some wonder or other in the way of simplifying the labours of the investigator, or of lightening those of the more practical engineer or surveyor. Too often a trial of the instrument, or even a critical examination, shows that the profession is profession only, and that, even if the principle of the machine is unimpeachable, it is either a scientific toy, useless, for some reason or other, for practical purposes; or, on the other hand, is, as a matter of fact, more clumsy in its operations than are the old instruments in skilful hands. This does not seem to be the case with a new surveying instrument invented by Professor Dr. Luigi Cerebotani, of the Verona University, and called by him the Universal Teletopometer. With this instrument the Professor claims to be able to measure distances and heights from one station, without the aid of a chain or the necessity of trigonometrical calculations,—and this with an accuracy represented by a maximum error of a half per cent.—and, moreover, to plot his survey at the same time by an automatic arrangement on a drawing-board attached to the stand of the machine. The instrument itself consists essentially of a horizontal and perfectly rigid steel bar, with horizontal and vertical movements, and to the ends of which are attached astronomical telescopes, one fixed and the other movable in a horizontal plane, both on a pivot and forwards and backwards. The distance between the optical axis of the fixed telescope and the centre of the pivot becomes the base of a triangle, the apex of which, when an observation is being taken, is the object the distance of which is required.

The peculiarity of the instrument is that its movements record, not the angle taken by the movable telescope, nor any of its trigonometrical functions, but the length of a line parallel to the axis of the fixed telescope, and which forms the side of a triangle similar to the larger one, and the base of which is an aliquot part of the larger base. The length of this line is read with great exactness by the aid of a micrometric screw, and, on reference to a table attached to the instrument, gives the length of the parallel line from the telescope to the object. The distance being known, the height is ascertained in the ordinary way by taking a vertical angle and multiplying the distance by its natural tangent. Attached to the pivot of the instrument, and moving over the surface of a horizontal drawing-board, is a steel straight-edge, the edge of which, moving with the bar of the instrument, is always parallel to the direction of the object under observation, and bears a metrical scale, by means of which its distance may be marked off as soon as found; thus, with a rapidity beyond any possible comparison with that of the ordinary processes, the relative position of any number of points within the range of the instrument, which depends only on the distance which separates the telescopes,—may be found and plotted, and, if desired, their height relatively to the level of observation may be noted beside them.

For rough surveys, such as are often required for military purposes or for valuing standing crops, we believe the usefulness of the instrument will be at once recognised. A trial, which took place on Friday, the 11th inst., on the Thames Embankment, gave very satisfactory results, and we hear it is being tested by the Woolwich authorities, and that it has been adopted by the German War Office, so that it comes to us well recommended; but for purposes where great accuracy is necessary we fear that the expressed hope of the inventor that it will supersede the theodolites and trigonometry is doomed to disappointment. Dr. Cerebotani himself confesses its liability to an error of 18 in. in every 100 yards, and when the shortness of the base-line and the liability of metal to be affected by temperature are taken into account, we do not think this estimate excessive; besides, even if that were the maximum, it would still, we fear, be too great to satisfy the conscience of most surveyors.

**Wolverhampton.**—A carved oak lectern has been presented to St. Mark's Church, Wolverhampton, by an anonymous donor. The work has been carried out by Messrs. J. & W. Cockerill, from a design by Mr. J. R. Veall, architect.

## SANITARY CONGRESS AT LEICESTER.

The following is the order of proceedings to be observed at the Sanitary Congress to be held at Leicester next week:—

**Tuesday, September 22nd.**—12.30 p.m., Reception by the Mayor at the Town Hall.—1 p.m., Public Luncheon.—3 p.m., Opening of Exhibition, Floral Hall, Belgrave Gate, by the Mayor.—8 p.m., First General Meeting: Opening Address by Professor F. S. B. F. de Chantmont, M.D., F.R.S.

**Wednesday, September 23rd.**—Breakfast to members of the Congress by the Leicester Temperance Society, Temperance Hall, 8.30 a.m.—Section I.—“Sanitary Science and Preventive Medicine”: 10.30 a.m., Address by Mr. Arthur Ransome, M.A., M.D., F.R.S.; 11 a.m. to 1 p.m. and 2 to 5 p.m., Papers and Discussions, in the same section; 8 p.m., *Conversazione* at the Museum.

**Thursday, September 24th.**—Section II.—“Engineering and Architecture”: 10.30 a.m., Address by Mr. Percival Gordon Smith, F.R.I.B.A.; 11 a.m. to 1 p.m. and 2 to 5 p.m., Papers and discussions in the same section; 8 p.m., Lecture to the Congress, by Mr. Ernest Hart, M.R.C.S.

**Friday, September 25th.**—Section III., “Chemistry, Meteorology, and Geology”: 10.30 a.m., address by Mr. William Marcet, M.D., F.R.S.; 11 a.m. to 1 p.m. and 2 to 4 p.m., papers and discussions in the same section; 4.30 p.m., closing general meeting of Congress.

**Saturday, September 26th.**—Excursions during the day; 8 p.m., Lecture to the Working Classes, by Captain Douglas Galton, F.R.S.

The lectures to the Congress will be held in the Temperance Hall, Granby-street. The sectional meetings and the general meetings will be held in the Municipal Buildings.

The exhibition will be held in the Floral Hall, Belgrave-gate, and will remain open until Saturday evening, October 10th.

CASE UNDER THE METROPOLITAN BUILDING ACT.  
CONCRETE BUILDING.

MR. HENRY GOODWIN, builder, of Burghley House, Blackheath-hill, was last week summoned before Mr. Bridge, at the Southwark Police Court, by Mr. E. R. Hewitt, one of the District Surveyors of Southwark, for unlawfully constructing the walls of the artisans' dwellings in Zoar-street, with concrete, contrary to the Metropolitan Building Act, 18 and 19 Vic., cap. 122, sec. 40, and without licence from the Metropolitan Board of Works. Mr. Duke, barrister, prosecuted, and Mr. Arthur Reed appeared for the defence.

Mr. Hewitt said that the defendant was building the artisans' dwellings between Zoar-street and Cashers-ground, in St. Saviour's. They were to be five stories high, and the walls should have been of brick and stone. On the 8th of August witness found that the defendant was using concrete for the walls, and on the 15th he served him with notice to discontinue it, as the Metropolitan Board of Works had refused a licence to use it. Witness received a letter from the defendant stating that under advice he should proceed with the buildings.

In answer to Mr. Bridge, the witness said he had inspected the buildings going on and found that the concrete was put on in squares. It was quite solid and firm. The defendant had been refused a licence to use concrete.

Mr. Bridge was of opinion that concrete was a good material for building purposes if properly used, and he thought the Board ought to have sanctioned it. The Admiralty Pier at Dover, and other substantial buildings, were constructed of concrete.

Mr. Duke submitted that the Act specified that the buildings should be erected in a substantial manner of brick and stone. Concrete was not known when the Act was passed, and the Board did not think it to be of sufficient substance to be safe, consequently they refused the licence to the defendant.

Mr. Reed, on the part of the latter, said that no licence was required, and he thought it very unfair of the Metropolitan Board to interfere in the matter, as they had done. He had witnesses in court to prove that the concrete was properly done, and that the buildings were being substantially erected.

Mr. Hewitt was recalled, and in answer to Mr. Bridge said he had seen the buildings going on. The walls were 9 ft. high, and seemed very strong and substantial.

Mr. Bridge asked if the Board had any objection to the defendant going on with the building in a proper manner?

Mr. Duke said the Board had refused the licence, and the defendant should discontinue using the concrete.

Mr. Bridge observed that it appeared to him that the buildings were being constructed in a proper manner; therefore he dismissed the summons.

## CITY OF LIVERPOOL LABOURERS' DWELLINGS COMPETITIONS.

SIR,—The resolution arrived at by the In Sanitary Property and Artisans' Dwellings Committee, and published in your last issue [p. 378], is another specimen of the very highly unsatisfactory results obtained by competition where an independent professional referee is not called in to advise and assist the committee in selecting and adjudicating upon the designs submitted by the competitors.

Surely if “some of the plans submitted show considerable merit,” the gentlemen who have prepared these designs, at a very considerable expense and trouble, have earned the paltry premiums offered by the wealthy Corporation of the City of Liverpool, and I trust that they will, one and all, combine and, if necessary, form a deputation to wait upon the Council, as to the gross injustice of the resolution arrived at by the In Sanitary Property and Artisans' Dwellings Committee.

OPTIMUM QUOD PRIMUM.

## IRON FENCE FOR HOVE SEA-WALL.

SIR,—It will be within the recollection of your readers that a few months back the Hove Commissioners advertised in the *Builder* for designs and estimates from contractors who were willing to supply and fix an ornamental iron fence along the new sea-wall. In consequence, many, besides myself, were induced to prepare special designs, which were duly submitted under “notio.”

After some delay, the writer received notice that one of the designs submitted by him had been selected with others for a final competition, fresh particulars being given of a more definite character, entailing amended drawings.

From that time until to-day we have been waiting to learn the decision of the Commissioners; and from a paragraph in an article in your current issue it appears that the railing is being supplied by the “local” man. Comment is unnecessary.

J. JEFFREYS.

.\*.\* We have received other letters complaining of the treatment of the competitors in this case.

## BROUGHTON CASTLE.

SIR,—It may interest your readers to know that your view of Broughton Castle, published in the *Builder* of Saturday last, is of great historic importance. In the upper room of the left-hand gable, shewn above the roof, the leaders of the Civil Wars and the execution of Charles I. The windows of the room commanded extensive views over the surrounding country, which enabled the watchers to observe the approach of any hostile party. To guard against spies, eavesdroppers, or treachery within, there was, and indeed is now, an elaborate arrangement of doors and vestibules ingeniously contrived to prevent the possibility of any unauthorised person approaching the chamber. When the future Shakespeare writes the great drama of “The Commonwealth,” the opening scene ought to be laid in this room.

J. TOM BURGESS, F.S.A.

## IRON CHIMNEY-SHAFTS.

SIR,—Will you please allow me to ask if any of your readers will kindly give me some particulars of factory chimney-shafts made of sheet iron?

I want to know about thickness of plates used, size of rivets, coat, and any other information respecting the construction of wrought-iron shafts.

O. F.

**The Mersey Tunnel Railway Stations.** We are informed that after much consideration the engineer and architect for the Mersey Tunnel Railway Company (having in view the expected enormous pedestrian traffic through their stations, estimated at millions per annum) have decided to adopt Lowe's Patent W. Block Flooring for the booking halls, waiting-rooms, offices, &c., of their new stations, and the work is just being taken in hand.



## PROVINCIAL NEWS.

**Oswestry.**—The Mayor of Oswestry (Mr. W. Fletcher Rogers) is having some model cottages erected in Oswestry from designs by Mr. Reginald Pinder, F.R.I.B.A., of Bournemouth. Each house has, on the ground-floor, parlour, kitchen, scullery, wash-house, larder, water-closet, and ashpit; and on the chamber floor three bedrooms and hanging cupboard. There are bells in each house, and gas and water are laid on. The water-closets are to be fitted with Farnill's "Eos" patent closets and flushing cisterns. The drainage system is said to be perfect, its ventilation being on the principle of atmospheric exhaust and in-draught, and inspection chambers are provided. The paving is used for porches, passages, kitchens, and sculleries. Each house will have a good garden at the back and a flower-garden in the front, fenced with brick wall, with stone coping and iron railing on the top. The elevations are of red brick, and in the English half-timbered style. The cottages will cost about 230*l*. each. Messrs. W. & G. Thomas, of Oswestry, are the builders.

**Bognor.**—A new building estate has recently been opened up at this watering-place on the South coast. The owners in March last entered into a contract with Mr. George Newman, of King-street, Deptford, to lay out about a mile and a quarter of new road, to be known as "The Victoria Drive." Drains have been laid, and paths formed, and every provision made for the erection of villa residences. The works have been carried out under the directions of Mr. W. L. Barrett, C.E. A contract has also been entered into between the Bognor Assembly Rooms Company (Limited), and Mr. George Newman, for the erection of a detached block of buildings, containing a large hall, 75 ft. by 45 ft., lecture-room, reading-room, and offices generally. The estimated cost of the works is nearly 4,000*l*. Rowland Castle bricks with Bath stone dressings are being used, and the works are progressing. Mr. Arthur Smith, of Bognor, is the architect, and Mr. Marshall is acting as clerk of works.

**Winslow (Bucks).**—A very large new church clock has been erected at Winslow, Buckinghamshire. It chimes the Cambridge quarters, strikes on a 20 cwt. bell, and shows time on three dials, each 6 ft. across. It is also fitted with special machinery for playing a tune every three hours. It has a gravity escapement and 2 cwt. pendulum compensated for changes in the temperature. The whole has been carried out by Messrs. John Smith & Sons, Midland Clock Works, Derby, who have also just erected a large stable clock at Ormerod House, near Burnley, and one at Messrs. Allsopp & Sons', Burton-on-Trent, which strikes the hours and has two illuminated dials.

## CHURCH-BUILDING NEWS.

**Rhyl.**—Lord Richard Grosvenor, M.P., lately laid the chief foundation-stone of St. John's Church, Rhyl. The designs for this proposed new edifice were selected by the Building Committee, in a limited competition between several well-known ecclesiastical architects. The instructions and aim of the committee were to provide a church in which the entire congregation could easily follow the service without any let or hindrance from piers, columns, or other obstructions. This object has been attained by what may be termed the central area type of edifice, as opposed to the ordinary nave and side-aisle idea. The church consists of one large nave, 77 ft. by 56 ft., the centre forming an octagonal dome, embracing the full width of the church, a bay at the western end being prolonged to form a nave arcade and aisle, the chancel at the east end being 33 ft. by 26 ft., and having an organ-chamber on the south side, and choir and clergy vestries upon the north side. The main-entrance porches are at the west end, arranged upon the north and south elevations. The interior is lofty, being 50 ft. from the floor-line to the ceiling-line of domical roof, and 40 ft. from floor-line to ceiling-line of chancel. The style of architecture adopted is that of the Early Decorated period, designed to suit the peculiar requirements of the plan and the local materials adopted in construction. The walls are of a massive character, and are to be built in Ochre Vol limestone, the dressed work being in Gwyspyr freestone, from the contractor's quarries. The internal woodwork will

be unvarnished pitch-pine, and floors laid in wood-block paving. The contractor is Mr. Alfred Torkington, of Rhyl. The first contract for shell of nave is 3,000*l*. The architect is Mr. David Walker, of Dale-street, Liverpool. The edifice, when complete, will cost 5,500*l*.

**Beeston.**—The ancient Church of St. Mary, Beeston, having proved itself inadequate to the wants of the growing congregation, and the walls, particularly that on the north, having become unsafe through great age, a meeting of the parishioners was held last January, when it was resolved to build a new nave to the church forthwith. The new church, which will give an increase of 100 sittings over the old church, making altogether (including gallery for scholars) accommodation for 450, has been designed by Mr. C. H. Thornton, of Leeds. The design is Early English, and is made to harmonise with the chancel and organ-chamber built some eight years ago from the designs of the same architect. The plan consists of nave, 64 ft. by 26 ft. within the walls, with an altitude of 39 ft. to the apex of the ceiling, the roof up to this point being open, with dressed and unvarnished pitch-pine principals, with curved braces, moulded collars, and king-posts and rafters, spars, and match-boarding. The nave is in five bays, and clearstoried. There is at the south-west corner a turret for clock and bell rising to a height of 63 ft., a doorway in the west wall thereof giving access to gallery for 100 scholars. All the roofing is covered with dark Westmoreland slating and stone roll ridging. All windows will be glazed with tinted cathedral glass in lead-work. Externally from the dressings fine sandstone will be procured from Horsforth, and the wall-stones, which are pitch-faced, from Potternewton. Internally the walls are to be plastered. The contractors for the work are:—For mason and general builders' work, Messrs. J. W. Wood & Sons, Churwell; carpenter and joiner, Messrs. J. Tomlinson & Sons, Leeds; slater, W. Atkinson, Leeds; plumber, T. Story, Leeds; plasterer, W. J. Haddock, Armley; and painter, W. Greenwood, Leeds. The total estimated cost of the work is 1,500*l*.

**Upleatham.**—Upleatham Church has been re-opened, after alterations which have been made at the sole expense of the Earl of Zetland, from designs and under the superintendence of Messrs. Clark & Moscrop, architects, of Darlington. Mr. Harwood, of Manfield, was the contractor employed.

**Llangrannog (Cardiganshire).**—A new church, capable of seating 210 worshippers, designed by Mr. E. H. Lingen-Barker, of Hereford, and raised in memory of the late Captain Jordan, of Pigeonsford, was consecrated by the Bishop of St. David's on the 8th inst. It consists of a nave, 38 ft. 6 in. by 17 ft. 6 in.; chancel, 21 ft. by 17 ft. 6 in.; south porch, and north vestry; the west end being provided with a double bell gable. The walls are carried out in local grey stone, with windows and other dressed stone-work of Box ground. The chancel roof is wagon-boarded, and the others plastered between the timbers, the whole being covered with North Wales slates. The church is fitted throughout in varnished pitch-pine. The glazing was executed in cathedral rolled tinted glass by the late Mr. Ben Gay, of Bristol. One of Porritt's stoves is provided. The nave passages are floored with Webb's Worcester tiles, and the chancel with Maw's encaustic ones. The stone carving has been executed by Mr. Herridge, of Cardiff, the contractor for the general work being Mr. Edwin Giles.

## STAINED GLASS.

**Hamworthy.**—A two-light stained-glass window, by Messrs. Mayer & Co., has lately been erected in Hamworthy Church, representing "Faith and Hope."

**Halifax.**—A three-light Munich stained-glass window, representing the Angel appearing to the women at the Sepulchre, has just been erected in the fine old church of Halifax to the memory of Mr. and Mrs. Norris, of Firby Park. The upper and lower portions are filled with Perpendicular canopy work, in accordance with the architecture of the church, while in the base of the central light is introduced the arms of the family. The work is from the studios of Messrs. Mayer & Co.

**Cullompton.**—A stained-glass window has been placed in Cullompton church by the nephews and nieces of Mr. Henry Hill, with a commemorative inscription stating that he was

born in the town of Cullompton, 1812, and died at Brighton in 1882. The window is of four-lights, with the lace-like stone tracery for which this church, and especially "Lane's Aisle," is notable. In the four large compartments are eight subjects designed to illustrate the career of St. Peter, and the tracery is filled with angels holding scrolls and emblems appertaining to the Saint. The whole has been executed by Mr. F. Drake, of the Cathedral-yard, Exeter.

**Crosby-on-Eden.**—A three-light Munich stained-glass window, representing "The Sermon on the Mount," has just been placed in the Church at Crosby-on-Eden, Carlisle. The artists are Messrs. Mayer & Co.

## Books.

*The Law relating to Building, Building Leases, and Building Contracts, with a full Collection of Precedents.* By ALFRED EMDEN, Barrister-at-Law. Second edition. London: Stevens & Haynes. 1885.

THIS is a considerably-enlarged second edition of Mr. Emden's work on Building Law, which has been for some time favourably known as a useful compendium of the law on this subject. Such a subject, indeed, does not permit of an author concluding a concise work, because if all the details of it are gone into it touches upon nearly every branch of municipal law. The principles of the law of contracts are involved in every building agreement, and the principles of equity in regard to building leases and building covenants. Nor is any subject more largely influenced than this by the statute law, when it is borne in mind that it is affected by the several Metropolitan Building Acts, for example, and by the Public Health Act.

Perhaps this notice will be most useful to our readers if we point out, in a few words, how this work differs from previous editions. It is much larger. In some ways this will lessen its utility, especially to those who are not lawyers, who require a work more of a handbook in its character. For a layman to have to hunt through a law-book of nearly 1,000 pages is a task which he would rather leave to a lawyer. Chapters on Gas and Water, Support, Party Walls, and Light are among the new chapters. Among other additions we also find the Metropolitan Management and Amendment Act, 1882, with numerous notes by the author. The annotated appendix of statutes is, indeed, as useful a part as any of the work. The chapter on support could hardly have been omitted from this new edition after the decision of the well-known case of *Angus v. Dalton*, upon which we commented from time to time during its progress through the several law courts. The chapter in question clearly states the law as it now exists, but, like all this book, what is said might have been put more concisely and yet with equal clearness. Diffuseness is the cardinal sin, indeed, of which Mr. Emden is guilty; for example, to leave this chapter for a moment, Chapter VII. is headed "The Construction of Buildings." It consists of thirteen lines in the middle of a blank page. The first four lines are, practically, what would occur to the author arranging his materials, and are of no interest to the reader, who can see for himself in what order the several incidents arise. The rest might have been put in a note at the beginning of the following chapter. Again, to return to the chapter on Support. Some lines on p. 477 are occupied with a point which was in doubt before *Bonomi v. Backhouse* was decided. It would have been enough to have told us the effect of this case. Unquestionably the perusal of this chapter will show how considerably in the last few years the position of the owner of a dominant tenement has been strengthened and cleared up, not only in regard to the support of buildings by land, but also in regard to the support of buildings by adjacent buildings. The two cases, indeed, of *Angus v. Dalton* and *Lemaître v. Davis* are perhaps the two most important in regard to buildings which have arisen within the last ten years. We have said enough to show that Mr. Emden's work is a most useful and comprehensive "compendium" of building law. It has its faults, no doubt, but these are not of such importance as to prevent the work from being one which will be of practical use to lawyers and laymen concerned with the subject of buildings.



*The Steam Engine: its Theory and Action.* By W. H. NORMICOTT, M. Inst. M.E. London: Cassell & Co. (Limited).

OUT of the multiplicity of books on the steam engine this is not by any means the worst. The author has succeeded in condensing in a very moderate space,—in conjunction with his own deductions,—a very considerable amount of the generally admitted theories and facts connected with the steam engine. He has, moreover, written in a clear style, and gives us a book easily understandable by the non-mathematician, a decided advantage to many interested in the steam engine who have not the time, and perhaps not the knowledge, to work out the more or less accurate, but certainly very intricate, formulae with which some works abound. The book commences with a short history of the invention of the steam engine, but, as this has already been repeated *ad nauseam*, we think it might very well have been omitted. A few neatly-put remarks on the "Origin of Force" follow, and the author deduces, what we believe no one disputes, that, considering the small proportion of the latent force embodied in fuel, which is turned into useful effect by the aid of the steam engine, it must be held in its present condition to be a very imperfect and uneconomical machine.

Chapter II. deals with the combustion of fuels and the thermal and dynamical value of combustion, and sets out in a concise manner some of the generally accepted, but not altogether proved, theories on the subject. We note the results of the experiments of Bunsen and Deville on the temperature of combustion are quoted. They place the temperature attained by undiluted hydrogen and oxygen at about 6,000° Fah., or about half the temperature calculated by the usual formula,—a very considerable margin, to say the least.

In speaking on the furnace combustion of fuels, the author asserts that anthracite coals are preferred for steam generating purposes to the bituminous coals; this statement requires, at any rate, modification. We presume the author does not refer to pure anthracite coal, but to anthracite which contains bitumen to a greater or less extent, but he does not say so. Should he refer to pure anthracite coal,—although it is practically speaking smokeless and evolves a great heat,—he must be aware of the difficulties attending its combustion,—such as burning of fire-bars, boiler plates, &c.,—that have hitherto prevented its general use. We may add, the most successful plan of burning anthracite in a furnace that we have seen is by the use of a water hearth, but before anthracite coal comes into general consumption for steam generating purposes many modifications and improvements in furnace construction will have to be made.

Further on the author says it is essential "that the layer of coal upon the fire-bars should not be too thick or the air will be unable to pass through it." This generalising is all very well, but we should have been glad to have heard what thickness of fire the author recommends for various types of boilers, premising, as he does, that the best quality of steam coal is used: this is information that might be of practical service to his reader. The author's remarks on stoking are not new, but they are satisfactory, and we agree with his remark that it is a bad practice to damp small coal before putting it on the fire. We may add that some experiments have recently been made in this direction, and with small coal containing 18 per cent. of water, 9 to 10 lb. of coal evaporated 5 1-10 lb. of water per pound of fuel. The same quantity of coal containing only 3 per cent. of water evaporated 8 to 8 1-2 lb. of water per 1 lb. of fuel; it will be seen, therefore, that wet coal loses from 15 to 20 per cent. in evaporative efficiency.

On page 57 the author tells us there is such a thing as "priming" in steam boilers, and gives some of the generally accepted reasons for it, but why not make the matter more complete and his remarks more serviceable by telling us some of the remedies for "priming"?

The faults of this book are almost entirely those of omission, and may arise from trying to "boil down" a very wide subject into a small space, but as far as it goes the book is decidedly a good one, and can safely be placed in the hands of young engineers and others desirous of obtaining, within a small compass, a good general idea of the theory and action of the steam engine.

*Reports of Appeals heard before the Court of General Assessment Sessions, from the year 1871 to 1885.* By EDWARD RYDE and ARTHUR LYON RYDE. The fourth edition brought down to the present date. With an Introduction to the Valuation (Metropolis) Act, 1869, by WALTER C. RYDE, Barrister-at-Law. London: Crosby Lockwood & Co. 1885.

As this is the fourth edition of these Reports, it can scarcely need recommendation, for it is obvious that the work is of practical use to those engaged in rating appeals. But we must dissent from the editor when he tells us in the preface to this edition that "the value of a volume of Law Reports depends mainly in facility of reference." It is really unnecessary to point out that this is but one of the features which tend to make a volume of Reports useful. But taking the editor's own test, is not some kind of head-note at the beginning of each case one of the most important ways of facilitating reference to a case? But the cases are merely headed with the names of the parties, then the names of counsel appear, and it becomes necessary to go quite through the case in order to discover what is the point of the decision. In some instances no direct decision is given, and we doubt the value of cases in which this occurs. The essay on the Valuation (Metropolis) Act, 1869, enhances the value of this collection, which, though in form it falls far below the standard to which a volume of law reports should attain, is no doubt a useful collection of cases.

*British Dairy Farming.* By JAMES LONG. London: Chapman & Hall.

THE author of this work is well known to the readers of the *Field*, in which he has, under the nom de plume of "Merlin," for years treated of the "Farm and Farming" in its many aspects. The present book deals not only with English dairy-farming, but with that of France, Denmark, Holland, Switzerland, &c., every process being clearly described and its appliances enumerated. Chap. XIII. treats of the disposition and construction of the buildings forming a typical dairy, and gives practical information which the architect who has the delightful task of designing a model dairy,—the delectable of all apartments,—will find invaluable. A point which may be noted is the proved superiority of a slate over a tile floor: the former absorbing only 1-200th of its weight of water as against one-seventh absorbed by the latter, and drying in one-quarter of an hour as against six days required by the tile. This information is given on the word of a bishop, and should therefore be received without question. The illustrations are numerous and good, and the whole book is evidently the work of a man who is quite master of his subject.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

6,264, Bridges. H. Lake.

The girder is constructed of a number of interchangeable parts. The longitudinal and diagonal bars have eyes at their ends through which are put the ends of the cross-bars. Two framings may be used, one within the other. The same parts may be used in the construction of arched bridges by arranging them as interlocking links.

6,918, Concrete Building and Slabs for same, &c. F. and J. R. West.

The walls consist of a shell of concrete slabs panelled on the inner face, the recessed parts being undercut. The slabs are formed with grooves and mortices in their edges, by which they are connected together by cement dowels. The interior of the wall is filled with concrete. Slabs for ceilings are made with dovetailed grooves, by which they are suspended from the flanges of the floor joists. Special slabs are also described for the junction of two walls, for quoins, setts, &c. The moulds are faced with vulcanite, so that the slabs shall leave easily. Moulded ornaments already set may be embedded in the plastic slab where required. When these slabs are used, the temporary boarding usually required for concrete building is dispensed with. The method is applicable to circular, domical, and pyramidal as well as to ordinary constructions.

7,268, Ventilator. J. Thomasson.

In the wall of the room to be ventilated, is arranged a casing, in which fits a conical valve provided with a spindle whereby it may be raised or lowered, a weight holding it at any desired height. The top part of the casing is vertically divided by open wedge-shaped partitions forming air passages inside and open slots outside. The inflow of air is divided by partitions into numerous currents which

mix with the induced currents of warm air passing from the room up the before-mentioned slots.

8,927, Windows. T. Tobitt.

The sash is provided with a bolt near the bottom, the case of which projects into a groove in the pulley stile. Beads are dispensed with, a strip of metal running into grooves in the sash and stile serves to guide the window. When the window is pulled down the bolt may be shot into a recess at the back of the groove and the guiding strip removed, the sash may be then turned on the bolt as a pivot.

9,025, Floor or Wall Covering. S. Loewenthal.

A composition, of which African flake is the chief ingredient, is spread on a thin layer over any fabric or paper. It is then printed and embossed, and afterwards hung up and exposed to heat. It is especially adapted for wall-coverings, imitation leather, or floor-cloth.

9,886, Glazing. T. W. Helliwell.

The bar is made with several shoulders on each side, in which are water-grooves. A groove is made in the upper part of the bar, into which a folded strip of lead is shidden, having its free edges standing along the bar. The glass rests on one of the shoulders, and is secured by the lead being bent over it. Pieces of felt may be put in the angle between the lead and the glass and bar, in which case stiffening angle-bars of metal are also inserted. The shoulders and water-grooves may be formed in sheet metal surrounding a cone of wood or iron.

9,888, Colouring Stone. L. de Liehaber.

Certain stones, such as Bath stone and yellow sandstone, are changed in colour, especially to red or pink, by the action of heat. The blocks of stone are immersed in or floated upon melted lead or a fused alloy, contained in a tank of convenient size, for a sufficient time, and are turned from time to time. The temperature of the bath is determined by the nature of the stone. A furnace or oven may be used instead of the heating tank of lead. Stone thus treated may be ground to a red or pink powder, and used in place of hearthstone.

#### APPLICATIONS FOR LETTERS PATENT.

Sept. 4.—10,468, Perrot & Habershon, Sliding Canopy Stoves.—10,476, W. B. Haigh, Improvements in Machines applicable to Planing Wood.—10,479, J. Hansen, Automatically Regulating the Temperature of Hothouses, Workshops, &c.—10,480, W. G. Margetts, Improvements in Loading Cement Kilns.—10,488, H. C. Choquet, Improved Sorec-driver.—10,514, E. Wood, Improvements in Ventilators.

Sept. 5.—10,538, Geraud & Neoe, Gas-burner, with Electric Ignition.—10,544, M. Farrington, Improvements in Kilns and other Structures employed in the Manufacture of Lime and Cement.

Sept. 7.—10,548, T. Taylor and Another, Blind Card Brackets.—10,571, D. S. Keith, Water Supply Apparatus for Water-closets, &c.—10,581, W. H. Tonks, Improved Letter-box.—10,585, G. Butchard, Improvements in Kilns.—10,586, W. Pope, Ventilators for introducing Fresh Air without Draught.

Sept. 8.—10,599, W. Young, Closets for Indoor use.—10,605, J. Moore and J. S. Moore, Combined Table and Writing-desk.—10,625, J. Vaughan, Water-saving Flushing Cistern.—10,640, J. Morrison, Device for Lowering Venetian Blinds.—10,643, M. Syer, Improvements in Flushing Cisterns.

Sept. 9.—10,659, H. Sainsbury, Spring Air Apparatus for Closing Doors and Gates.—10,666, H. Morley and J. Pope, Roofs or Coverings for Houses.—10,669, C. Edwards and W. Richard, Combined Flush and After-flush Cisterns for Closets.

Sept. 10.—10,717, S. Henshaw, Securing Doors and Windows by a Self-acting Box.—10,721, Mercer, Collection and Storage of Rain-water from Roofs, &c.—10,740, G. Butchard, Kilns for Burning Cement.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

8,958, C. Ching, Apparatus for Ventilating Rooms, Buildings, &c.—8,968, W. Buchan, Improvements in Water-closets.—8,297, B. Mills, Improved Joint for Pipes.—8,929, Improvements in the Manufacture of Keene's Cement.—9,730, W. Wood, Compound for the Manufacture of Furnace Bricks and Linings.

#### COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

14,430, A. B. Joy and J. Lewan, Manufacture of Imitation Marble.—14,744, A. Breuker, Fret Saw.—14,888, F. Wilcox, Improvements in Ventilators.—15,120, R. H. and R. S. Hughes, Improvements in Hall Lamps, &c.—15,460, E. De Pass, Preparing Tiles, Slabs, or Flags in Panel form for use in Ceramic Frazings.—15,758, J. Bartlett, Stencils and Stencil Frames.—16,220, T. Jones, Stanchions for Supporting the Roofs of Buildings, &c.—8,737, W. Lake, Improved Paint or Pigment.—9,165, W. H. Beck, Improvements in Water Waste-preventing Apparatus.—14,115, A. Carey and E. Latham, Machinery for the Manufacture of Concrete and Mortar.—14,712, J. Moeratti, New Method of Building a House.—15,464, J. Loring, Ventilating Apparatus.—9,379, S. Fornival, Composite Moulds for Moulding Plastic Articles.



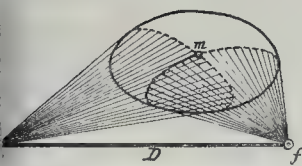


Fig. 162.

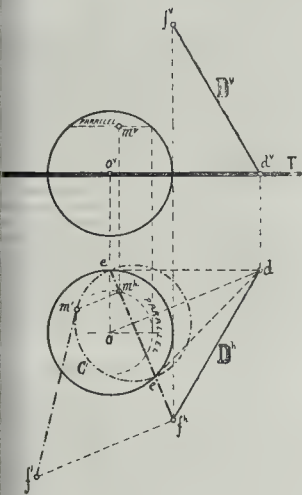


Fig. 163.

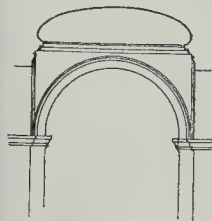


Fig. 164.

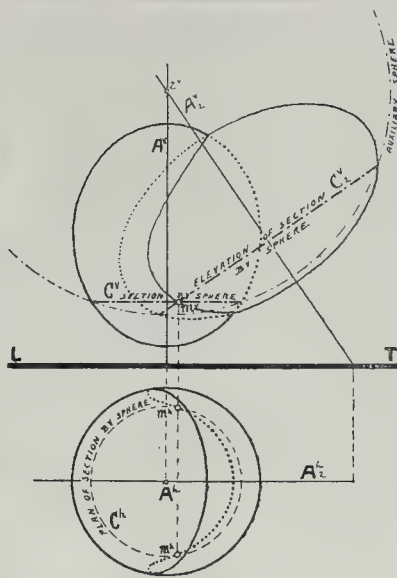


Fig. 165.

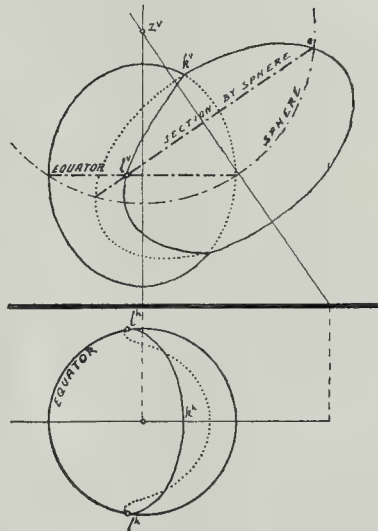


Fig. 166.

(Note that the points  $o$  and  $d$  of the plan are not projections but the points themselves, and, therefore, do not receive the sign  $h$ ). In the way we have set the problem the above circle of contact is vertical, and, therefore, the plan of this circle is a straight line  $e e$ . If we turn down the plane of the said circle round its trace  $e e$  we shall be able to draw it on the plan as the circle  $C^1$  of diameter  $e e$ . We turn down also with the plane of the circle the point  $f$ , where it is penetrated by the line  $D$ , and we get it on the plan in  $f^1$ ; we need only take a tangent to circle  $C^1$  to get the point  $m^1$ , the position on the turned down plane of one of the points of contact required. When the plane of the circle is turned back to its former position the point  $m^1$  has  $m^h$  for its plan. To find the elevation of the point we draw the parallel of the sphere on which it is situated, an operation so easy that we need not describe it, and carry thereon the elevation  $m^v$ . (See fig. 163.)

Find the intersection of two surfaces of revolution the axes of which are in the same plane.

The penetration of a cupola by a circular archway would be one special case of the intersection of surfaces of revolution, so would be the intersection of two cupolas; but we will treat the question in its most general form by selecting for the one surface of revolution an elongated ellipsoid such as an egg, and, for the other surface an ellipsoid generated by an ellipse revolving round its minor axis, such as the surface of the old-fashioned watches, vulgarly called turnips. It was the practice of the late Sir Charles Barry to use such ellipsoids as cupolas to crown pendentives when used, as he was so fond of doing, in internal corridors. He called them watch-glass cupolas, and pointed out their advantage of receiving a shadow round their edge which augments their apparent height (see fig. 164). Generally, we can say that, for domes and cupolas, ellipsoids are always to be preferred to spheres, as the latter are deformed in appearance by optical causes which do not affect ellipsoids.

The axis  $A_2$  of the second surface is inclined and meets the axis  $A$  of the first surface in a point  $Z$  (see fig. 165). We assume that the elevation-plane of our drawing is parallel to the plane, which contains the axes  $A$  and  $A_2$ , and we assume also that the axis  $A$  of the first surface is vertical. The plan of the first surface is then a circle, and the plan of the second surface is an ellipsis which we have not drawn, as it would be useless for our purpose.

The reader will remember that the general method of finding the intersection of two surfaces consists in cutting both surfaces by a third of such a nature that its intersections can be readily found, and where these auxiliary intersections meet we have points of the required intersection of the two given surfaces. It is this general method we are going to apply.

It is evident that any sphere which has the point  $Z$  for centre will make circular sections in both surfaces of revolution, the elevations of these circles will be the straight lines  $C^o$  and  $C^v$ , which intersect in the point  $m^v$ . We know that  $m^v$  is the elevation of the points of intersection situated on the circular section  $C$ , we shall therefore find on  $C^h$  the points  $m^h$  plans of two points  $m$  of the intersection required. By repeating this operation with a series of spheres of different sizes we should get a series of points of the intersection. (See fig. 165.)

There is one sphere in particular which gives us important points of the curve of intersection, this is the sphere which cuts the first surface of revolution along its equator; for on the equator will be the points which separate on the plan

other we shall have the points of contact  $m$  of the planes  $P$ . As this is doing fig. 154 twice over, we do not see any utility in the student making this drawing, as long as he has understood the method employed, which sketch fig. 162 will probably make sufficiently clear.

The same method, of course, extends to solving the above problem in the case of surfaces of the second degree generally, such as the ellipsoid of fig. 158, or hyperboloids and paraboloids, but there is a special surface of the second degree where the method of operating admits of great simplifications, and that is the sphere.

We assume that the centre of the sphere is placed in the plane of the plan; this means that the ground line  $LT$  passes through the centre  $O^v$  of the sphere's elevation. If from the point  $d$  foot of the line  $D$  we carry a series of tangents to the sphere, we know that the line of contact of the circumscribed cone formed by these tangents will be a circle contained in a plane perpendicular to the axis  $Od$  of the cone.

## The Student's Column.

### DESCRIPTIVE GEOMETRY.—PART II.

XVII.

a plane,  $P$ , tangent to a surface of revolution and passing through a line,  $D$ , in space; so mark the point,  $m$ , where the plane  $P$  is tangent.

HERE are only two planes which can satisfy this question, for this problem is equivalent to putting an egg between two leaves of a portfolio. The egg is a surface of revolution, the back of the portfolio is line  $D$ , and its sides are the two tangent

es. We know how to find the curve of contact cone with its vertex in a given point and onto a surface of revolution, we can find two points,  $f$  and  $e$ , on the line  $D$ ; then construct the curves of contact for the cones which have the points  $f$  and  $e$  for vertices, and these curves of contact intersect each

the seen from the unseen parts of the intersection. (See fig. 166.)

The tangent to the curve in any point is, as we know, the intersection of the two planes which are respectively tangent to each surface. In the points  $l$  of the equator, the planes tangent to the first surface are, at all events, vertical, and, as they contain the tangents to the curve, we can conclude that on the plan the tangent to the curve in the point  $l$  is also tangent to the equator; in other words, that the curve of the intersection is, as seen in the drawing, tangent to the equator. There is one exception possible to this law, for, if the tangent to the curve in a point  $l$  were a vertical line, then its plan would be a point. The curve in this case would touch the equator and recede back, forming a sharp angle with itself instead of a continuous curve. Such a point of recoil can be seen on the elevation in the point  $k'$ , because the tangent to the intersection in this point is in our drawing perpendicular to the elevation; the hidden branch of the curve in this case is exactly covered by the seen branch. (See fig. 166.)

#### RECENT SALES OF PROPERTY.

##### ESTATE EXCHANGE REPORT.

| SEPT. 8.                                                                                      |        |
|-----------------------------------------------------------------------------------------------|--------|
| By TOWERS, WILLIAMSON, & ELLIS.                                                               |        |
| Bayswater—25, 26a, and 26b, Pickering-place, 20 years, ground-rent 6s.                        | £550   |
| Marble Lane—7, Harcourt-street, and 13, Harcourt-street, 7 years, ground-rent 34s.            | 150    |
| By FRANK JOLLY & Co.                                                                          |        |
| Poplar—1, 3, 5, and 7, South-lane, 60 years, ground-rent 8s.                                  | 645    |
| Limehouse—32, 34, and 36, Clarence-street, 88 years, ground-rent 13s. 10s.                    | 920    |
| SEPT. 9.                                                                                      |        |
| By BEALE & DANFORTH.                                                                          |        |
| Deptford—6, Strickland-street, 39 years, ground-rent 2s. 6s.                                  | 265    |
| Greenwich, Humber-road—“Waverley House” and “Carlisle House,” 97 years, ground-rent 14s. 14s. | 700    |
| By C. A. RICHARDS.                                                                            |        |
| Eltham, Cross-lane—A Freehold Residence called “Park View”                                    | 500    |
| By WALDOY & LEE.                                                                              |        |
| Bucks, Wraybury—An Enclosure of LAMMAS Land, containing 6a. 1r. 10p., freehold                | 160    |
| By R. & J. R. MITCHELL.                                                                       |        |
| Camberland, Epsom—The Calder Abbey Estate, containing 1,440 acres, freehold                   | 44,200 |
| SEPT. 10.                                                                                     |        |
| By HARMAN & MATTHEWS.                                                                         |        |
| Old Kent-road—23, Glenhall-road, 40 years, ground-rent 5s. 6s.                                | 400    |
| 26, Glenhall-road, 38 years, ground-rent 8s. 6s.                                              | 400    |
| By J. P. LASH.                                                                                |        |
| Stratford—69, Letts-road, 73 years, ground-rent 4s. 4s.                                       | 165    |
| Poplar—431, East India Dock-road, 88 years, ground-rent 7s. 7s.                               | 360    |
| By EASTMAN BROS.                                                                              |        |
| Anerley, Croydon-road—The Residence called “55, Aubyn’s,” 63 years, ground-rent 13s.          | 900    |
| By C. G. COLES & Co.                                                                          |        |
| St. John’s Wood—4 and 6, Cochrane-street, 34 years, ground-rent 3s.                           | 765    |
| 27, Cochrane-street, 34 years, ground-rent 1s.                                                | 455    |
| 72 and 74, Cochrane-street, 34 years, ground-rent 10s.                                        | 785    |
| 2, Blenheim-place, 35 years, no ground-rent                                                   | 640    |
| Battersea—2, Castellan-gardens, 44 years, ground-rent 7s. 10s.                                | 350    |
| By STICKLAND & SON.                                                                           |        |
| Camberwell—45 and 47, Denman-road, freehold                                                   | 860    |

#### Miscellaneous.

**Death of Mr. W. Nicholson, Leeds.**—We regret to record the death of Mr. W. Nicholson, builder and contractor, of the old-established firm of William Nicholson & Sons, of South Brooke-street, Leeds. For some two or three years past he had not been enjoying his usual good health, but (with slight variations) had been able to give a constant supervision to the management of the business. At the time of his death (which occurred very suddenly) he was on a visit to the seaside with his family. Mr. Nicholson was one of the originators of the Leeds Master Builders' Association, and has been its President and held office as secretary and treasurer for more than twenty years. He was a member of the Council of the National Association of Master Builders of Great Britain, also a director of the Builders' Accident Insurance, since the formation of these institutions, and, as such, has been highly and deservedly respected by all who knew him. He was a member of the Leeds Town Council for some years. His death, at the comparatively early age of forty-nine years, is deeply regretted by all classes with whom he came in contact. His remains were interred at Woodhouse Cemetery, Leeds, on the 10th inst., in the presence of a large number of friends and work-people of the firm.

**A Long-Span Bridge for India.**—The Society of Engineers, under their President, Mr. Charles Gandon, paid a visit on Wednesday to the works of Messrs. Westwood & Baillie, at Poplar, to see the model, drawings, and portions of the work already executed of the great Sukkur Bridge across the Indus on the Afghanistan Frontier Railway, which branches off from the Kurrahee and Peshawur Railway. The bridge will be the largest in the Indian Empire, and surpassed by none in length of span, except the Tay Bridge now erecting over the Firth of Forth. The bridge is to be erected on the Rohri Pass side of the Bukken Island, across the water-way which separates that island from the main land. Across the other channel on the Sukkur side, a bridge of three spans, respectively 90 ft., 238 ft., and 278 ft., has already been erected. The bridge now under construction for the Indian Government has a single actual span of 900 ft. Of this, 350 ft. at each extremity are supported on cantilevers, and the 200 ft. central span is borne equally by the two terminal cantilevers. The actual width between the two faces of the land abutments is 820 ft., but there is a step back in each of 40 ft., which raises the full span to the 900 ft. above stated. The height of the towers is 163 ft. from their bases on the abutments. From the rear upright there projects diagonally, like the jib of a crane, an iron lattice shore, or support, 200 ft. long by 16 ft. 6 in. square in section, and weighing 225 tons. From a mass of plating embedded in masonry, and termed the anchor, a webbing of steel stretches from the ground over the top of the tower forward to the end of the cantilever, supporting, in tension like the chain of a suspension bridge, the overhanging weight of the cantilever. The two uprights are 123 ft. apart. Under the cantilever two booms, 6 ft. deep in structure, project from the abutments and strut the cantilever from below. The cantilevers are alike on both sides, as the bridge is perfectly straight from end to end. It is wholly composed of steel plates, some as much as 14 in. in thickness; and the total weight of the steel used in the construction will be 3,500 tons. The railway on the bridge is 16 ft. between the centres, and the portions between the rails are filled in with wood for the better footing for horses. The entire bridge will be put together and fitted in Messrs. Westwood & Baillie's yard, and the staging or scaffolding is being erected for that purpose, and will absorb no fewer than 2,000 loads of timber. The structure will thereafter be sent out, and will be erected on its future site by the Indian Government, under the superintendence of Mr. Robertson, who has been sent to this country in charge of the undertaking.

**The School of Art Wood-Carving.**—The School of Art Wood-Carving has been removed from the Royal Albert Hall to the Central Institution of the City and Guilds of London Technical Institute, Exhibition-road, South Kensington, room No. 66 on the second floor, where it has re-commenced work. Both day and evening classes are held in the school. There are at present twelve free studentships in the school, viz., six in the day classes and six in the evening classes, the fees for which are paid from funds supplied by the City and Guilds of London Institute for the Advancement of Technical Education. The holders of these studentships are selected by the Committee of the school from persons of the industrial class who are intending to earn their living by wood-carving. Candidates must have passed the second grade art-examination of the Science and Art Department in freehand drawing at least. Those who have some knowledge of wood-carving, or have passed in the other subjects of the second grade art certificate, or in drawing from the antique and the figure, architectural drawing, or designing, or in modelling, will be preferred. Applications for these studentships should be addressed to the Secretary at the school.

**Schools, Old Kilpatrick, N.B.**—At a meeting of the Old Kilpatrick School Board, held in their office on Saturday, the 12th inst., for the purpose of examining the competition plans sent in by various architects for the erection of the new school at Gavinburn, those prepared by Messrs. J. T. & R. Turnbull, joint architects, Glasgow, were approved of and accepted. The estimated cost is 3,500. The clerk was instructed to forward the plans to Lord Blantyre for his approval, and to intimate acceptance to the architects.

**Paris Exhibition, 1889.**—The Lord M. received on Wednesday, at the Mansion House, M. J. Bourdais, architect to the French Government, and designer of the Trocadere Palace, Paris; M. Ch. Devic, civil engineer, author of the scheme of the Universal and International Exhibition to be held at Courbevoie, near Paris, in 1889; and M. Louis, head of the For Department of the Committee to examine report upon the scheme. The deputations were introduced by Mr. Campbell Robert, informed his Lordship that their plans were laid before the French Chambers on their assembling after the coming General Election. The undertaking will be entirely self-supported and no financial support will be asked either from the French Government or of the Paris Municipality. They further stated that the proposals will remove all cause of complaint on account of space, which was a most serious grievance of the Foreign Commissioners in 1875. In point of fact, the proposed Palace at Courbevoie will offer an almost unlimited space for exhibitors, the preparatory plans, drawn up by M. Jules Bourdais, covering an area of more than 500 acres of land. The promoters of the scheme, who are receiving large support in France, have come to London to enlist sympathies of intending English exhibitors.

**Standard.**  
**Tramway Employees at Birmingham.**—Mr. E. Pritchard, C.E., the chairman of the Aston Tramways Company, on Sunday, on occasion of a breakfast given by the Central Tramway Company to their workpeople, stated that the directors of the Birmingham and Aston Company had for the last few weeks had under consideration the best means to be adopted whereby the present long working hours of engine drivers, guards, and other persons engaged could be reduced, and at the last to the employees given by the company definite instructions were given to the secretary, Mr. Bartley, to submit at an early date for the consideration of the directors a workable scheme whereby the hours of labour might be reduced from fifteen to twelve hours each day without reducing the amount of work at present paid by the company. Such scheme has now been submitted, and at a meeting of the directors held on Monday it was, upon motion of the Chairman, unanimously adopted and instructions given to put the same force as soon as relief drivers, guards, and other officials could be secured.

**Opening of a Board School.**—A Board school was opened at Denmark-street, Plaistow, last week. The site of the school forms part of 6½ acres of land bequeathed by Nicholas Avenon, a merchant tailor of London, A.D. 1580, to the parish of West Ham, on condition that twenty-four poor persons should receive at the parish church “one penny loaf” upon every Sabbath day, the residue of the land, if any, to be paid to the vicar for a sermon to be preached by him once every year. The School Board purchased the site for £1,500. The site, the construction, and the furniture cost about 12,300l., the capacity being 1,272 children, about 9s. 13s. 8d. per head. The architect is Mr. S. J. Newman, of Fenchurch-street. The builder is Mr. J. G. Bortolotti. Messrs. Jukes & Co., Bromley, supplied ironwork; Mr. Adams fitted all the window openings with his patent fasteners, &c.; Brown, Broad-street, supplied the red mould bricks for strings and cornices, &c.; Messrs. S. Trickett & Son supplied the Green hill stone.

**New Theatre for Oxford.**—A site for a new theatre has been obtained in George-street and is being rapidly cleared for the erection of the new building, which, it is expected, will be ready for use at the beginning of next year. The plans, which have been prepared by H. G. W. Drinkwater, F.R.I.B.A., were approved by the Local Board at their last meeting, the carrying out of the work has been entrusted to Messrs. Wilkins & Son. The building will accommodate nearly a thousand people.

**Carbolinum Avenarius.**—In reference to our comment on this protective solution recent “Note,” the patentees affirm that the wood coated with this substance might be inflammable when newly coated, it is not when the Carbolinum has had time to dry into the wood. It is fair to say that our opinion was based on experiments with wood not coated, and our readers may take the opinion of the patentees *per contra* for what they think it worth.



**Monster Water Meter.**—There has been set up at the Corporation depot, a novel kind of meter for measuring water supplied to the Leeds and Liverpool by the Blackburn Water Committee. The meter is conveyed from the old gathering ground to the Audley depot in a 12-in. pipe, which is itself into a small tank at the side of the canal. The measurer, which is self-acting, has been specially designed by the Borough Water Engineer (Mr. McCallum), and consists of a twin-tumbler or double-tipping tank, which works with a see-saw motion. The meter works underneath a weir (which affords water an outlet from the above-mentioned tank), and it is so shaped and balanced that in one compartment is full, the weight of water causes it to tip over and discharge; the other compartment then immediately begins to fill. This action continues as long as the water is being discharged into the canal, both filling and emptying alternately. Each compartment holds 100 gallons, and the quantity of water measured is registered by means of a series of wheels and pinions (with dials) worked in eccentric on the shaft of the tumbler mechanism. As the weight of water at each side is considerable, two gun-metal hydraulic rams of novel design are fixed at each side, arranged as to let the tumbler fall gently once it has begun to tip. At the suggestion of the Chief Engineer to the Canal Company (Mr. Chas. White, C.E.) appliances have been constructed to break the force of the water over the weir prior to its entrance into the tumbler, and also to ensure uniformity of movement throughout the length of weir. The meter is enclosed on three sides by concrete, the indicator is raised on posts for convenience of reading. The tumbler is made of iron, and has been made and fitted by the Corporation workmen. The hydraulic buffers, valves, &c., have been supplied by Messrs. T. & Co., of Blackburn.

**Always in the Cape Colony.**—By the opening, last month, of the last section of the Cape Railway System of the Cape of Good Hope, which has reached its terminus at Aliwal, the entire railway system of the colony has been completed by acts of the local government is completed, with the one exception of extension of the Western line to Kimberley (Diamond Fields), the work of which is now actively carried on, and will very shortly be completed. The three railway systems, in the Cape, Midland, and Eastern, comprise in all 1,500 miles, and if to this total be added the other lines, such as the junctions to King's Town, to Graham's Town, to Malmesbury, and to Coleridge, and the private company line from Port Alfred to Graham's Town, the total length of the railways in the colony is 1,662 miles, at an expenditure of 14,788,600l. During the last six months of this year the railways of the colony have yielded returns sufficient to pay maintenance and working expenses, and left a surplus of nearly 3½ per cent. towards payment of interest on the capital expended for construction.—*Iron.*

#### PRICES CURRENT OF MATERIALS.

| TIMBER.          | £. s. d. | £. s. d. |
|------------------|----------|----------|
| Heart, B.G. .... | 6 10 0   | 7 10 0   |
| Red, B.G. ....   | 12 10 0  | 15 10 0  |
| U.S. ....        | 2 2 0    | 2 2 0    |
| Canada ....      | 3 0 0    | 5 0 0    |
| " .....          | 3 0 0    | 4 10 0   |
| " .....          | 3 10 0   | 6 0 0    |
| " .....          | 1 10 0   | 4 10 0   |
| " .....          | 3 0 0    | 5 0 0    |
| " .....          | 6 0 0    | 7 0 0    |
| " .....          | 3 0 0    | 4 0 0    |
| " .....          | 3 10 0   | 5 0 0    |
| " .....          | 5 0 0    | 6 0 0    |
| " .....          | 5 0 0    | 7 0 0    |
| " .....          | 8 0 0    | 4 10 0   |
| " .....          | 8 0 0    | 9 0 0    |
| " .....          | 6 10 0   | 7 10 0   |
| " .....          | 7 0 0    | 8 10 0   |
| " .....          | 10 0 0   | 17 0 0   |
| " .....          | 8 0 0    | 9 10 0   |
| " .....          | 6 10 0   | 11 0 0   |
| " .....          | 7 0 0    | 17 0 0   |
| " .....          | 8 10 0   | 19 0 0   |
| " .....          | 18 0 0   | 32 10 0  |
| " .....          | 12 0 0   | 18 10 0  |
| " .....          | 8 0 0    | 10 10 0  |
| " .....          | 9 0 0    | 12 0 0   |
| " .....          | 8 10 0   | 8 0 0    |
| " .....          | 5 0 0    | 7 10 0   |
| " .....          | 4 0 0    | 13 0 0   |

#### TIMBER (continued).

|                                        | £. s. d. | £. s. d. |
|----------------------------------------|----------|----------|
| Flooring Boards, sq. 1 in.—Pine, first | 0 9 0    | 0 13 0   |
| Second                                 | 0 7 6    | 0 8 6    |
| Other qualities                        | 0 5 0    | 0 7 0    |
| Cedar, Cuba, .....                     | 0 0 34   | 0 0 4    |
| Honduras, &c. ....                     | 0 0 3    | 0 0 4    |
| Australian .....                       | 0 0 3    | 0 0 34   |
| Mahogany, Cuba .....                   | 0 0 5    | 0 0 74   |
| St. Domingo cargo av. ....             | 0 0 54   | 0 0 74   |
| Mexican .....                          | 0 0 4    | 0 0 5    |
| Tobacco .....                          | 0 0 4    | 0 0 64   |
| Honduras .....                         | 0 0 41   | 0 0 64   |
| Rosa, Rio .....                        | 7 0 0    | 17 0 0   |
| Bahia .....                            | 8 0 0    | 16 0 0   |
| Satin, St. Domingo .....               | 0 0 8    | 0 1 0    |
| Porto Rico .....                       | 0 0 8    | 0 1 0    |
| Walnut, Italian .....                  | 0 0 4    | 0 0 5    |

#### METALS.

|                                     |         |         |
|-------------------------------------|---------|---------|
| Iron—Pig in Scotland .....          | 2 1 6   | 0 9 0   |
| Bar, Welsh, in London .....         | 4 15 0  | 5 2 6   |
| " .. in Wales .....                 | 7 6     | 4 12 6  |
| " .. in Staffordshire, London ..... | 8 0 0   | 7 0 0   |
| Sheet, single, in London .....      | 7 10 0  | 8 0 0   |
| Hoops .....                         | 6 10 0  | 7 10 0  |
| Nail-roads .....                    | 6 0 0   | 7 0 0   |
| COPPER—                             |         |         |
| British, cks. and ingots .....      | 45 0 0  | 46 10 0 |
| Best selected .....                 | 46 10 0 | 47 10 0 |
| Sheets, strong .....                | 55 10 0 | 56 0 0  |
| " .. India .....                    | 52 0 0  | 53 0 0  |
| Australian, fine cash .....         | 0 0 0   | 0 0 0   |
| Chili, bars .....                   | 41 12 6 | 42 5 0  |

#### METALS (continued).

|                              | £. s. d. | £. s. d. |
|------------------------------|----------|----------|
| YELLOW METAL .....           | 0 0 44   | 0 0 44   |
| Lead—Pig, Spanish .....      | 11 1 3   | 0 0 0    |
| English, com. brands .....   | 11 10 0  | 0 0 0    |
| SPRINT—                      |          |          |
| Silesian, special .....      | 14 10 0  | 14 12 6  |
| Ordinary brands .....        | 14 7 6   | 14 10 0  |
| TRY—                         |          |          |
| Straits .....                | 91 0 0   | 91 10 0  |
| Australian .....             | 91 2 6   | 91 12 6  |
| English ingots .....         | 93 0 0   | 0 0 0    |
| TRIPLES—                     |          |          |
| IC coke .....                | 14 8 0   | 16 8 0   |
| IX ditto .....               | 21 0 0   | 25 0 0   |
| IX charcoal .....            | 17 0 0   | 20 0 0   |
| IX ditto .....               | 28 0 8   | 27 0 6   |
| OILS.                        |          |          |
| Linseed .....                | 22 10 0  | 23 0 0   |
| Cocoon, Ceylon .....         | 31 10 0  | 32 0 0   |
| Ceylon .....                 | 37 0 0   | 0 0 0    |
| Copra .....                  | 28 0 0   | 28 10 0  |
| Palm, Lagos .....            | 30 0 0   | 0 0 0    |
| Palm-nut Kernel .....        | 26 0 0   | 0 0 0    |
| Rapeseed, English pale ..... | 25 15 0  | 0 0 0    |
| " .. brown .....             | 23 0 0   | 0 0 0    |
| Cottonseed, refined .....    | 31 5 0   | 23 0 0   |
| Tallow and Oleine .....      | 25 0 0   | 46 0 0   |
| Lubricating, U.S. .....      | 7 0 0    | 10 0 0   |
| " .. Refined .....           | 8 0 0    | 16 0 0   |
| TURPENTINE—                  |          |          |
| American, in cks. ....       | 1 5 6    | 1 6 0    |
| TAB—Stockholm .....          | 0 19 6   | 1 0 0    |
| Archangel .....              | 0 11 0   | 0 11 6   |

### COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

#### COMPETITIONS.

| Nature of Work.                    | By whom required. | Premium.  | Designs to be delivered. | Page. |
|------------------------------------|-------------------|-----------|--------------------------|-------|
| Design for a Villa Residence ..... | R. H. Smith ..... | 10l ..... | Not stated               | ii.   |

#### CONTRACTS.

| Nature of Work, or Materials.                    | By whom required.                              | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page.  |
|--------------------------------------------------|------------------------------------------------|-----------------------------------|--------------------------|--------|
| Renewing Water Mains, &c., Aldershot .....       | War Department .....                           | Official .....                    | Sept. 22nd               | ii.    |
| Rebuilding Paving, &c., and Making-up Road ..... | Tottenham Local Board .....                    | De Pape .....                     | do.                      | ii.    |
| Concrete Invert within Sewage Works .....        | do. ....                                       | do. ....                          | do.                      | ii.    |
| Well-Sinking .....                               | do. ....                                       | do. ....                          | do.                      | ii.    |
| Guernsey Granite and Pipe Sewer, &c. ....        | Willenden Local Board .....                    | O. Claude Robson .....            | Sept. 23rd               | ii.    |
| Granite Macadam .....                            | Staines Local Board .....                      | Official .....                    | Sept. 24th               | xviii. |
| Broken Granite and Kentish Flints .....          | Twickenham Local Board .....                   | do. ....                          | Sept. 26th               | ii.    |
| Scavengers' Depot .....                          | Comm. of Sewers .....                          | do. ....                          | Sept. 28th               | ii.    |
| Brick and Pipe Sewer .....                       | Lowestoft Impr. Com. ....                      | R. H. Inch .....                  | do.                      | ii.    |
| Painting Barracks, &c., Halifax .....            | War Department .....                           | Official .....                    | do.                      | ii.    |
| Road-making .....                                | United Land Co. Lim. ....                      | do. ....                          | Sept. 29th               | xviii. |
| Making-up Roads, &c. ....                        | Wandsworth Bd. of Wks. ....                    | Official .....                    | do.                      | ii.    |
| Sewerage Works .....                             | Hereford Town Council .....                    | J. Parker .....                   | do.                      | ii.    |
| Forming Roads, &c., Garrair-lane .....           | Wandsworth & Clapham Union .....               | F. W. Aldwinckle .....            | October 1st              | xviii. |
| Cottages, Roads, Drainage, &c. ....              | Sheerness Permanent Benefit Building Soc. .... | Official .....                    | do.                      | xviii. |
| Broken Gradiote .....                            | Bishop's Cleeve L. ....                        | do. ....                          | do.                      | ii.    |
| Water Works, Highbridge .....                    | Axbridge R. S. A. ....                         | A. Woodhouse .....                | October 4th              | ii.    |
| Stores .....                                     | Great Western Ry. Co. ....                     | Official .....                    | October 5th              | ii.    |
| Concrete Sea-Wall and Promenade .....            | Ipswich Sanitary Auth. ....                    | E. Buckham .....                  | October 8th              | ii.    |
|                                                  | Hartlepool Corporation .....                   | H. Meir .....                     | October 28th             | ii.    |

#### PUBLIC APPOINTMENTS.

| Nature of Appointment.        | By whom Advertised.        | Salary.                 | Applications to be in. | Page. |
|-------------------------------|----------------------------|-------------------------|------------------------|-------|
| Engineering Draughtsman ..... | Belfast Town Council ..... | 156l .....              | Sept. 23rd             | xvi.  |
| Clerk of Works .....          | Acton Local Board .....    | 2l. 10s. per week ..... | Not stated             |       |

#### TENDERS.

|                                                                                                                                                                   |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>BROMLEY (Kent).</b> —For making up Lower Camden-road, for the Bromley Local Board. Mr. Hugh S. Cregeen, surveyor:—                                             |            |
| John Mowlem & Co. ....                                                                                                                                            | £1,378 0 0 |
| James Hare .....                                                                                                                                                  | 1,275 0 0  |
| Thomas Lansbury .....                                                                                                                                             | 1,247 10 8 |
| Edwin Peill & Sons (accepted) .....                                                                                                                               | 1,169 0 0  |
| <b>BROMLEY (Kent).</b> —For making up private road belonging to the South-Eastern Railway Company, for the Bromley Local Board. Mr. Hugh S. Cregeen, surveyor:—   |            |
| James Hare .....                                                                                                                                                  | £375 0 0   |
| John Mowlem & Co. ....                                                                                                                                            | 232 0 0    |
| Edwin Peill .....                                                                                                                                                 | 211 0 0    |
| Thomas Lansbury (accepted) .....                                                                                                                                  | 161 0 0    |
| <b>COLCHESTER.</b> —For the erection of villa residences, Wellesley-road, Colchester, for Mr. Bouttell. Mr. G. H. Page, architect, Trinity Chambers, Colchester:— |            |
| G. Bowles (accepted) .....                                                                                                                                        | £850 0 0   |
| [No competition.]                                                                                                                                                 |            |

|                                                                                                                                          |          |
|------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>COLEFORD (Gloucestershire).</b> —For erection of new south transept to St. John's Church, Coleford. Mr. S. Gambier Parry, architect:— |          |
| Wall & Hook, Brimscombe (accepted) .....                                                                                                 | £630 0 0 |

**GEDLING (Notte).**—For a pair of villa residences, for Mr. W. A. B. Salisbury. Mr. W. H. Radford, architect, Nottingham:—

|                                         |          |
|-----------------------------------------|----------|
| J. Hutchinson, Nottingham .....         | £770 0 0 |
| Thos. Cant, Carrington .....            | 758 0 0  |
| Wm. Baynes, Nottingham .....            | 668 0 0  |
| F. Wartonby, Nottingham .....           | 635 0 0  |
| G. Pillatt, Nottingham .....            | 623 0 0  |
| Smith & Bellamy, Gedling .....          | 623 0 0  |
| Wool Bros., Nottingham (accepted) ..... | 675 0 0  |

**HULL.**—For new market, &c., for the Corporation of Hull. Mr. W. Alfred Gelder, architect. Quantities by architect:—

|                                   |             |
|-----------------------------------|-------------|
| Armstrong & Hodgson, Leeds .....  | £19,627 0 0 |
| Simpson & Malone, Hull .....      | 19,610 16 1 |
| Vernon & Co., London .....        | 19,149 1 9  |
| M. Harper, Hull .....             | 18,921 0 0  |
| F. Blackburn, Hull .....          | 18,816 0 0  |
| Ives & Co., Shipley .....         | 18,760 0 0  |
| Jackson & Son, Hull .....         | 18,720 0 0  |
| A. W. Stanley, Hull .....         | 18,683 0 0  |
| T. Gosses, Hull .....             | 18,468 0 0  |
| Hockney & Liggins, Hull .....     | 18,288 0 0  |
| R. W. Richardson, Hull .....      | 17,922 14 0 |
| B. Musgrave, Hull .....           | 17,775 0 0  |
| John Drury, Hull (accepted) ..... | 17,610 0 0  |

*Iron Roof.*

|                                          |            |
|------------------------------------------|------------|
| Newton, Chambers, & Co., Sheffield ..... | £3,024 0 0 |
| Buller & Co., Leeds .....                | 2,970 0 0  |
| Head, Wrightson, & Co., Stockton .....   | 2,765 0 0  |
| Handysides & Co., Derby .....            | 2,641 0 0  |

**HIGHGATE.**—For alterations and additions to two shops in the Archway-road, Highgate. Mr. Wm. Smith, architect. No quantities. .. £470 0 0  
J. O. Richardson, Albert Works, Peckham \* Revised estimate accepted.

**HYDE (Hants).**—For repairs to church roof, Hyde, near Fordingbridge, Hants. Mr. Robt. J. Beale, architect, Palace Chambers, Bridge-street, Westminster. .. £114 10 0  
C. Mitchell, Woodfalls, Salisbury \* Accepted.

**KILBURN.**—For the erection of shop and dwelling-house in High-road, Kilburn, for Mr. Geo. Skinner. Mr. Edw. Monon, jun., architect, Acton. .. £291 0 0  
J. Lord, Chelsea (accepted)

**KILBURN.**—For alterations and additions at Kilburn, for Mr. R. Horman. Mr. C. H. T. mas, architect. .. £470 0 0  
Stevens  
W. & D. Macgregor ..... 468 0 0  
F. Mark ..... 342 0 0  
J. O. Richardson ..... 344 0 0

**LONDON.**—For erecting an eight-cell destructor and chimney-shaft, 185 ft. high, and works in connection therewith, in Westworth-street and George-yard, for the Whitechapel District Board of Works, from plans by Mr. W. La Riviere, architect and surveyor to the Board, Great Alie-street. Quantities by Mr. E. W. Hobden, Devonshire-street. .. £2,280 0 0

For the Ironwork, including Royalty on use of Patents. Manlove, Allics, & Fryers ..... £2,280 0 0  
For the whole of the Brickwork, Masonry, and other work, exclusive of the Foundations of the Shaft, which is being done by the Board.

Bentley ..... £4,792 0 0  
Chappell ..... 4,900 0 0  
Greenwood ..... 4,546 0 0  
Brass ..... 4,443 0 0  
Nightingale ..... 4,364 0 0  
Mortimer ..... 4,100 0 0  
Dove ..... 4,100 0 0  
Rider ..... 4,086 0 0  
Smart ..... 3,990 0 0  
Mowland ..... 3,973 0 0  
Perry ..... 3,947 0 0  
Gentry ..... 3,896 0 0  
Aebys & Horner ..... 3,847 0 0  
Little ..... 3,766 0 0  
Fitchard ..... 3,697 0 0  
B. Cook & Sons ..... 3,591 0 0

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Scotfield ..... 1,198 0 0  
Tyler ..... 1,197 0 0  
Jones & Co. .... 1,190 0 0  
R. Eldridge ..... 1,125 0 0  
B. Wells ..... 1,119 0 0  
Buller ..... 1,100 0 0  
Lindfield ..... 1,095 0 0  
W. & F. Crocker ..... 1,073 0 0  
Ridout ..... 1,047 10 0  
Sabey & Son ..... 1,044 0 0  
J. Angood ..... 1,020 0 0  
El. R. Swain ..... 1,020 0 0  
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Wellings ..... 2,118 0 0 ..... 347 0 0  
Davis ..... 1,269 0 0 ..... 535 0 0  
Moss ..... 1,800 0 0 ..... 409 0 0  
Horsman ..... 1,694 0 0 ..... 368 0 0  
Tyldesley ..... 1,694 0 0 ..... 350 0 0  
Lynett ..... 1,649 0 0 ..... 347 0 0  
Bradney ..... 1,688 0 0 ..... 344 0 0  
Gough ..... 1,490 0 0 ..... 322 0 0

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# The Builder.

Vol. XLIX. No 2225.

SATURDAY, SEPTEMBER 26, 1885.

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### International Inland Navigation.

THE subject of Inland Navigation, which has been frequently referred to in the *Builder* as of growing national importance, has lately received a decided impetus in the remarkable International Conference recently held at Brussels. Though not surprising, seeing the almost culpable apathy which the question has been treated in our own country, yet it is somewhat singular that, appreciated as water-carriage is by the great States of Europe generally, it has been left for the small State of Belgium to inaugurate so important a Congress as that lately summoned to its capital. The detailed account\* of the papers laid before it, and of the several discussions thereon, have only been recently made available in this country, and form so valuable a contribution to the question of internal communications generally as to deserve more than a passing notice.

His Majesty the King of the Belgians is to be congratulated on the success with which, the recommendation of his able Minister of Public Works, Chevalier de Moreau, so large an assembly of statesmen, savants, and engineers were collected together to discuss the important subject of water transit. Austria, France, Germany, Great Britain, Holland, Italy, Norway, Portugal, Russia, and Switzerland, as well as Brazil and Canada, all sent plenipotentiaries to assist at the deliberations of the Belgian representatives. The most recent experiences, together with the most matured opinions of each country, were freely contrived, and with a singular unanimity of testimony demonstrated not only the superior economy and profit conferred by water carriage to the general community of a State, but, at the same time, injuriously affecting the interests of its great rival, the railways; it further, the absolute necessity that exists for providing for a large description of goods a cheaper mode of transit than it is possible for railways to afford.

The question, having thus assumed an international character, has been lifted out from the region of comparatively local discussions to which it has hitherto been confined, and has attained such a prominent position in Europe generally, as cannot fail to secure a practical

result in placing, sooner or later, the carrying trade on a sound and economical basis, and so remedying the anomalies and penalties which the powerful combination of railways had succeeded in imposing on the producer, manufacturer, and consumer alike.

The programme set before the Congress contained several points involving technical as well as economic considerations on canals in general, both inland and maritime, and these were severally dealt with by sub-committees, which, after a primary discussion at the general sittings of all the members, deliberated on such points as had elicited divergence of opinion, or on which the experiences of specialists were desired, and then submitted their several reports to the final sitting of the Congress. Though many important details were discussed therein, yet, as it is more the development of canals and water transport generally, and the economic considerations connected therewith, that constitute the pressing question of the day, it is more particularly with that aspect of the subject it is proposed here to deal.

In the paper read by Herr de Beeck on "The Importance of Water Communication," it is stated that in France, out of the public water loan for 200 millions voted for M. de Freycinet's grand scheme, it has been decided to construct, at a cost of five millions, the Canal du Nord for carrying the products of the Pas de Calais and North of France to Paris, while another project for a junction canal between the Garonne and Upper Loire, thus connecting Bordeaux with Bâle, has also been elaborated. In England the Manchester and Liverpool Canal has at last received the sanction of the Legislature. In Holland there is the Grand Northern Canal for connecting Amsterdam with the Helder, as also that which gives that city access to the North Sea, and which, as respects traffic and working capabilities, is of exceptional importance. In Germany a network of eight waterways, measuring 750 miles, has been projected by the Government, of which the line from the Weser to the Elbe, 263 miles long, will alone cost about 5½ millions sterling, while the Rostock-Berlin Canal is also of the first importance, placing, as it does, the city of Berlin in direct communication with the Baltic. This development of waterways in Germany is all the more remarkable as showing that though the Government hold a monopoly of the railways, they nevertheless attach the highest value to water transit. In Canada the Government have been expending ten millions sterling on the construction of ship canals with a capacity sufficient for the passage of vessels of 1,800 tons burthen. The system comprises the Welland Canal, which, turning

the Falls of Niagara, connects Lake Ontario with Lake Erie, and seven lateral canals to the St. Lawrence. These lines compete directly with five great lines of railway, which serve the State of New York, and will absorb the greater part of the grain traffic of the country lying between the Western States and the Atlantic; and there appears little reason to doubt but that they will afford an additional proof of the superior economy of water transit. M. de Lesseps two great isthmus canals also come under the category of modern waterways. Indeed, there are signs on every side that by the construction of canals endeavours are being made to counteract the differential and arbitrary rates created by the railway combination. The writer of the paper next passes on to consider the somewhat vexed subject as to the State holding a proprietary right in the waterways. From a Continental point of view there would seem to be little doubt of its expediency, but at present, judging from the opinions expressed in the Canals Committee of 1883, the public is not prepared to acquiesce in such an arrangement for England, though no very clear reasons have ever been advanced as to why the Government should not assume the same power over its waterways that it has taken over its postal and telegraph arrangements. As far as Belgium itself is concerned, the State possesses a monopoly of the railways, and therefore it is but consistent to keep in its own hands its waterways as regards proprietary rights; but even then the working of the canals would probably be better left to private enterprise, as competition would effectually keep down rates and charges to the lowest figure. The influence of the State, however, could be properly and profitably exercised in regulating the management as well as in maintaining a uniformity of rates and tolls, and so removing one of the existing impediments to a successful working of its waterways. It is difficult to see how, as has been recommended, a total abolition of tolls is to be effected if any return is to be obtained for the capital outlay, by whomsoever made, unless, indeed, a canal be worked like a railway,—solely by the Government or company who constructs it; but such a proceeding would only accentuate for the public, the existing difficulties from which competition alone can seemingly deliver it. It is well pointed out also by the same writer that the old argument used by railway advocates to the effect that facility and rapidity, so essential to modern traffic, are only obtainable by railways, leaves out of sight the fact that it is quite possible to secure both regularity and speed equally on canals, for as yet nothing has been attempted in that direction. The rate of speed depends principally on the sectional area given to canals, but as to the

\* Mémoires publiés à l'occasion du Congrès International de Navigation Intérieure tenu à Bruxelles du 2 au 6 Juin, 1885. Bruxelles Imprimerie: H. Luyckx; Dr. Ch. Maladry, 33, Rue des Foulons, 1885.



carrying capacity there is no sort of comparison between the two modes of conveyance, inasmuch as on canals every boat can move at exactly the speed best suited to the cargo it carries, without in any way hindering the rate of travelling of any other boat, whereas every wagon on a railway must move at the speed of the train of which it forms a part, irrespective of the value or bulk of the articles with which it is laden. The truth, however, is that there is ample room for both methods of transport, and, when properly regulated, it will be found that, so far from any injurious rivalry, the traffic best suited to it will gradually find its way by each mode to the advantage of both.

On the three canals of Neufosé, d'Aire à la Bassée, and de Haute Deûle, three modes of traction are resorted to, viz., horse haulage, traction engines running on rails laid on the towing-path, and steam-tugs working a submerged chain. The traffic on those three canals last year amounted to

|                             |                 |
|-----------------------------|-----------------|
| On the Canal de Neufosé ... | 1,015,000 tons. |
| " d'Aire .....              | 1,225,796 "     |
| " de Haute Deûle .....      | 1,350,000 "     |

In 1882, the Steam Tug Company alone conveyed 32 million ton kilomètres at a price of 4 millimes per ton per kilomètre, or 1-18th of a penny per ton mile. These canals are navigated by vessels measuring 126 ft. in length, 16 ft. beam, and 6 ft. draught, and carrying 300 tons.

In Germany and Austria, the development of water-traffic has been most remarkable. Prof. Schlichting states that the trade on the Spree, at Berlin, which, in 1850, amounted to 1,200,000 tons, had, in 1884, risen to 3,700,000 tons. That on the Elbe, at Hamburg, had mounted from 450,000 tons, in 1852, to 2,400,000 tons in 1883; while the traffic on the Rhine, at Emmerich, had risen from 550,000 tons in 1850 to 4,500,000 tons in 1883; in other words, the trade on these three lines had increased between three and eight fold in thirty-six years—a signal proof of the appreciation awarded to water transport.

In an admirable paper, M. de St. Hubert, a delegate from Austria, after describing the Danube as the principal artery of inland navigation in Europe, with a course of 2,500 miles, from its source near the Lake of Constance (with which a connexion might easily be made) to the Sulinna mouths on the Black Sea, states his conviction that at no very distant date the carriage of all the products of Central and Western Europe would take that route to the Caspian and Central Asia, toward which, in his opinion, the commerce of Europe must eventually find a principal outlet, and that therefore the improvement of the Danube, in regard to the depth of its navigable channel, is an object of the first importance. Already, by the construction of the canal from Mayence to Frankfort, the first step towards a junction of the Rhine with the Danube will have been accomplished, while, by the canalisation of the Maine and the enlargement of the Ludwig Canal, the large cities of Aschaffenburg, Würzburg, Bamberg, Nuremberg, &c., will be placed in direct navigable communication with Vienna, the central capital of Europe. Already, projects are afoot for the junction of the Danube with the Baltic and the North Sea, by means of the Donau-Oder and Donau-Elbe Canals, so tending to constitute Vienna an inland port, while the connexion of Paris, Brussels, Berlin, and Vienna, by first-class waterways, will complete the development of the vast trade which is carried on between the ports of Havre, Antwerp, London, Hamburg, Stettin, and the Black Sea. Taking the data contained in M. Perdonnet's work on "Traffic Statistics," M. de St. Hubert claims an advantage of 2-63 centimes per ton kilomètre in favour of water-carriage, and calculates that, on a traffic moderately estimated at 1,200,000 tons over 625 miles, there would be an annual saving to the public of three millions sterling.

In Holland the adaptability of canals as the chief mode of conveyance goes without saying, but at the same time it is probable that the actual statistics of water-borne traffic in that country are not very generally known. According to Mr. Stielgijes they are as follow:—

In 1881 the total imports amounted to

10,326,000 tons (1,000 kilos.), of which 75-5 per cent. was water-borne, viz. :—

3,884,000 tons, or 37-5 per cent., went along the rivers;  
3,909,000 tons, or 38 per cent., were carried by sea; while  
2,532,000 tons, or 24-5 per cent., only were carried by rail and road.

The exports amounted to 4,751,000 tons, of which—

2,185,000 tons went out by the rivers;  
1,147,000 tons were carried by sea; and  
1,419,000 tons were transported by rail.

That is, three-fourths of the whole external trade was water-borne, a result all the more remarkable seeing that the neighbouring States of Germany and Belgium, furnishing 64 and 81 per cent. of their whole trade, are in direct communication with Holland by several lines of railway. In Holland, moreover, the canals are utilised, not simply for the carriage of goods, but are frequented largely by passengers, the number of steamers increasing yearly on the Netherlands lines, there being at the present time 213 regular steamboat services travelling at speeds varying from 5 to 10½ miles per hour.

It is disappointing to find that, with the exception of Mr. Leader-Williams's paper on the Manchester Ship Canal, there was no representative to describe the working of canals in England, or to furnish extracts from the evidence taken before the Parliamentary Canals Committee of 1883, in which so much valuable information was afforded, and when the remarkable economy of water-carriage was exemplified by the results obtained on the Aire and Calder Canal. Besides those already quoted there were several excellent contributions by Continental authorities, as, for example, a paper by Herr De Beeck on the working of canals generally; another by M. Huet on the best method of supplying water to the upper reaches of canals; and a particularly able paper by M. Vandrunen on the future of canals, and on the comparative merits of hydraulic lifts and inclined planes. M. Jacquier, of the Ponts et Chaussées Department, also contributes an exhaustive note on the construction of inclined planes and their relative economy with hydraulic lifts, showing that though the working expenses of both methods are about equal, the inclined plane is much the cheaper work in first construction. A paper on river navigation and towage by endless chain, which has a special application to the difficulties encountered on the Rhone, is well worth perusal. The expediency of adopting it on canals is, however, not so clear; for one of the special advantages claimed for it is the ease and safety with which large vessels may be handled in a strong current; but of its economy there is no question, though it does not seem to have reached the low figure at which the Aire and Calder boat-trains are worked. An exhaustive history of the important network of waterways which are comprised in the Canal de l'Est, in France, occupies a large section of the report presented to the Congress, but it is a project of the highest importance and value to the countries which it subserves, and reflects great credit on the Government of France and on the distinguished statesman with whose name is associated the magnificent scheme of public works before alluded to. When completed, it will have cost about four millions sterling, and will bring into direct connexion no less than five important rivers,—the Meuse, Moselle, Marne, Rhine, and Saone,—by which means produce may eventually be carried from the North to the South of France.

The reunion at Brussels of so many able and thoughtful men, devoting a considerable portion of their valuable time to the discussion of waterways, with a view to their international utilisation, cannot but be viewed as a most important demonstration and protest against the high-handed proceedings of the railways, and as a new departure in the matter of transport, and the first step towards the inauguration of, or, rather, return to, the only system which can meet the exigencies of the time, and which all nations are beginning to recognise as essential to the maintenance of their respective industries. Before the Congress broke up it was

unanimously resolved to constitute a Congress in permanence, and the Austrian delegate, in the name of the civic authorities of Vienna invited all his colleagues to meet next year at that capital. It is to be hoped that Great Britain will be better represented thereat, and that the experiences which the Continental States have given to the world at large will not be lost to our own country, but that those classes of the community more especially interested will unite in setting on foot without delay measures for carrying out the improvements which are so sorely needed for our canals, and which, as was shown by experienced witnesses on the Parliamentary Committee, can be provided at a comparatively small outlay.

## SANITARY EXHIBITION AT LEICESTER.

**I**N connexion with the eighth Congress of the Sanitary Institute of Great Britain, opened at Leicester on Tuesday last, a large exhibition of sanitary apparatus, and materials and appliances connected with sanitary construction, was opened in the Floral Hall by the Mayor. The exhibitions held in connexion with this Institute are noteworthy from the fact that they are always ready by the opening day, a result due to the commendable arrangement of the judges commence their examination of the exhibits some three or four days before the exhibition opens, compelling exhibitors who do not want to miss their chance of an award to have their goods placed in position beforehand. The present exhibition may be said to be a fairly representative one of its kind, but we failed to discover many novelties. Several of the exhibits, however, which at first sight would appear to be old friends, are shown with modifications or improvements which will, in most cases, be found worth attention.

Dealing with the stalls in their numerical order, we noted that Messrs. Doulton & Co., of Lambeth (Stall 1), have a very good display of sanitary goods, including a trough closet in stone ware, of pipe section, which, used in conjunction with Doulton's automatic flushing-tank, is one of the best appliances of its kind, and we hope the day is not far distant when such automatic flushing closets (which can be arranged to flush at any desired interval, and the action of which cannot be tampered with) will take the place of the old-fashioned and disgusting latrines which are to be found in many factories. The same firm show their "Combination" closet in a new shape; the "Lambeth Flush-out Closet;" the "Lambeth Trapless Closet;" a very good trough urinal, with automatic flushing arrangement; and a number of their excellent fire-clay stoves. The most interesting exhibit made by this firm is, however, a new form of fireproof construction for floors, known as the "Doulton-Peto" flooring. It consists virtually of a number of fire-clay voussoirs, keyed together so as to form a flange between rolled iron joists, the end segments or voussoirs being so shaped as to pass round and over the lower flanges of the joists, so as to completely protect the soffits of the latter from the action of fire. The under surfaces of these segments or blocks of fire-clay unite to form a flat ceiling, and are capable of affording a good key for the plaster. The floor above can either be of concrete or wood as may be desired. It is stated to have been tested for strength up to a load of 8 cwt. or 9 cwt. per square foot. We are informed that this method of flooring has been used throughout the new London Pavilion Music-hall, Coventry-street.

At Stall 2, Surgeon-Major Pringle, of the Sanitary Department of her Majesty's Bengal Army, exhibits his patent "Sursum" shield, as applied, firstly, to a household water-cistern, and, secondly, to a cattle-trough. The appliance is one which is well worthy the attention of visitors to the exhibition, as when applied to a household cistern it serves to secure the admission of the water in such a way as to prevent the drawing off of any sedimentary matter which may have accumulated at the bottom of the cistern, while, at the



same time, the water is kept fresh. This appliance can be had for a few shillings, and appears calculated to do away with the necessity for the periodical cleansing of house cisterns,—a necessity which, under existing arrangements, is not fully recognised by the public. It must be owned, however, in extenuation, that very often house cisterns are placed in extremely inaccessible positions, and that even when they are tolerably accessible, there are no means of rapidly emptying them, it being necessary to go through the tedious process of lading-out all the water below the outlets to the taps. No wonder that under such circumstances the duty of cistern-cleaning is often shirked. The "Sursum" shield is applied to cattle-troughs with the view of getting rid of any impurities which may be blown on to the surface of the water in the troughs.

At Stall 3, Messrs. John Warner & Sons, of London, exhibit Goslin's patent "Ejector Siphon Flushing Cistern," which is a newly-patented arrangement designed to meet the requirements of the Local Government Board and of the water companies, so as to ensure a rapid and effective flush with a limited quantity of water. It is simple in its mechanism, and deserves inspection. John Smeaton's patent "duplex" under-seat water-waste preventing valve, of which Messrs. Warner & Sons are the manufacturers, is simple and effective, and capable of very wide use. It meets the requirements of the New River and other water companies. The "Avalanche" registered closet and trap, shown by these exhibitors, is a very efficient wash-out closet, and is likely to find much favour. The "cottage" closets of this type supersede the elongated conical "hopper" closets,—in which the water, instead of giving an effective flush, gyrates spirally against the surface of theopper, and loses nearly all its inertia or flushing-power before it reaches the water in the trap,—the better will it be. Among other exhibits shown by the same firm is Goslin's patent expansive boiler-cock, which has for its object the prevention of the explosion of high-pressure or close boilers in kitchens. It is intended to be used as an ordinary draw-off cock, and its construction is such that it appears well calculated to effect the object in view.

Mr. P. A. Maignen, of London, exhibits (Stall 4) his "Filtre Rapide" in its various forms, including those used by our forces in the Sudan expedition. The same exhibitor shows a working model of a water-softening apparatus. At Stall 5 Messrs. E. & J. M. Verity, of Colborn, exhibit Crabtree's patent kitchener, which is shown in action, and appears to possess considerable merit. This exhibit, and the numerous displays of gas cooking and heating stoves, some of which are mentioned hereafter, are placed in an annex to the Floral Hall. Messrs. H. & C. Davis & Co. (of Camberwell) give a good show of their "Metropolitan" and other gas kitcheners, of the merits of which we have spoken on previous occasions. Stall 1 is occupied by Mr. Harry Hunt, of Stoke Newington, with his "Crown Jewel" and other continuous burning stoves, to which the same mark is applicable. Leon's "Nonpareil" gas kitcheners and other gas stoves are shown at Stall 13. One merit claimed for them is that they are rustless and require no blackening, some of the external portions being coated with a species of enamel. Messrs. Hart & Son, of Euston-road (Stall 15), exhibit new instantaneous water-heater, termed the "Hausbedarf," which appears likely to find vogue in many households. Messrs. John Wright & Co. (Stall 14), Messrs. Somerville & Walker (Stall 16), Messrs. Arden Hill & Co., Birmingham (Stall 18), and Mr. Thomas Fletcher, F.C.S., of Warrington (Stall 17), are so exhibitors in this section, which is instructive, as showing the efforts that are being made to meet the increasing demand for gas as fuel for cooking and warming purposes.

Two water-waste preventing flushing cisterns, the "Invicta" and the "Peerless," are exhibited by Messrs. Goode & Co., of Loughborough (Stall 20). From the first, the quantity of water discharged is not under the

control of the operator, a stipulated quantity, neither more nor less, being allowed to flow at each pull. In the "Peerless" cistern, on the contrary, the amount of water to be discharged is entirely subject to the will of the user, who may empty the cistern entirely, or only partially.

Stall 21 is tenanted by Mr. J. J. Ellis, of the Ellistown Collieries, who exhibits sanitary stoneware of good quality. Stall 23 is that of Messrs. Fergusson & Starkey, of Leicester, who show some good baths by Shanks & Co., of Barrhead, near Glasgow. Mr. Frank Ashwell (Stall 23), of Leicester, exhibits a dinner-lift by Waygood & Co., of London, and heating and ventilating apparatus as used in some of the schools of the Nottingham School Board, under the direction of Mr. A. N. Bromley and Messrs. T. C. Hine & Sons, the architects. Mr. Ashwell also exhibits Körting's heating and ventilating apparatus, as used in the new Grammar School at Coventry. At the same stand is shown a Blackman air-propeller, worked by a half-horse power "Otto" gas-engine. Messrs. Adams & Co., of York and London, exhibit (Stall 25) a new manhole-cover; while at Stall 26 Mr. William White, of Abergeenny, exhibits the "Hygeian Rock" Building Composition under tests which appear to be conclusive as to the strength and imperviousness of the material. Mr. White also exhibits a specimen piece of walling built with concrete blocks in combination with the composition.

Mr. F. Dyer (Stall 28), of Camden Town, exhibits an air-tight manhole cover and a tidal valve for preventing the admittance of tidal water into sewer outfalls. The valve consists of a chamber enclosing a ball, which is pressed tight against a seating prepared for its reception as the tide rises. The Æolus Water Spray and General Ventilating Company, of London, have a large display (Stall 29) of their well-known specialties in ventilating and warming apparatus, which have been so often described that it is needless to speak of them here in detail. This company also exhibit Keidel's patent "hydro-ventilator," worked by a small jet of water. It can be used either for exhaustion or injection, the change from one to the other method of working being effected by turning a couple of taps so as to reverse the direction in which the jet of water flows. It appears to be a very simple and efficient little contrivance.

Messrs. John Ellis & Sons, of Leicester, exhibit (at Stall 34) examples of their Barrow blue-lime, for which (as will be seen by a reference to the list of awards which we print on p. 423) they have been awarded a medal. At Stall 35 ventilators are again to the fore, for here Messrs. C. Kite & Co. exhibit their well-known and long-tried exhaust roof ventilators and turret ventilators. An "ornamental" ridge ventilator shown by them has been apparently designed to represent externally a mimic construction of half-timbered work, but, as it appears to be wholly of metal, the taste displayed in it (at any rate with regard to the colouring) is not commendable. Less open to question, perhaps, is the way in which what is apparently a small cabinet hung upon or affixed to the wall of a room is made to conceal one of this firm's well-known wall-inlet ventilators. We say "perhaps," because, while some people will condemn the masking of a ventilator in this manner, there are others who will contend that it is justifiable to resort to such means in view of the prime importance of efficient ventilation. With care and judgment efficient ventilation is to be obtained without draughts, but such is the sensitiveness of some people that they feel, or fancy they feel, a draught whenever a ventilator is in sight,—and that whether the ventilator be open or closed. But, whatever form they may take, it appears to us that these wall-inlet ventilators, used in conjunction with the exhaust chimney-breast ventilators, are capable of keeping the air of even small rooms, where gas is burning, in a fairly cool and wholesome state.

At Stall 38, Messrs. Bower, Scott, & Read, of London, exhibit Field's flush-tanks; and close by, at Stall 41, Messrs. John Knowles &

Co., of Burton-on-Trent, have a good show of sanitary stoneware. One of the most noteworthy novelties in the Exhibition is shown at this stall, viz., Hassall's patent joint for drain-pipes. This, which promises to be very useful, and, in many instances, to obviate the necessity for using iron drain-pipes, certainly forms a very perfect and strong joint. To describe it in as few words as possible, in the absence of a section, it may be stated to consist essentially of a combination of Stanford's patent joint with the ordinary spigot and faucet joint, but with these important differences, viz., 1. The socket or lip at one end of the pipe is made much deeper than is the case with the ordinary pipe. 2. Through this lip or socket a transverse slit is made midway in the lip. This slit is kept uppermost when the pipes are fitted together. We shall, we think, be understood when we say that while spigot and faucet are fitted into each other in the usual way with the Stanford joint, there is, in Hassall's patent joint, what may be called a double Stanford joint, that is to say, instead of spigot and faucet each containing one girdle or band of the composition which goes to make Stanford's joint, there are here two bands of the Stanford composition inside the socket, and two girdles or belts of the same material round the spigot. These belts and bands of composition would of themselves suffice to secure a watertight joint, or even one of them (as is the case with Stanford's joint pure and simple), but being placed  $1\frac{1}{2}$  in. or 2 in. apart on both spigot and faucet, it will readily be understood that when the pipes are fitted together there is a space left midway in the depth of the socket all round the spigot end of the pipe, the said space being bounded by the bands of composition referred to. Now becomes apparent the utility of the slit before referred to, for it serves as an aperture for pouring in liquid Portland cement, which fills up the whole of the vacant space left inside the socket. To ensure that the space is completely filled, resort is had to the very simple expedient of forming a sort of mimic dam halfway across the slit, and pouring the liquid cement in at one side only, until it rises on the other side, thus ensuring the complete filling up of the annular space which we have described. If this description is quite clear, it will be obvious to the reader that the Stanford composition will have completely prevented the passage of any of the liquid cement into the interior of the drain-pipe itself, thus at once making a complete cement joint, and totally avoiding the risk of obstruction by the oozing of the cement into the interior of the waterway of the drain-pipe. We have described this invention at some length on account of its intrinsic importance.

At Stall 42 Mr. Roberts, of Haslemere, exhibits an improved form of his automatic "rain-water separator," which was described by us some months ago. At Stall 44 Messrs. Elliott, Edmonson, & Olney, of Manchester, exhibit their double-cone mechanical lead-pipe joint, for which they claim that it is "a perfect substitute for the plumbers' wiped joint." We have seen something of the kind before, but this method of jointing is likely to be useful in many situations.

Mr. Ellison, of Leeds (Stall 46), exhibits his excellent "Radiator" ventilators, one of them with a screw movement worked by a key, so that only the holder of the key can open or close the apparatus. The same exhibitor also shows Stevens' exhaust ventilators. Stall 47 is occupied by Messrs. Leggott & Co., of Bradford, who show their admirable contrivances for opening and closing fanlights and skylights, thus affording easy means of control over ventilation in situations where the exercise of such control would be exceedingly difficult without the aid of such contrivances.

The Whitwick Colliery Co. (Stall 50) exhibit some good moulding and facing bricks and architectural terra-cotta. Messrs. Broad & Co. (of Paddington), Stall 51, show a good arrangement of drainage inspection chamber lined with white glazed bricks, the channels for the drains being white-enamelled. At the next stall the Bourtrehill Co. make a good display of glazed fireclay sinks and other sanitary goods; while at Stall 53 the Wortley



Fireclay Company show some white enamelled bricks. At the adjoining stall the Patent Porous Carbon Company exhibit their material in its applications to water supply and sewage purification; for the latter purpose we are informed that it has been in use for some time at Southampton, with satisfactory results.

Messrs. James Stiff & Sons, of Lambeth (Stand 57), exhibit some of their excellent traps and other specimens of sanitary stone-ware. We notice that they have received awards at this exhibition for the Weaver's ventilating sewer-air trap, and for their architectural terra cotta. The "Kensington" grease-trap, also exhibited, was described and illustrated by us a few months ago (see p. 884 of our last volume). The Patent Victoria Stone Company (Stall 69) show their material for paving and steps; and, hard by, the Croft Granite Company show a kindred material, some of the "ornamental" adaptations of which, in the shape of cast portrait medallions and other sculptural subjects, are, to say the least, far from judicious. Stall 71 is occupied by Messrs. Nightingale & Co., of Great Grimsby, with some good specimens of wood-block flooring.

Among other exhibits which are worth attention, but which we can only here enumerate, is Dr. Paulson's method of ventilating the sewers by the aid of the street lamps (Stall 93); Barton's "hermetically closed" sectional sanitary van, for use in towns where the "pail system" is in vogue; the "Gordon" disconnecting trap (designed by Mr. Joseph Gordon, the Borough Surveyor of Leicester), exhibited by Messrs. Fergusson & Starkey; some man-hole and inspection covers, and other appliances used in the Leicester drainage works, and made to the order of Mr. Gordon by Messrs. Wright Bros.; Bromhead's automatic dry gas regulator (Stall 94), The "Wenham" Gas Lamp (Stall 99); and Willacy's patent sand-spreading cart for use where slippery roadways exist.

We must not close these notes without mentioning that the Ladies' Sanitary Association have a stall in the Gallery for their excellent publications, which should be disseminated far and wide.

The Exhibition will remain open until Saturday evening, October 10th.

#### NOTES.

**T**HE correspondence which has been recently going on in the *Times* between a writer signing himself "Sanitary," and persons who were officially or personally concerned about certain dilapidated houses in Marylebone, received a fresh comment in a letter from a member of the Metropolitan Board of Works on Tuesday, who admits that the strictures of "Sanitary" are not a whit too severe if they can be substantiated, but inquires whether he has ever brought the matter under the notice of the Board in the proper manner, by a complaint, in writing, addressed to the Clerk of the Board. "Sanitary" replies on Thursday that of course the matter has been known all along to the officials of the Board of Works, but does not distinctly say that he applied in form, which was obviously the first course to take. It is very probable that the facts are as stated, and that the object of the writer is good; but he would have done better to have set about his efforts in the official channel first; and, in consideration of the nature and manner of his charges, he would have done better to sign his name to his letters. Neither has the member of the Board of Works, who is affirmed to be the ground landlord of the houses, unveiled himself. But there appears to be an awakening in the minds of the Board in regard to the ownership of insanitary property. A few days since we read of a complaint made by the Mansion House Committee, under the Artisans' Dwellings Act, to the authorities of Homerton, in regard to three houses, in this case also the property of a Member of the District Board of Works and of the Board of Guardians, which were in a state unfit for human habitation, according to

the report of Dr. Tripe, the Medical Officer. The owner of the houses, who was present, admitted the bad condition of the houses, but said they would be pulled down at Christmas, and "Was it worth while to put him to an expense of 200l. for repairs?" He does not seem to have explained how they came to be in that condition, or how long they had been so. Mr. Runtz, of the Board of Works, said it was a "great misfortune" that a Member of the Board should hold property which was unfit for people to live in. It is certainly a great misfortune for the people who have to live in them, and the sooner members of the Board surmount this kind of "misfortune" the better for all concerned.

**I**N regard to Mr. Baker's comments on the weakness of many railway bridges, to which we referred in our last, Mr. Ewing Matheson suggests that many portions of such structures, besides losing their elasticity by off-repeated bendings, are at the same time wasting by rust. "The fact," he says, "is apparently not sufficiently appreciated that iron and steel structures must either be protected entirely from the atmosphere by being embedded in concrete or masonry, or must be regularly and effectually painted. Too often painting is neglected, or, when nominally attended to, many of the connexions and other important parts are inaccessible to the painter's brush." Between Mr. Baker's and Mr. Matheson's vaticinations, there is a pleasant look-out for railway passengers crossing iron bridges.

**F**ROM the *Bullettino* of the German Archaeological Institute at Rome we learn that an interesting discovery has been recently made at Palestrina. Beneath the foundations of the cathedral a slab has been found, bearing (according to the accredited restoration) the following inscription:—"L. Quintinius T. f. L. n. praetor LE (VCADO. CEPIT | T. Quintinius T. f. L. n. cons | V DEDIT. Great interest attaches to the stone because it is one of the earliest remains of Latin epigraphy we possess; it belongs to the sixth century A.U.C. Mr. Stevenson, who restores the inscription, thinks we have here a votive stone recording the dedication of booty taken from the town and island of Leucadia, in the province of Acarnania, by L. Quintinius Flaminius, in the year A.U.C. 567. If so it is, of course, valuable monumental evidence to a historical fact hitherto accredited only by literary tradition.

**T**HE Berlin Museum has recently been enriched by the addition of a very fine bronze, bought at the Gréau sale in Paris. The statue represents a standing Apollo of the athlete type. However much other museums may covet the possession of so fine a piece of work, archaeologists may be glad that the Gréau Apollo has gone to Berlin. It will there stand side by side with the beautiful Sabouroff bronze, to which we last year called attention. The two, which rank among the finest bronzes left us by the ancient world, present very marked analogies in style.

**T**HE great dockworks at Tilbury, for which the first turf was cut in July, 1882, and the progress of which we have noted from time to time, are now fast approaching completion. The principal work that remains to be done is the excavation of the entrance from the river to the tidal basin giving access to the docks, which is of course necessarily the last part of the operations. This basin will be accessible at all states of the tide to large vessels, the entrance having a low-water depth of 26 ft., and 46 ft. at high spring-tide. This basin gives access to the graving docks, and a lock for passage and for controlling the water-levels to the main dock, the three being arranged in parallel lines between the tidal basin and the main dock. From the inner side of the main dock three long branch docks extend in parallel lines further inland, affording quay accommodation for more than thirty ships of the largest class. Between and on either side of the branch docks are the quays and sheds. Sixty hydraulic travelling cranes

will be fitted for loading and unloading. The graving docks are closed by floating caissons, which are raised by pumping and towed out of position for the entry of ships. The lock is closed by immense iron folding-gates at each end, which are now being built up nearly in position, and will be moved into position on rollers when complete. The dock walls are faced with brick; the backing is a mass of concrete 6 ft. or 8 ft. wide at the top, and increased by steps to a thickness of about 20 ft. at the base. The concrete walls are honeycombed with sluices for the control of the water. The graving docks are emptied by a series of centrifugal pumps worked by steam. Hydraulic power for the whole working of the cranes, lock-gates, &c., is supplied from the engine-house on the north-west or land side of the branch docks, with two auxiliary accumulators in towers adjoining the graving docks. Near the entrance of the tidal basin the large hotel for the accommodation of passengers is now complete in all but its internal fittings, and will be a first-class erection of the kind. It is built on piles driven down to the gravel, and timber is largely used in its construction for the sake of lightness. A fine view of the whole extent of the docks is obtained from the roof of the hotel; the upper windows of which on the river side command also a fine prospect far down the Thames. Area is provided for an extension of the docks towards the south-west, to double their present acreage, with another access higher up the river. It is a great piece of work and carried out in the most thorough and admirable manner, under the direction of Mr. Manning, the engineer for the whole. The present contractors are Messrs. Lucas & Aird.

**A**NOTHER proposal has just been added to the numerous undertakings of harbours and docks that are so characteristic of the present day, viz., to transform the decayed town of Sandwich into a busy deep-sea port. It would not be quite correct to call it a new work, for it is in reality only reverting to an old order of things, when Sandwich was one of the most important, not only of South coast, but of English ports generally, exceeding Liverpool in its volume of trade, and contributing a large contingent of ships to the navy in Henry VIII's time. So great was the coming and going at that period, that the night was as noisy as the day, and what was the embarkation and landings of royal personages and other visitors of distinction, Sandwich was one of the gayest places in the country. But the forces of Nature overpowered those of fashion, and the sea retired so persistently, that the whilom harbour was left high and dry inland,—its glory departed, and the streets became grass-grown for want of traffic. Even now, however, more interesting towns are to be found in England, its churches and old houses afford a rich harvest to the antiquary; while those who are curious in folklore will find many singular names, both of streets and residences. The proposal now under discussion is to restore the business vitality of Sandwich, forming a deep-sea harbour near the mouth of the Stour, and carrying it for two miles off into the heart of the town, so as to bring into communication with the South-East Railway system. The nature of the soil is sand and very light gravel, which will reduce the cost of excavation to a minimum, as is the time required for completion. Sandwich is a great deal nearer to Flushing than Queenborough, or to Ostend than Dover, that the promoters hope to make it a departure station for the Continent. Opening a harbour would do, directly upon the Dover, it would secure a safe entry in all weather together with a certain amount of business from the proximity of the vessels that are at anchor there. Moreover, the local industries of catching and curing, with the import of fish, will probably assume large dimensions. The whole, the industrial outlook of Sandwich seems very satisfactory, and we may expect to see ships moored almost under the walls of the ancient castle of Richborough.



where once upon a time the Roman triremes disembarked the legions of Cæsar.

THE announcement which appeared in Wednesday's papers regarding railway freightage on the American trunk lines shows that, with all their advantages, the freighters of that favoured region have some unpleasant things to put up with. The low rates which have been in force have apparently proved unremunerative, an advance of 50 per cent. having been agreed upon for westward traffic, leaving the rates for that bound eastward still under consideration,—probably on account of the uncertain effect upon exports which might be produced by a similar sweeping alteration. The effect of this great advance upon the already fluctuating prices of American Railway Stock remains to be seen. Under the old rates—low as they were,—the charges by rail were some four times as much as those by the great Lake steamers, which are fast becoming powerful rivals to the railways. Those lines which have this competition to cope with have gone down considerably within the last few years, having lost much of their grain and cattle traffic. It appears probable that they reduced their freights to a losing figure, and have now to adopt a retrograde policy in order to secure dividends. But to the freighter who does not enjoy the advantage of alternative methods of transit, an advance of this nature must be a very serious matter. The alteration in the mode of charging carriage on traffic conveyed at "Owners' Risk," which came into operation on our own lines some three years ago, and which represented an increase of 10 to 15 per cent. to those traders using that system of conveyance, was most strongly resented; but it seems that our Transatlantic cousins are by no means free from railway-rate grievances, both traders and speculators being subjected to sudden and heavy changes through fluctuating freight rates such as we seldom experience.

IN reference to the subject of the pollution of the Lea, we have had forwarded to us the result of an analysis of effluent water, with a report upon the treatment of sewage carried on at the Leyton Sewage Works, which are under the superintendence of Mr. W. Dawson, C.E., Surveyor to the Board; it bears date Sept. 12, and is signed by Mr. W. C. Young, F.C.S., Consulting Chemist to the Lea Conservancy Board. He says the result of his analysis of the sample of effluent water is that it "is practically free from odour, entirely free from micro-organisms, contains very little organic matter of any kind, shows no liability to undergo putrefactive change, and is exceedingly satisfactory in every respect." He also says the use of "black ash" or "alkali waste" for the treatment of sewage, if it is properly applied at the sewage works, is the most satisfactory mode of dealing with sewage at present known, where chemical precipitation has to be relied upon solely for purification. It destroys the offensive gases present, and prevents the subsequent putrefaction of the organic matter in solution, its effect being permanent and not merely temporary, as is the case with most chemical precipitation processes. In Mr. Young's opinion the use of black ash waste with lime employed at Leyton "forms a combination capable of giving the most satisfactory results at present attainable." We give this, of course, "without prejudice" (as the lawyers say), merely as one statement in regard to a matter of public interest.

THE eighty-first volume of the Proceedings of the Institution of Civil Engineers, just issued, is a book of remarkable value. It contains two papers on the Metropolitan and Metropolitan District Railways, by Mr. Baker and Mr. Barry, illustrated by five plates, which supply a much-felt want by placing on record the history and the main details of these important and original undertakings. At a moment when steam tramways and ordinary omnibuses are running costly railways so hard, this account has a very opportune value; and it is especially worthy of note that in 1854 it was expected that the trip from Paddington to the City would be accomplished in fifteen

minutes. Mr. Stroudley's paper on the Construction of Locomotive Engines is illustrated by four plates, giving drawings of the standard locomotive engines on the London and Brighton Railways, on the large scale of 3-8ths inch to a foot. It is to be hoped that the authors of these valuable contributions to engineering knowledge will think it due to their own fair fame to publish standard editions of their work, enriched with the upshot of the discussions, and of a size to give the admirable illustrations without folding. The papers on the Purification of Water by Iron have a special value, in view of some of the remarkable discoveries recently made as to the rapid disinfection of sewage by a novel application of this powerful agent. The papers on the Cape Government Railways, by Mr. Brounger; on the Public Works of the Orange Free State, and on the Flow of the River Buffalo, have also much public interest at a time when the reports and surveys of General Sir Charles Warren's expedition are being anxiously expected. In one point only has the indefatigable and able editor of the Minutes been unfortunate. The portrait of Mr. Charles Manby is a grievous smudge, altogether unworthy of the beauty of the typography and lithography, which, as usual, are marked features of this series of valuable records of scientific experience and progress.

IN the Evening Class Department of King's College there are a series of lectures announced, to commence on October 5th, on "The Properties of Metals and Alloys, and their Uses in the Arts," and another course on "Fuel," the lectures being included under the general head of "Metallurgy." The Professor in Metallurgy is Mr. A. K. Huntington, who we presume is the lecturer on metals, though this is not explicitly stated in the syllabus; and the Demonstrator is Mr. W. G. Macmillan, who delivers the series of lectures on fuel. A class of Practical Metallurgy is also to be held on Friday evenings, going into the general methods of assaying and mechanical testing. The laboratories include two testing-machine, one on Mr. Kirkaldy's principle, the other a Thurston automatic recording machine. Free admissions to the classes are given under special circumstances, to be ascertained on application.

IN a general way we have no great sympathy with the writer who signs herself "Ouida," but her long letter in the *Times* of the 22nd on the subject of the de-poetising of Venice is one which it is impossible to read without a melancholy interest. The moving cause of the letter having been written seems to have been a commiseration for the poor gondolier, who, according to "Ouida," is likely soon to have no work to do, if the canals are given up to the usurpation of steam traffic. This, unfortunately, is to begin with, a piece of characteristically feminine logic, or want of logic. We are no more called upon to make work for the gondolier, to keep him in being, than we were called upon to keep up stage-coaches for the sake of the drivers and of the coaching inns. They had their day, and had to go when a more commodious and rapid means of transit was invented. But one cannot help feeling that Venice is "an exceptional case." It stands alone in the world in regard to its site, its architecture, and its associations and history; and it does seem lamentable that we cannot preserve some of the unique character of such a place from being destroyed by the all-levelling spirit of modern trade and its servant steam. This feeling, however, it must be admitted, is that of persons who do not live in Venice, but who visit it as a form of enjoyment. They are in the vast majority; but it is easy to understand that to a tradesman born in Venice, and therefore probably not seeing anything unique or remarkable in a place to which he has always been used, it would seem unreasonable that he is not to start a steam-living or a factory if he can make a better living thereby. "Ouida" suggests one excuse for exceptional legislation in respect of the steamboats, in the danger to the foundations caused by the continual wash from the steamers; and this is probably a real

and tangible objection, which might serve as a legitimate excuse for the restriction of steam traffic by special taxation or otherwise. "Ouida" complains, also with reason, that nothing but iron, "that most hideous of all materials," can be found when a new bridge is wanted in Italy, and that such structures, "painted lead-colour above and red underneath," look worse than anywhere else, in comparison with the exquisite ancient bridges of Venice. In regard to the treatment of the ancient buildings, again, she asks, "Is it fitting that a palace of historic fame should have spread over its front gigantic letters, declaring that some one sells glass or *bric-à-brac* in it?" Here is, certainly, a Vandalism, in regard to which local legislation might have something to say; but, we fear, local authorities care little about the matter. Perhaps if it occurred to them that they were destroying the very interest which brings the stranger to their city, they would bestir themselves to arrest this modern spoliation of the "Sea Cybele."

#### THE ARCHITECTURAL ASSOCIATION.

VISIT TO TAPLOW COURT AND CLIEFDEN.

THE sixth Saturday afternoon visit of the Architectural Association was made on Saturday, the 19th inst., to Taplow Court and Cliefden. The excursion was under the guidance of Mr. James Rutland, of Taplow, the first visit being made to his house "The Gables," when some interesting photographs of the various objects of interest found in the mound in the churchyard at Taplow last year were examined, and other curiosities. The party then proceeded to Taplow Court, the seat of Mr. Grenfell. The earlier portions of the house were built from the designs of Cottingham. The house did not present any objects of interest from an architectural point of view, but the grounds and views from the principal rooms were very fine. The old churchyard of Taplow adjoins the house, and the curious mound in which were found the remains, the photographs of which had just been examined, is situated in the centre of the ground. Mr. Rutland informed the members that the churchyard was the centre of a large Danish camp, and that the ground was full of flint implements, showing that it had been occupied as a camp for a long period.

The next place visited was Cliefden, the property of the Duke of Westminster. This place, famous for its sylvan scenery and unrivalled views of the Thames, does not possess so much interest for the architect, apart from the splendid site. The present house was built from the designs of Sir Charles Barry, about the year 1851, the former house having been twice burned, in 1795 and 1849. Only a small portion of the old house, built at the end of the seventeenth century, remains. It was a red brick building, with stone quoins of the usual type of that period. The design by Sir Charles Barry is said to be a revival of Inigo Jones's design of old Somerset House, and is carried out in stucco. The main entrance is on the north, and has a wing on each side, connected by curved corridors; on the left are the greenhouses, &c., and on the right the stables. These have been enlarged, and a water-tower and clock added, from designs by Mr. Henry Clutton, in 1861. The south front, which is the one seen from the river, stands on the original terrace, which is 433 ft. long, the lawn being reached by means of a double flight of stairs in the centre. The terrace contains various rooms, which are also connected with the basement of the house. The lawn, of five acres, is laid out in the formal style of landscape-gardening, and is beautifully kept. The entrance-hall contains a very fine tessellated pavement presented by Mr. Herbert Minton to the Duchess of Sutherland; there is also an interesting frieze round the staircase from Minton's works. The hall contains some interesting pieces of sculpture. The dining-room ceiling panels have trellis work painted on them, with clusters of fruit, and the open sky painted as background. The staircase ceiling is painted with the Four Seasons, portraits of various members of the family being introduced.

Mr. Rutland read an interesting history of the manor of Cliefden and the various owners of the property. The original house was built by the second Duke of Buckingham, whose miserable death has been commemorated in



Pope's well-known lines. About the year 1700 it was purchased by George, first Earl of Orkney (a favourite and celebrated commander under John, Duke of Marlborough). He built the pavilion in the grounds to commemorate his victories in the Low Countries. During the infancy of George III. his father, Frederick, Prince of Wales, lived here for many years, renting it of the Countess of Orkney. On the 20th of May, 1796, the house was destroyed by fire, occasioned through the carelessness of a maid-servant; it lay in ruins for twenty-five years, when, in 1830, it was purchased by Sir George Warren, who rebuilt it. The estate was sold in 1849 to the Duke of Sutherland, and during some alterations was again burned down. The present house was built by the late Duke of Sutherland. On the west side of the lawn is a temple, with octagonal cupola, built from the designs of Leoni in 1735.

The Yew-tree-walk, leading down to the river and the celebrated springs, is 858 ft. long. The estate of Cliefden consists of about 436 acres. The house and grounds occupy about 186 acres. The woods abound with primeval yews. In the cliffs are several small caves or fissures, which may have been once inhabited. Tradition says that they were the homes of robbers, and that in one of them Princess Elizabeth took refuge from her sister Mary. Mr. Rutland mentioned that the Duke of Westminster had given him permission to explore these caves, and there could be no doubt of their having at one time been inhabited at a very remote period by a flint-using people. He had found flakes and scrapers of flint, rude pottery, and a bead and a silver penny of Egbert's, which was found in making a road in the woods.

The meadow opposite Cliefden is called Battle Mead, probably from a Saxon or Danish conflict, and during the Civil Wars, when Cromwell was at Windsor with 22,000 men, in 1645, billeted in the villages round, skirmishes must have occurred, as stone cannon balls have been found in the woods.

#### MANCHESTER AUTUMN EXHIBITION.

THE Autumn Exhibition now open at the Art-Gallery of the Corporation of Manchester (the third held under the present management, it appears by the catalogue, which comprises 1,166 works of art), is one of considerable interest; for, apart from the ordinary contributions of artists who have sent their works direct, there is a special selection of pictures by Sir John Millais, R.A., which have been lent to the Gallery by their various owners.

These pictures extend, as to date, over many years, and may be said to illustrate the career of the artist during a quarter of a century of incessant labour in his profession.

This loan collection includes "Portrait of the Marquis of Salisbury," "Mistletree Gatherers," "The Princess Elizabeth in Prison at St. James's," "The Princess in the Tower," "Portrait of Mr. Gladstone" (the three-quarter length in standing attitude, which we have already noticed, when exhibited at the Grosvenor Gallery this summer), "Message from the Sea," "Autumn Leaves," "Callow Herring," a beautiful child's face, "Cherry Ripe," "Cinderella," "Lorenzo and Isabella," "Dropped from the Nest," "Awake," "Asleep," "The Appointment," "The Sick Child," "Amino and the Lady," "Jacobite Cockade," "Portrait of J. Bright, M.P.," and some studies in chalk, and pen-and-ink drawings. It is impossible, on examining these pictures, not to be struck with the much freer and less conventional treatment observable in the more recent, as compared with the earlier, works of the artist.

Passing from this loan collection to those pictures which form the more immediate staple of the Exhibition, we find a large number of figure-paintings of importance, including many which have already been noticed in our articles upon the London galleries. Among these are "Phoebe" (139), Sir F. Leighton, P.R.A.; "The Sheepfold" (64), J. R. Herbert, R.A.; "Portrait of Mrs. F. Myers" (140), G. J. Watts, R.A.; "A Norman Archipelago," J. Brett, A.R.A.; "The Holy Child," G. Goodall, R.A.; "Portrait of Robert Browning" (327), by R. B. Browning; "Venetians" (387), S. Luke Fildes, A.R.A.; "Portrait of the late Lord Overstone," Frank Holl, R.A.; "Diadumenos" (426), T. Poynter, R.A.; "Pandora" (464), Walter Crane; "Queen of the Night," H. Moore, A.R.A.; "Circe," John Collier, &c.

Of the above, Mr. Fildes's fine picture, "Venetians," and Mr. J. Brett's characteristic and highly-finished work of the coast of Sark, which he calls "A Norman Archipelago," have been bought for the Manchester Permanent Gallery, and we think our Manchester friends have used a wise discretion in thus boldly securing works of a high order, instead of (as we sometimes see done), selecting inferior pictures, rather apparently for the sake of some sentiment they are supposed to convey, than for any intrinsic merit of their own.

Mr. John Pettie, R.A., has "Here's to the Maiden of hashtful Fifteen," which represents a Cavalier, in the white satin attire this artist is so fond of, with glass in hand proposing the health. It is a bright effective little picture, but the figure is not equal to some in the same vein we have seen of his.

"Showing his Paces" (822), W. F. Calderon, is remarkable for the spirit and motion of the horse coming forward at a sharp trot, held by a lad, who evidently has all he can do to hold and keep up with his charger. The attitude of both horse and youth are admirable.

"The Angler's Rest" (446), Mr. H. S. Marks, R.A., is one of this artist's pleasant delineations of human and rural nature. Two anglers, in sixteenth-century costume, discussing their day's sport, and refreshing themselves in front of a country inn, overlooking a nice bit of English landscape. This picture, if we remember rightly, has been exhibited in London.

"The Poet's Dream," by John Paed, R.S.A. (151), is an imaginative and clever picture. The figure of the poet lying asleep in the foreground is well drawn, but his dreams of ancient palaces, heroes, heroines, &c., represented in the sky, are somewhat realistic and wanting in atmosphere, and the aerial mystery, which they ought to possess to appeal to the mind as visions.

"Evening," B. W. Leader, A.R.A., is a very good specimen of the painter on a small scale, possessing more sentiment and poetic effect than is always met with in his pictures. His fine landscape, "Hedgerow Elms and Hillocks Green," which was exhibited at the Royal Academy, is also here.

The "Slopes of Ben Nevis" (265), C. E. Johnson, is a large landscape possessing considerable power, and portraying a very picturesque subject; but the catching lights on the side of the mountain strike us as too uniform in tone and strength, which has the effect of detracting from its size, those about the summit being nearly as strong as those nearer the eye.

Mr. Edwin Ellis exhibits a coast scene, "The Haven under the Hill" (128). This picture has every appearance of being a study from nature. It is of a brown headland and small bay, with fishermen in the foreground landing a boat-load of fish. It is a picture that takes one in fancy to the fresh sea-side. It has been selected for the Manchester Permanent Gallery.

There are two good sea-pieces by Edwin Hayes, R.H.A., "Fair Winds from the Harbour" (175) and "Shifted Cargo," which latter was in the Royal Academy Exhibition. This artist generally gives us a grey flowing sea, liquid, and in motion, while as a draughtsman he is almost always correct in all the details of his shipping. The masts and rigging of the disabled ship in the latter picture are examples of this, for while he represents them "weather worn and tempest torn," their details are not scamped, and it is evident he is familiar with the aspect of things he is seeking to represent.

Besides his Grosvenor picture of "Queen of the Night," Mr. H. Moore, A.R.A., has "A Marine View" (575). Here we have a great expanse of grey sea, with a good sky, and one small schooner, the drawing of which is not good; nor is this the only instance which may be pointed out of otherwise fine sea-pieces being marred by similar carelessness, it can hardly be ignorance, on the artist's part. To any one acquainted with the details of shipping these shortcomings are great eyesores.

"The Old Falcon, Gravesend," by Mr. C. E. Holloway (687). This is an effective and interesting water-colour drawing of one of those picturesque and irregular old buildings, partly of brick and partly of wood, which one used often to meet with in out-of-the-way places on the Thames and other rivers, where sailors were fond of sitting overlooking the water, and, pipe in mouth, would "fight their battles o'er again." The march of civilisation is fast demolishing such little nooks and corners, and replacing

them with buildings no doubt much more in accordance with the principles of sanitary science, but lacking their picturesque quality and associations; the pencil of the artist is well employed in preserving their memory.

Even in our short notice No. 941, "Pygmalion and Galatea," by Mr. H. T. Schäfer, ought not to be passed over. The statue of Galatea is springing into life, the flesh tint diffusing her face, and the hair showing colour, not suburn but light golden; Pygmalion kneels with his hands before his face at the statue's feet. The execution of this picture is very refined and the finish high without being overdone; the face of Galatea is, perhaps, wanting in loftiness of expression, but it is very pretty and there is a classical feeling throughout the picture.

"Rue de la Mer Rouge, Algiers" (678), Mr. R. M. Tabley Kelly, is a clever architectural drawing with clear lights and shadows.

"Coming from the Fountain" (698), Mr. T. R. Macquoid, is also an architectural subject, an Italian gateway well treated with figure.

"Rouen Cathedral" (1,003), M. Jules Lessore, is a careful drawing, but rather woolly in texture, probably from over-sponging.

The "Interior of Dining-room, West Kirby, Cheshire," (1,017), Mr. Berenger Bengier, is a well-executed drawing of carved chimney-piece and interior of room.

There is a light and sparkling little drawing by Signor Giuseppe da Pozzo (1,023) of a Venetian canal. Also some interesting sketches in black and white by Mr. Hedy Fitton, called "Hawarden Sketches," including a view of the church.

"Central Board Schools," Mr. Henry Lort (1,057), is a design in brick with stone dressings, of five stories in height, with four gables to front of street.

"Nixon School, Oxford" (1,079), Mr. R. P. Spiers, is a drawing of a curious old Gothic building, but filled in with insertions of details of Queen Anne and other dates from time to time.

We cannot afford space for further remarks, and must leave unmentioned very many drawings of merit (there is no sculpture exhibited) which go to make up a most enjoyable and interesting provincial exhibition.

#### NOTES IN SPAIN.

SAN ILDEFONSO, OR LA GRANJA.

OUR illustration (principal entrance to the royal seat) represents the first view of the palace on entering the grounds. The three domed towers surmounting the *Colegiata* here show to advantage, whereas many glaring defects seen on a nearer view do not catch the eye at this distance. The pinewoods, covering the first conical hill to the right, and extending many leagues on every side, and the more rugged and precipitous mountains beyond, form an admirable background to San Ildefonso, and constitute, indeed, its chief charm.

The *Colegiata* forms the centrepiece of the whole group of buildings on this, the north-west front, the royal apartments extending on either side and behind, and having their grand facade towards the gardens and the south-east. Appurtenances to the palace, such as cavalry barracks and the royal stables, flank the approach and in front of these appears a double line of chestnuts adorning the view and affording grateful shade. Higher up, what was formerly a splendid open square, used for grand reviews, has become in modern times a beautiful *glorieta* or garden with lawns, lovely pines, shrubs, and flowers.

There is a profusion of beautiful fountains artistically arranged in various portions of the grounds of the palace. One series, arranged in terraces, is called the *Racecourse* (*La Carrera de Caballos*); the fountains consisting partly of figures of horses with water spouting from their nostrils, &c.; the whole in a somewhat vulgar taste; but the effect of the water, playing to a considerable height, dispersing themselves in a feathery spray, once more to fall gracefully over the sculptured forms beneath, and all this, amid the leafy line on either hand, is indeed admirable. The mountain background, with the deep gullies clothed with sombre green pines, descending abruptly from the lofty crests above, forms a magnificent setting for these works of art, they may be called, notwithstanding the defects in taste and execution.

The origin of the name and royal seat of Sa



Ildefonso is not without interest. The kings of Castile possessed an immemorial right of chase in the pine forest of Valsain (Val de Sapias), and were accustomed to pass some weeks occasionally in the Palacio del Bosque, situated in the village of Valsain, about half a league to the south of San Ildefonso. King Henry IV. was residing there in the year 1450, and either in account of his deliverance from the claws of a wild beast on the spot, or simply out of devotion to the saint, resolved to erect a dwelling-house and hermitage to San Ildefonso, on the site now within the royal grounds and known as the Hermitage.

In 1477 the Catholic sovereigns, Ferdinand and Isabella, being in Medina del Campo, executed a deed of gift of the residence of San Ildefonso to the monks of the Segovian monastery, El Parral, of the order of San Jerome. This was followed next year by the cession to the same order of the Hermitage, which in the mean time had passed to the see of Segovia. About half a century later, judging, at least, from the appearance of a cloister still existing enclosed within the actual palace, the monks erected a *casa hospitalaria*, or country-house, with quarters sufficient for the accommodation of guests, of simple and severe style. Herein during some 200 years, they and their successors passed the hot season, devoting their time, says the record, "to the contemplation of the beauties of nature, and the meditation of heavenly things." To this monastic country-house and *Grange*, we trace the origin of the name and town of La Granja, its other designation having been already accounted for.

In the year 1720, Philip V., first prince of the House of Bourbon, occupied, after a hard-fought war of succession, the throne of Spain, and he, too, in his turn, came to hunt in the forest of Valsain. It seems that he was so taken with the charms of San Ildefonso that he, assisted by his courtiers, put hastily together a log hut, wherein they passed the night. Approving on trial of the site, he made overtures to the monks of St. Jerome for the purchase of their country-house, hermitage, and possessions, all which passed into the hands of the king, on payment annually of 1,000ducats and 100 bushels of salt from Atienza. The king's fixed idea of abdication in favour of his son, Louis I., an idea he carried into effect in 1724, though revoked during the same year in consequence of that son's death, seems to have been one chief object for the selection of this picturesque site. He wished, in the words of Spanish authors, to create another Versailles, but created instead another Versailles. The first purchase of lands being too moderate or the magnificent designs of Philip, it was allowed by others in 1723 and 1735.

The design of the palace and its collegiate church was entrusted to Don Teodoro Ardesiani, "Maestro mayor del Real Palacio," and the works were begun on April 1st, 1721, the sculptures and laying-out of the gardens being commenced by Carlier and Boulton at the same time. During the year 1723 we read that the works were carried on with great spirit under the direction of Philip and his teen, Isabel de Farnesio, who both came to inspect them every day from Valsain. The palace was blessed on July 27th, 1723, and occupied during that summer, the church being likewise consecrated on December 22nd of the same year by Cardinal Borja, Patriarch of the Indies. But the laying-out of the gardens involved an immense amount of time and labour, due to filling up ravines, levelling the inequalities of the surface, constructing the numerous fountains, reservoirs, and conduits, so that some twenty years were necessary to bring all to a conclusion. The country-house of the monks of the Parral was not destroyed, but enclosed within the new palace by the king's express orders. In fact, the court, cloisters, and two towers, of much the same style and date, occupy a post of honour in the very centre of the plan.

The ground-plan of the original palace is a parallelogram with its front to the gardens on the south-east. The *Colegiata* is an excrescence, so to speak, from the right line of the opposite side. It lies in the same line with the cloister directly behind the sixteenth-century cloister and central portion of the chief façade is mentioned.

The front of the palace, more than 500 ft. in length, with a central façade of over 200 ft., and of corresponding height, is truly regal in its magnificence. The finest view of the façade is

from a platform in front of the Fountain of the Three Graces, directly in the line of the Grand Cascade, and within sight of the Throne Room. The effect of the Classic colonnade in the centre, and of the surmounting attic, seen from this point, is decidedly favourable. Four columns occupy the very centre of the middle portion, or chief façade, which projects slightly out of the general line of the garden front of the palace. Above the entablature rises the attic, adorned with the shields and medallions of the founders, represented as Roman warriors. The cornice of the attic is supported by caryatides, typifying the four seasons. Surmounting the cornice is a balustrade adorned with trophies. Behind this balustrade arise the cupola and lantern of the *Colegiata*.<sup>\*</sup> Three kinds of material are used,—grey granite in the walls, plinths, and parts of the entablature; a delicately-coloured red stone, resembling travertine, from Sepulveda, for the pilasters, columns, and frieze; and white marble for capitals and pedestals. From the point of view we have chosen only the chief façade, already described as some 200 ft. long, is visible, the view of the two wings being intercepted by the shady lindens on each side. Was this intentional on the part of the designers of palace and gardens? This disposition has been condemned as contrary to all rules of laying down gardens by the two intelligent authors of an excellent Guide to San Ildefonso, published in the present year, members of the Corps of Engineers and of the Royal Household. It is possible, however, that this disposition of the foliage was intentional; for otherwise the entire façade of 500 ft. would have seemed very low in proportion. The architect of the façade was an Italian, by name the Abate Juvara, and his plan was adopted and carried out by his pupil Saqueti.

We have mentioned the fact that the old monastic country-house was enclosed within the new palace. These remains can be best seen from the Patio de la Fuente. In the centre stands the fountain which gives name to this court. It has the form of a pillar, with sixteenth-century mouldings, and a jet of water issues from each face into a basin forming a Maltese cross beneath. The building is of three stages, and there are two square towers at the angles, surmounted each by a balustrade. The cloister consists of a Classic colonnade of very plain and severe forms, and the shafts of the columns are of a single block of granite.

Returning to the view of the entrance in the first illustration, it may be mentioned that the long lines of barracks and stables on either hand, the upper portions of which are seen in the view, as well as the loftier appendances in the Plaza beyond, were erected by Charles III. (A.D. 1769–1788), about half a century later than the original Palace. It has been already noticed that the view of the palace and its collegiate church, from the entrance gates, with its background of pine forest and mountain, is, notwithstanding that mixed character, for which the eighteenth century is in so many instances chargeable,—taken all in all, picturesque and pleasing.

A fine open esplanade, with statues for the most part of no special merit, leads from the palace to the several showy *parterres* and shady avenues with which the park abounds. The grand cascade, arranged in terraces of marble, with the several fountains, and a handsome pavilion, with sculptures, pillars, and pediments, wrought in rich red stone, and all included in this front view, is one of the finest features of the beautiful gardens. It is no wonder that the founder took a lively interest in this special view, and urged on the works to the utmost. Between the esplanade and the cascade is an effective *parterre*, kept in excellent order. On each side are lines of statues and vases, the former of marble and by no means devoid of merit, the whole view enclosed on either hand by tall and shady limes.

The Collegiate Church, of which the tall towers and dome give so much character to the approach to San Ildefonso, is not otherwise very remarkable. The plan is a Latin Cross, the dome rising from the intersection of the arms. The high altar is entirely of marble and porphyry. The tabernacle is of lapis-lazuli, inlaid with marble, and shows in its front a mosaic of Our Lady of Loretto. The retablo is supported by Corinthian pillars of red marble,

resembling jasper, the mouldings of the bases and the capitals being of gilt bronze. The altar-piece itself is a large oil-painting of the Blessed Trinity; the patron saints of the founder and his family are seen in an attitude of adoration beneath the leading figures. It is put down to Solimena, of the Neapolitan School, and an imitator of Luca Giordano. Opposite to the high altar, though separated from it by the body of the church, as usual in Spain from the sixteenth century, the canons, attired in their purple robes, of like style and colour to those worn by the canons and prebends of St. Peter's in Rome, sing the offices of the Church in choir-stalls, ably carved in the Renaissance style. The principal Royal tribune is supported above the choir by two marble pillars, once forming part of the collection of Cristina, Queen of Sweden. There are other tribunes for the rest of the Royal family, overlooking the aisles on each side. In a chapel near the high altar is the mausoleum of the founder and his queen, Isabel Farnesio, with this inscription:—

PHILIPPO V. HISPANIARUM REGI,  
PRINCIPI MAXIMO, OPTIMO PARENTI,  
FERDINANDUS VI. POSUIT.

Though the material is magnificent, and the execution of statues and reliefs not devoid of merit, the taste and predominating ideas which produced the design of this monument cannot be commended.

Among the many interesting and valuable objects preserved in the sacristy, we need only mention two.

First, there is a monstrance of the last century measuring 3 ft. high, containing 2,014 emeralds, diamonds, and topazes. Its weight is 26 lb., and its estimated value 25,000 dollars. The higher portion is wholly of gold, dividing outside the circle into rays and crosses. In the stem is a small figure of the Immaculate Conception, of solid enamelled gold. The whole is surmounted by the cross. The effect produced by the display of gold and of so many jewels is simply magnificent. The many fine emeralds and the innumerable diamonds give this *custodia* a character of special beauty.

Secondly, there is a Processional Cross of the style of the fourteenth century, proceeding from the ancient parish church of Santa Columbia in Segovia. It is of silver gilt, very richly and delicately wrought in filigree into Gothic forms. The ball-flower finials terminating the arms of the cross and other details point out the above century as the probable date. The geometric tracery imitated contains round forms as well as pointed, and the oak-leaf prevails likewise. In a sort of boss in the lower part of the stem the ornamentation takes the form of a series of turrets, frequently repeated,—a form of Gothic decoration frequently found in Mediaeval stained glass, of Continental origin. The Crucifixion is represented by a figure of very pure and brilliant silver, and, date considered, is of excellent design and execution.

Of the interior of the palace, of its adornment and works of art, we can say little here, for, although we visited it twice, on neither occasion was there an opportunity for studying it in detail. Though fitted up in much the same style as other royal palaces in this country, nevertheless it appeared to us hardly equal to some others in the country, especially that of Aranjuez. It once possessed, it is true, valuable collections of paintings, statues, and marbles; but the most precious of these were sent by Ferdinand VII. to enrich the museums of Madrid.

The gardens of La Granja are extensive and highly esteemed. One great charm of the place, along with its mountain scenery and clear air, is the noise of falling waters, so constantly greeting the ear in its shady promenades. The total extent of the Grounds included within the park wall is 360 acres. The public gardens consist of park-like grounds, adorned with fine elms, chestnuts, limes, with *parterres* and fountains. The prevailing style is Classical Renaissance, copied directly from Versailles. It is claimed, and to some extent with justice, that the copy surpasses the original. The effect of water rising and falling in crystal showers and spray is managed with admirable skill; and the fountains are justly celebrated as among the finest in the world. In all there are no fewer than twenty-six fountains adorned with figures. The principal of these are La Fama, Baños de Diana, Ranas, Ocho Calles, Canastillo, Andromeda, Apolo,

\* See illustration of "Centre Portion of Palace."



Neptuno, and Tres Gracias. Though each of these is striking enough by itself, several of them can be combined, when the effect is greatly enhanced. Those named Anfitrite, Cascada, and Tres Gracias are combined in the splendid vista seen from the Throne-room in the palace, as well as from the esplanade beneath, and which is known as the Cascada Nueva. The Carrera de Caballos includes a vista of no less than eight fountains rising one above another, and terminated by the fine group of Andromeda. Not every day, nor even every month, can all the fountains be seen in full play. This grandiose spectacle is reserved for six days in the year, the feasts of the patron saints of the Royal Family. We had the good fortune to be present on one of the most recent occasions. There was a rush among the crowd of people present to see, first one, and then another, of the several most famous fountains in full play, for the few minutes allowed to each. Those of the Grand Cascada, Carrera de Caballos, Ocho Calles, Canastillo, and La Fama were successively visited and admired. The two first series are remarkable for their magnificent vistas, for the height to which the waters rise, the admirable effect of the falling spray amid the surrounding foliage, and the part played by the statues amid the descending showers. The eight fountains of the Plazuela, called Ocho Calles (eight avenues) were less effective than the rest. The effect of this group is spoiled by gilding. However, this unfavourable impression was made up for by the play of the lovely Canastillo (Basket) seen from the same spot. La Fama is remarkable for the surprising height of 130 ft. to which the central jet rises.

#### ANCIENT AQUEDUCT, SEGOVIA.

There are many points from which the Roman Aqueduct of Segovia shows forth to such advantage that the rest of the monuments of that city seem to grow small by comparison. One of the best stations from which to see it is in the Plaza de Azoquejo, whence the full height of the loftiest part, 102 ft., can be well seen. The greatest altitude is at the point in the view shown in our illustration where there are three additional courses of masonry above the two or three arches rising highest of the lower tier. The distant view of that same part is likewise imposing, as the city seems thence quite dwarfed to insignificance by the side of the grand old Aqueduct. Even though in part destroyed by the Moors (not, indeed, the part now under review), about the year 1072, it was repaired towards the end of the fifteenth century, by order of Isabella the Catholic, and so to this day brings the fresh stream of Riofrio from the Sierra Fuenfria in the Guadarrama Mountains, a distance of three leagues. It is built of granite.

The Aqueduct begins near San Gabriel, and is carried on with a slight declivity of about 1 in a hundred in a series of curves and angles to La Concepcion, San Francisco, and thence in one grand sweep of some 900 ft. to the city wall, the whole length being about half a mile. The total number of arches is given by Mr. Ford as 320, out of which thirty-five or thirty-six were broken down by the Moors. During succeeding centuries the breach was clumsily repaired by woodwork, until Juan Escobedo, a monk of El Parral, of the order of St. Jerome, in Segovia, undertook to repair it for Isabella in 1483.

The author last quoted praises Escobedo for his good taste in imitating the model before him, calling him the first restorer of the Greco-Roman style in Spain. Other observers, and among the rest no less a personage than Marshal Ney, have noticed, on the contrary, a striking contrast between parts of the restoration and the antique, Ney exclaiming (in view of the contrast) "here begins the work of men" (Madoz, "Segovia").

It is, however, evident on a careful examination, that the restorations do not all belong to Escobedo; and Madoz relates that repairs in the more modern masonry having become necessary during the first years of the present century, such repairs were then executed. The lower piers in the centre are built in four stages, each crowned by a simple impost, instead of a capital, the three lower stages being about 12 ft. high, and the fourth about double that much, the whole tier thus rising to a about 60 ft. The lower piers have no pedestal, while the plain, horizontal line above the lower tier forms a sort of simple

pedestal for the piers in the upper. The arches are plain, without mouldings of any kind. The severity of the style is very remarkable. This work is truly grand,—we might almost say, sublime,—from its very simplicity.

In respect to the restorations, we were especially struck with the deformed appearance of an arch in the Calle de Cañuelas, whereas it was evident that the Medieval work had been clumsily joined to the antique. Pointed arches then follow for some distance down that street. It was opposite to Nos. 19 and 20 that the joining had been made. On further examination it became manifest that two different restorations had been effected, one in which the architect,—possibly Escobedo,—had been impressed by Gothic form, as these arches are pointed. This earlier reconstruction is, on the whole, the better of the two. In the later the architect was evidently much more influenced by Classic form, as there is a too prominent horizontal member, a sort of abacus, which does not quite harmonise with the veritable antique. Here, however, the arches are round and well built. This work is in all probability later than the time of Isabella and Escobedo, though it certainly did not give us the idea of being of the present century, and could hardly have been the restoration referred to by Madoz.

#### SANITARY CONGRESS AT LEICESTER.

INAUGURAL ADDRESS BY PROF. DE CHAUMONT, F.R.S.

The eighth autumn Congress of the Sanitary Institute of Great Britain was opened at Leicester on Tuesday last, under circumstances which augur well for its success and usefulness. There are about 250 "Associates of the Congress," about one hundred of these being members of the Institute and their friends.

The President of the Congress, Prof. de Chaumont, F.R.S., delivered a very comprehensive address at the opening meeting, which was held in the Lecture Hall of the Museum Building, and was attended by from 300 to 400 ladies and gentlemen. The first part of the address was devoted to the circumstances which led to the formation of the Institute a few years ago, and to a review of the progress of sanitary legislation and administration since the days of the General Board of Health (with which the name of Mr. Edward Chadwick is so honourably associated). It was pointed out that dire as was the loss which we sustained by the annihilation of our soldiers in the Crimea and elsewhere, by disease and not by the sword, out of their terrible sufferings god had come, for it led to the appointment of the Royal Commission of 1857, whose report was one of the most remarkable and instructive documents ever furnished to a Government, the investigation was so complete, the inductions so clear, and the predictions as to the future so fully justified by subsequent experience. The Commissioners were able to point to certain conditions which they believed to be the causes of the evils complained of, and they further said: "Let them be remedied, and there is no reason why the soldier should not be as healthy as the healthiest in civil life." The recommendations of the Commission were acted upon as rapidly as circumstances permitted, and we are now at a distance of thirty years from the former evil days. What are the facts now? The soldier at that time died at the rate of 18 per 1,000 at home, or, to be a soldier in time of peace was more fatal than to be the inmate of the filthiest and most poverty-stricken parts of our crowded cities. The last return, that of 1883, shows that the death-rate at home is only 6·28, instead of 18, and only 5·28, if we exclude violent deaths,—that is, nearly 40 per cent. less than the death-rate of the most healthy districts in England and Wales. Calculating upon 80,000 men, the strength of our home army in 1883, we have 1,032 men saved to the State in one year alone,—and when we add to this the amount of sickness saved, we find that it represents the services of 800 men for a whole year, so that, practically, a saving of two battalions has been effected. "The case may be made even more startling," said the Professor, "if I state that, at the time I myself entered the army there were dying of consumption alone more men in two years than now die from all causes whatsoever in three! Similar valuable lessons were deduced from the experience of sanitation as applied to the circumstances of our troops in India, the West

Indies, and elsewhere, and the popular ascription of heavy mortality and sickness rates to "the climate" was shown to rest upon a very slender foundation. Having reviewed the work of the Institute in the past, Professor de Chaumont continued:—"The Institute, however, has not considered that the arrangement of annual meetings like this has been sufficient for the work before it. Meetings and addresses have been given from time to time in London and we hope that the time is not far distant when something like a school may be established, with a staff of teachers, laboratories, museums, &c. For this purpose it will be necessary to gather together into one centre the scattered efforts which are being made in the same direction, but which are at present, from want of union, somewhat dissipating energy in an unproductive way. . . . The advantages of unity in administration, both as a question of efficiency and of expense, have been much dwelt upon by our friend and veteran sanitarian, Mr. Edwin Chadwick. There can be no question that a more uniform and united system would greatly add to the efficiency and materially diminish the expense of sanitary work. But the apparent outlay is not all, for the indirect expense produced by inefficiency is vastly greater than any direct outlay likely to be incurred, however extravagant. A premature death is reckoned as a loss of 100*l.*, and if it is the head of the house and the breadwinner, it is evidently much more. If we double this estimate it will be less than the probable coincident damage, due to the loss of time from the proportionate amount of sickness which each death represents. There are about 750,000 deaths every year in the United Kingdom, about one-half of which are deaths of children, or of persons in the unproductive periods of life; of the remainder, pretty nearly one-third are distinctly preventable. Could those deaths be prevented we should save (on the above calculation) a sum of 25 millions per annum, or little short of the amount we pay yearly for the interest of the National Debt. Other calculations have brought out even higher figures, but they all agree in one thing, viz., that we are as a nation paying yearly an enormous sum for our sanitary shortcomings, a sum undoubtedly less than we need to pay, but still very large,—a sum, too, that would rapidly increase if our vigilance were in any way relaxed. It is the aim and object of sanitation to reduce and, if possible, to extinguish this gigantic burden, which represents about one-sixteenth of the entire taxable income of the country. But even this is not all, for besides the immediate losses from sickness and mortality, we have the remoter effects in weakened health and enfeebled offspring, every lowering of the health standard preparing a fertile soil for future disease and the perpetuation of the scourges of humanity. We may, however, take comfort from the good results that have arisen from such united effort as has already been put forth, and we may congratulate ourselves on the progressing diminishing mortality generally, and the control which has been established over some of our most virulent diseases. Much, of course, is due to the increasing well-being of the poorer classes, in spite of the outcry about depression of trade. Such ebbs and flows are inevitable, but on the whole the people generally are better off now than they have ever been,—at any rate, within any period of which we have trustworthy records. It has sometimes been said that the rural population were better off in former times when the population was less. In some particulars this may be the case, but I think on the whole the balance is in favour of the present day. If I should be wrong in this view, then it only strengthens the other part of the argument, viz., that the sanitary efforts of modern time have been even more productive of benefit than they seem to have been at first sight. Our statistics before this century are very imperfect, but it has been shown by comparison of the bills of mortality that the death-rate in the metropolis in the seventeenth century was between 70 and 80 per 1,000 per annum; in the eighteenth century it fell to about 50, and towards the end of the century to about 30. At the time of the commencement of systematic registration, about fifty years ago, the death-rate was more than 25 per 1,000 (actually 29·55 in 1838, and 23·63 as the average of five years, viz., 1838-42), whereas the whole of England was only 22·60 in 1838, and 22·02 of the five years, 1838-42. A quarter of a century



later the rates were—for London, 22·6; for England and Wales, 21·7; and the great towns, 23·4. London was therefore healthier than the average of the other great towns, and only five per cent. behind all England and Wales, whilst in the earlier period it was 17 per cent. behind, and in 1838 33 per cent. behind the country generally. In the later returns the figures are even more satisfactory, the London death-rate being only 21, or about the same as that of the country generally. We must remember also that this improvement has taken place with a progressively increasing number of persons in the area concerned, even although the area is also continually extending. In 1831 there were less than 44 persons to an acre in the metropolis, and in 1841 just under 46. In 1853 there were 52·5, and at present probably over 54. In 1833 the area per head was only 92·2 square yards, and the proximity, or distance from person to person, if equally distributed over the area, was 104 yards, or nearly 31 ft. At the present time it is probably not more than 10 yards or 30 ft.

I have spoken hitherto chiefly of general death-rates, but these, although valuable, are less sure marks of improved sanitation than particular death-rates, and more especially those from particular classes. The three most significant are: (1) the deaths of children; (2) the deaths from consumption; and (3) those from zymotic diseases. With regard to deaths from consumption, the disease of all others most constantly fatal, three main causes have been assigned, viz.: (1) hereditary predisposition; (2) faulty nutrition; and (3) impure air. I do not propose to discuss the first cause, partly because it is too difficult a question to treat of in the time at my disposal, and partly because it is less directly connected with the immediate subject on hand. I would only say that the fact of hereditary predisposition is pretty generally recognised, and that it is only by improved sanitary conditions that there seems any chance of mitigating or extinguishing it. Of the second cause much has been written, and there can be no doubt of the fact that faulty nutrition is a very important factor. But the most important factor of all is undoubtedly the third, namely, impure air, the rebreathing of air already charged with the impurities of respiration and transpiration. Such impurity appears especially to favour the growth of the bacillus which has been shown to be the probable active agent. I think we may, therefore, justly infer that the diminution in consumptive complaints is due to the improvement in the well-being of the community, and the better housing of the poor. Consumption, however, is a disease of the rich as well as of the poor, and in the case of the former it has been largely favoured, if not caused, by their being too well housed, in the sense that there has been too great a barrier between their living and sleeping rooms and the external air. The best security against the development or propagation of the disease is free ventilation, and the avoidance, of course, of chilling draughts. On this subject the experience of the Army is very instructive. Before the Crimean War the annual death-rate of the army at home was 18 per 1,000, and of these deaths nearly 8, or 44 per cent., were from consumption. But this did not represent all, for some men were invalided, who died as civilians, and, if we add these, we should have a loss of at least 100 per cent. more. This would bring the loss up to at least 16 per 1,000 from consumption alone. The data, however, are imperfect. The Royal Commission of 1857 showed clearly that this inordinate amount of disease was due chiefly to the bad ventilation of the dormitories, and steps were taken to remedy this as soon as was practicable. Accordingly, in 1861 the consumptive deaths were only 3·1 per 1,000, and the invaliding about 8 per 1,000, or a total loss of 11 per 1,000. In 1883, our latest information, we find that the deaths were only 1·72, and loss by invaliding 3·47 per 1,000, or a total loss of 4·19 per 1,000. In the same year the total deaths from all causes of disease were only 5·28 per 1,000,—one-third less than the deaths from consumption alone thirty years ago. But satisfactory as the results of sanitation have been, we are not at all entitled, nor are we inclined to rest and be thankful. We have still before us the fact that our consumptive death-rate among the troops is excessive. . . .

The third group of importance is that of Fevers. Under this head there are three distinct forms, viz.:—Relapsing or famine fever, typhus fever, and enteric or typhoid fever,

besides an anomalous class called common continued fever, which will probably diminish or disappear as diagnosis becomes more accurate. Typhus fever, also called spotted fever, putrid fever, jail fever, &c., is a disease connected with destitution, crowding together, and dirt. Once started, however, it is capable of being communicated by direct contagion in a very rapid and fatal manner, and this by individuals not themselves the subjects of the disease, as witness the story of the Black Assises at Oxford. It is looked upon as the most contagious of all known diseases, but fortunately its contagion does not spread far. It is most completely amenable to hygienic measures, for it is generally sufficient merely to scatter the population and allow free aëration to put a stop to it. Accordingly, it has now become very rare in England, although we have occasional small outbreaks in crowded cities, such as Liverpool and Dublin, when there is much poverty and wretchedness. But a much more important disease is enteric or typhoid fever, which was up to forty years ago confounded with typhus (and is still called abdominal typhus on the Continent). By the labours of Stewart, Jenner, and others, it was definitely separated, but continued to be merged in the group of fevers by the Registrar-General until the year 1869. This disease, we now know, owes its origin to a very different cause from true typhus, being a disease connected with bad drainage or insufficient removal of excreta. It turns up in all parts of the world and harasses troops whenever they are gathered together. Its presence is a very sure indicator of insanitary conditions. It attacks the young by preference, although the old are not entirely exempt from it, and it is as much a disease of the palace as of the hovel.

On the motion of Mr. T. T. Paget, M.P., seconded by the Mayor of Leicester (Mr. Israel Hart), the thanks of the meeting were given to Professor de Chaumont for his address.

#### AWARDS AT THE LEICESTER SANITARY EXHIBITION.

The following are among the awards which were announced at the opening of this Exhibition on Tuesday last:—

##### Medals and Starred Certificates.

Bountrethill Coal Co., Dregburn, Ayrshire, for white enamelled fireclay cistern.  
"Calvert, F. C. & Co., Manchester, for carbolic acid for disinfecting purposes.  
Eldred Bros., Leicester, for artistic domestic ironwork.  
Ellis, J., & Sons, Barrow-on-Soar, for Barrow blue hydraulic lime.  
"Ellison, J. E., Leeds, for conical ventilators.  
Jeyes's Sanitary Compound Co., for Jeyes's "Perfect Fluid."  
Johnson, W. R., Leicester, for ornamental domestic appliances.  
Leggott, W. & R., Bradford, for openers for fanlights and skylights.  
Lyon, J. W., London, for steam disinfecter.  
"Maigues, F. A., London, for "Filtre Rapide."  
"McNeill's Sanitary Appliance Co., Manchester, for portable cinder-sifting sub-closet.  
"Moule's Earth Closet Co., for Moule's earth closet.  
Richardson, J., & Co., Leicester, for their exhibit of anti-septic preparations.  
Sanitary and Highway Appliance Co., Sheffield, for Robert's street orderer in bin; another for Robert's sand distributor for two-horse tram track.  
"Scott, J., & Co., London, for mercurial gas governor.  
"Trot, H., Battersea, for the "household closet."  
Victoria Stone Co., London, for Victoria artificial stone paving.  
Willacy, R., Preston, for sand distributor for roads.

##### Certificates of Merit.

Adams, R., London, for the Victor spring hinge.  
Adams, R., London, for Potts's Edinburgh sewer trap; another for improved shape of trough for water-closets.  
Ashwell, F., Leicester, for Blackman air-propeller.  
Bountrethill Colliery Co., Dregburn, Ayrshire, for white enamelled sinks and wash-tubs.  
Broad & Co., Paddington, for white enamelled straight and curved channels for inspection-chambers to drains; another for white enamelled fireclay gutters.  
Croft Stone Quarry and Brick Company, Croft, Leicestershire, for the Croft artificial stone paving.  
Doulton & Co., London, for economical Combination closet in two pieces.  
Ellis, J. J., Ellistown Collieries, for Gordon's disconnecting trap.  
Ferguson & Starkey, Leicester, for "unbreakable" fireclay lavatory basins for schools, &c.; another for Shanks's porcelain lavatory fittings; another for Shanks's "Eureka" spray and plunge bath.  
Foster & Pearson, Nottingham, for Morris's cast-iron gully, with movable dip-pipe.  
Genl. J. T., & Co., Leicester, for electric bells.  
Goode & Co., Loughborough, for double valves for flow and return in hot-water circulation; another for "Invicta" flushing cistern.

\* These exhibitors have received "starred certificates," equivalent to medals, they having taken medals at former exhibitions of the Institute.

Greenall, T., Manchester, for Greenall's steam washer.  
Humpherson, F., & Co., Chelsea, for siphon water-waste preventer; another for "Beaufort" flush-down closet.  
Johnson, W. F., Leicester, for galvanised-iron dust-bin.  
Kirk, E. C., Huddersfield, for night-soil-receptacle, with spring lid.  
Kite, C., & Co., London, for telescoped wall inlet ventilator.  
Maigues, F. A., London, for the soldier's filter.  
Middle Educational Company, Leicester, for the "Reliance" lift-up desk.  
Nightingale & Co., Great Grimsby, for method of wood-block flooring.  
Pringle, E. M.D., Blackheath, for working model of cattle drinking-trough.  
Sanitary and Highway Appliances Company, Sheffield, for Robert's asphaltic cauldron.  
Sharman, Leicester, for heating apparatus for small green-houses.  
Smith, E., & Co., Coalville, Leicester, for embossed tiles; another for photographic embossed and incised tiles.  
Smith, J., & Sons, Wolverhampton, for closed sectional sanitary van.  
Stiff, J., & Sons, Lambeth, for Weaver's ventilating sewer air trap; another for exhibit of architectural terra cotta.  
Taylor & Co., Driffield, for "Simplex" desk, with adjustable foot-board.  
Vassily, E. & J. M., Holborn, for Crabtree's kitchen range.  
Warner, J., & Sons, London, for lever nut for boiler cock.  
Whitwick Colliery Co., Coalville, Leicester, for their exhibit of terra cotta.  
Wortley Fire-clay Company, Leeds, for white enamelled straight and curved channels and channel junctions for inspection chambers to drains.  
Wragg, T. & Sons, Burton-on-Trent, for Gordon's junction block for lampholes and inlets to sewers; another for Gordon's disconnecting trap.  
Wright, Bros., Leicester, for Gordon's ventilating man-hole cover for sewers, with annular dirt box; another for Gordon's ventilating cover for disconnecting trap.

Among the exhibits "Deferred for Competition for Medals" are the following, viz.:—F. Ashwell (Leicester), Blackman Air Propeller; F. Humpherson (Chelsea), Siphon Water-waste Preventer; and E. Smith & Co., Coalville (Leicester), Embossed Tiles and Photographic Embossed and Incised tiles.

A number of exhibits are reserved for further and more complete practical trial than is possible at the Exhibition before the judges give their awards. Among the exhibitors concerned for these exhibits are Messrs. W. White (Aberavenny), J. Ellis & Sons (Barrow-on-Soar), F. Humpherson (London), H. Swete (Worcester), J. Warner & Sons (London), The Patent Porous Carbon Co. (London), Thompson & Co. (London), T. Jennings (London), Adams & Co. (London), J. Stiff & Sons (London), G. T. Worssam & Sons (London), H. Trot (London), T. Wragg & Sons (Burton-on-Trent), J. Knowles & Co. (Burton-on-Trent), Carter & Lees (Oldham), J. E. Ellison (Leeds), W. Paulson (Loughborough), Mawson & Swan (Newcastle-on-Tyne), Bowes Scott & Read (London), Wortley Fireclay Co. (Leeds), Broad & Co. (London), F. Dyer (London), Æolus Water Spray Co. (London), Kite & Co. (London), F. Ashwell (Leicester), Ewart & Son (London), Doulton & Co. (London), Wright & Co. (Birmingham), T. Fletcher (Warrington), Arden Hill & Co. (Birmingham), General Gas-heating & Lighting Co. (London), H. & C. Davis & Co. (London), Patent Safety Gas Stove Co. (London), J. Wolstenholme (Manchester), and W. Barstow (Ponferrant).

The judges, in concluding their report, say:—

"Several exhibitors show Stanford's joint for stoneware pipes. For this excellent invention on the medal of the Institute was awarded at the Stafford Congress in 1878, and starred certificates equivalent to medals have been awarded for it at subsequent exhibitions. This joint is now so well known and fully appreciated that the judges do not think it necessary to make any further award for it.  
"The cowls, and ventilators of that class, have been deferred for further practical trial, although the report of the Cowl Committee has not yet been issued, because the investigations of this committee are now so far advanced that it is anticipated that the judges will be able to test the cowls and other similar ventilators before the next anniversary meeting."

The following is a list of the judges:—Professor W. H. Corfield, M.A., M.D.; Mr. H. Saxon Snell, F.R.I.B.A.; Mr. W. Essie, C.E.; Mr. Rogers Field, B.A., C.E.; Mr. Ernest Turner, F.R.I.B.A.; and Mr. J. Wallace Pegge, A.M. Inst. C.E.

**Liverpool Architectural Society.**—The ninth meeting of the Junior Debating Club was held at the Rooms, No. 9, Cook-street, on the evening of the 21st inst. Mr. C. J. Anderson in the chair. Mr. Alexander Goodall (visitor) read a paper, entitled "A Few Notes on Plaster-work," which elicited a good discussion. The meeting, which was the concluding one of the session, then occupied itself with the consideration and emendation of the draft of the annual report of the Club to the Council which, in its ultimate form, was directed to be lodged with the hon. secretary of the society.



## Illustrations.

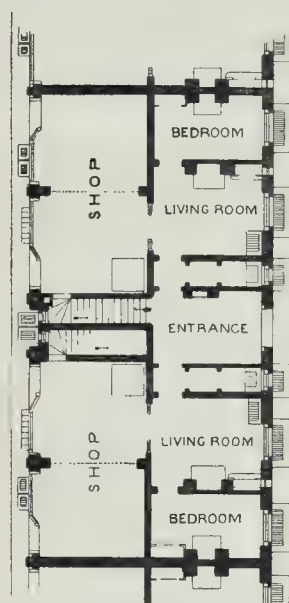
## SAN ILDEFONSO; AND AQUEDUCT, SEGOVIA.

**F**OR some account of the Spanish Royal domain of San Ildefonso, and of the ancient Roman aqueduct at Segovia, see the article entitled "Notes in Spain," p. 420, of this number.

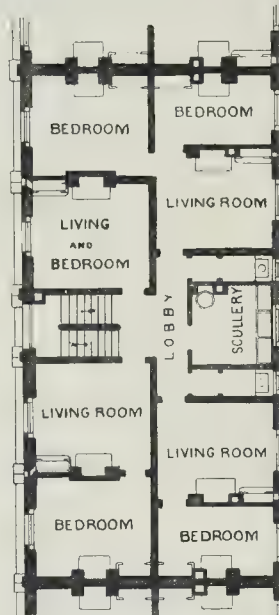
## ARTISANS' DWELLINGS, PETTICOAT-SQUARE, LONDON.

BETWEEN the years 1877 and 1879 the Commissioners of City Sewers under, the provisions of the Artisans and Labourers' Dwellings Act, 1875, cleared two large sites in the City for the purpose of enabling dwellings for the working classes to be erected thereon. On one of them, —the Petticoat-square site,—Artisans' Dwellings, the subject of one of our illustrations this week, have been erected.

The site comprised nearly all the property lying between the rear of the houses in New-street, Harrow-alley, the Metropolitan Railway, and the rear of the houses in Middlessex-street. Altogether 164 tenements were demolished.



Plan of Shops and Dwellings.



Plan showing one-room, two-room, and three-room Dwellings.

Including the courts and alleys, the area cleared was 79,198 feet superficial, or upwards of two acres. Plans were prepared for the erection of the dwellings by the Engineer to the Commission, and tenders for the work were received on the 20th of November, 1883, and the works were commenced on the 10th of December following.

The buildings consist of five blocks, and are named respectively North, Prince's, Queen's, King's, and South Blocks. The lengths of the blocks vary from 158 ft. to 221 ft. They are of a uniform width of 30 ft. from out to out of walls. Their height from the pavement level to the top of the parapets is 58 ft. There are basements only to three blocks, viz., the North, King's, and South Blocks. These basements are under the shops which front to Harrow-alley and Stoney-lane. Great attention has been paid to the drainage of these dwellings. All rainwater-pipes, sinks, &c., are cut off from direct communication with the sewers, and have proper specially-constructed traps, for making the requisite connexions. Each of the five blocks is five floors in height, counting the ground-floor. The floors throughout are fire-proof, and constructed of Portland cement and coke breeze concrete on rolled iron joists. These joists are wholly cased in with the con-

crete. The living-rooms and bedrooms have wooden floors laid over the concrete on fir joists.

An idea of the general principle of arrangement of the rooms will be obtained from the two portions of plans given. There are in the five blocks forty-three three-room tenements, 174 two-room tenements, and twenty-four one-room tenements, making a total of 241 tenements in all. Each living-room has a range, with oven, &c., and all the other rooms have stoves; the ranges and stoves have cast-iron mantels and shelves. There is a cupboard in each living-room, fitted up with shelves to serve as a pantry. These cupboards are ventilated by openings in the external walls, with iron gratings covered with perforated zinc. Beneath the cupboards, shut-up coal-bunks are found. All the sleeping-rooms have hanging closets, picture-rails, &c. The internal walls and ceilings throughout are rendered in Portland cement, and are finished in Martin's Cement and coloured. The staircase walls and passages are lined throughout with white glazed bricks, with coloured plinths and borders. The handrails are formed in the brick walls with glazed bricks, and, being sunk, are not liable to injury from the removal of

taking care that Mr. Gambier Parry's medium should have as much grip on the coarse cloth as on the usual granulated wall surface; "the preliminary stages resulting in a groz delightful to work upon, and as enduring as an Egyptian cere-cloth." The canvas was stretched with copper tacks on yellow pine frames. The size of the paintings is 10 ft. 1 ft. 6 in.

The connexion of the subjects with the Mercers' Company lies in the history or tradition that Becket was the son of a Citizen Mercer. Twenty years after the murder of Becket, his sister, who had married Fitz Theobald de Helles, built a chapel and monastery of Augustinian Friars, close to Ironmonger-lane, Cheap-side. The hospital was built on the site of the house where Becket was born, and was given to the Mercers by De Helles and his wife. The subject of the other fresco, the well-known history of the murder of Becket, needs no explanation.

## BIJOU RESIDENCE, HITCHAM VALE, TAPLOW.

THIS house has been erected upon the estate of Mr. Harvey Ranking, as a type of country residence to meet the present requirements of this locality.

The old materials from a late fire have been re-used. All interior woodwork is dark-stained, the drawing-room only being painted enamel cream colour.

The contract has been carried out by Mr. J. Almond, of Burnham, at a total cost of 705 £, and the stable is not yet built.

The architect is Mr. I. T. Walford.

## THE CANCER HOSPITAL, BROMPTON.

THIS hospital has existed as a free institution for thirty-four years. It began upon a very small scale, but, owing to the constantly increasing demands made upon it, the sphere of its operations has been gradually extended through the generous support of a benevolent public.\* The building has been entirely reconstructed and enlarged, so as to provide accommodation for 120 in-patients, a large number of out-patients, and a staff of resident officials equal to the requirements of a hospital for 200 beds. The walls built askew are, of course, portions of the old building, which forms the nucleus of the hospital. It is faced with red Farnham bricks and Ancaster stone, the external wall being 20 in. thick with a 2-in. hollow space, so as to ensure perfect dryness and to assist in equalising the temperature of the wards at all seasons. The principal wards average 55 ft. by 25 ft., and 14 ft. high, the floor space per bed being 116 ft. The floor construction throughout is of wrought iron and concrete, the surfaces of the wards and other rooms being laid with Hungarian oak in 4-in. widths, rebated and under-nailed. The internal walls are fixed with Parian cement on a backing of Portland cement, and most of the lavatories, &c., are entirely lined with glazed tiles. The wards are warmed by double open ventilating fireplaces placed back to back in the centre of the floor and with descending smoke-flues, a current of fresh air being induced into the body of the grate and passing into the wards at a moderate temperature. The corridors and waiting-rooms are warmed by hot-water circulation, coils being placed in the wards to assist in raising the temperature in extreme weather. The drains are laid in straight lines with manholes at the junctions, each section of drain being ventilated. In the rear of the hospital is a large garden, affording a pleasant retreat for the inmates, and with ample space for a future extension.

The works have been executed by Messrs. Lannance & Sons under the superintendence of Mr. Graham, the architect to the Governors.

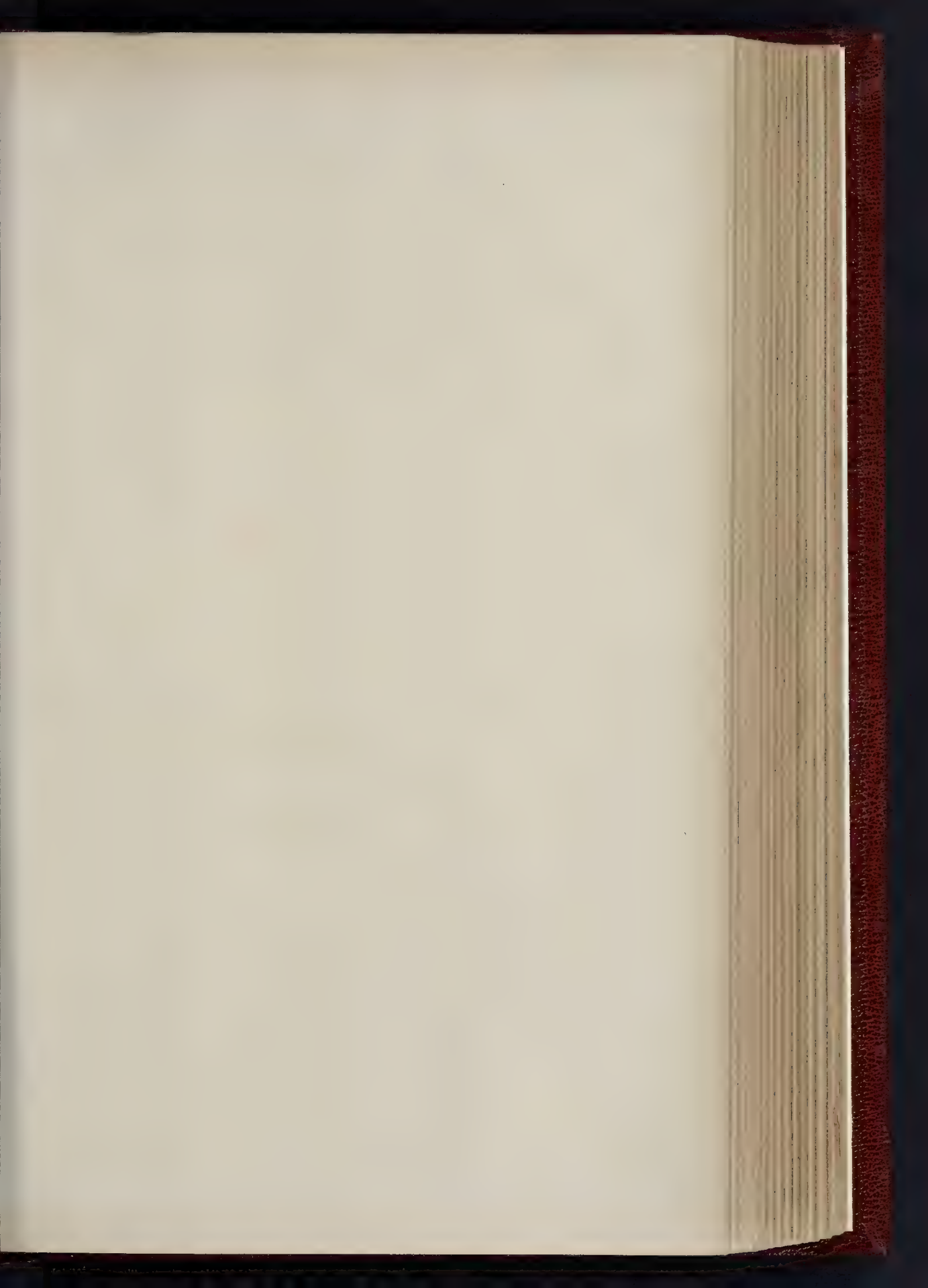
**The Architectural Association.**—As will be seen by an advertisement on our front page, a special excursion of the members of the Association will be made on Saturday next, October 3rd, to Bisham Abbey and Great Marlow. At the Abbey House special facilities will be afforded for sketching.

\* Since its foundation it has relieved nearly 24,000 persons suffering from this malady. No restriction placed on the admission of outpatients, the number of which amounts to nearly 800 constantly under treatment.

## FRESCOES IN THE CHAPEL OF THE MERCERS' COMPANY.

THESE frescoes were painted recently for the Chapel of the Mercers' Company, by Mr. P. H. Newman. The walls of the chapel having been previously painted, so rendering spirit fresco inadmissible, the artist painted them on canvas,



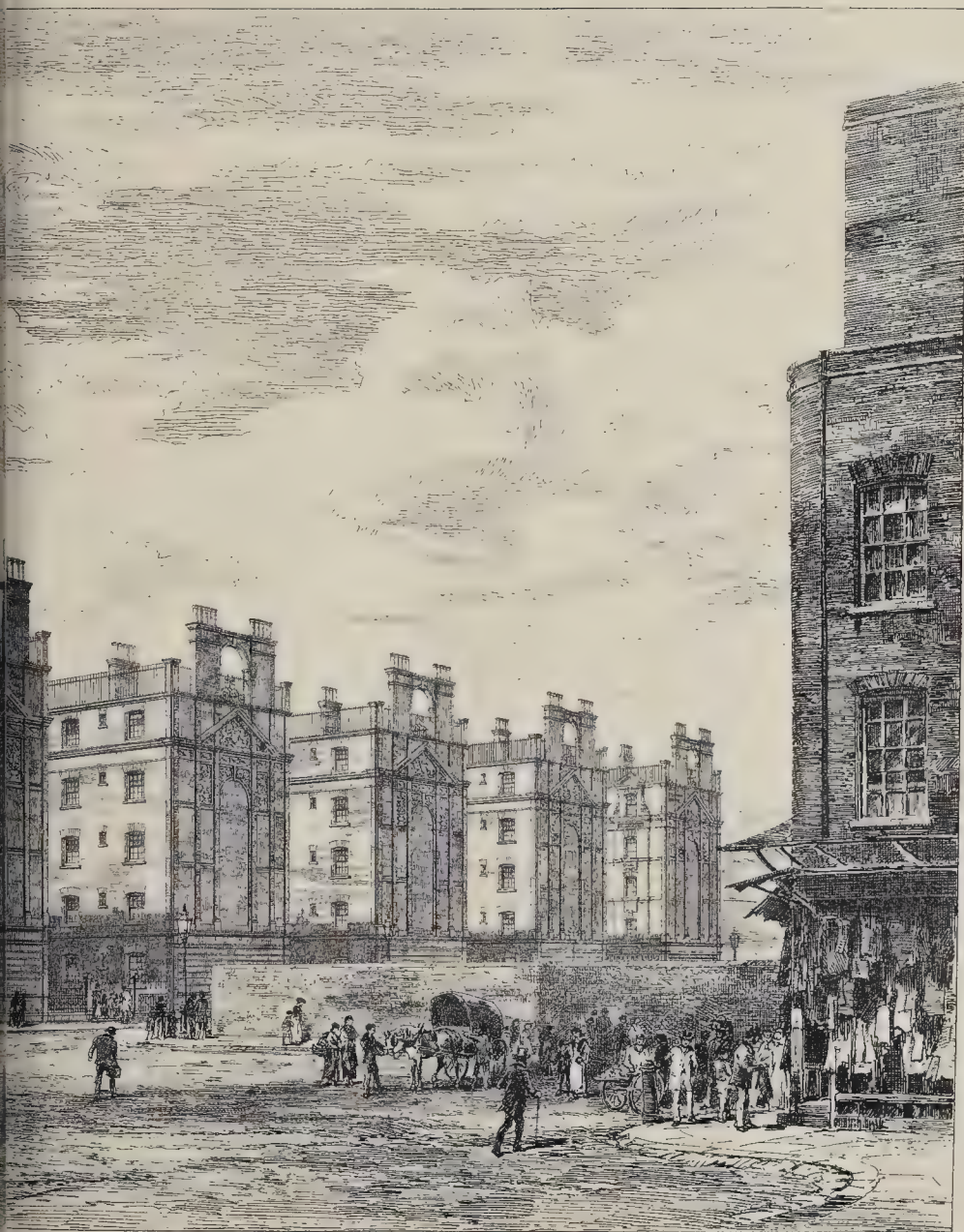




C. F. Kell Photo Lith & Printer

ARTIZANS' DWELLINGS, PETTICOAT SQUARE



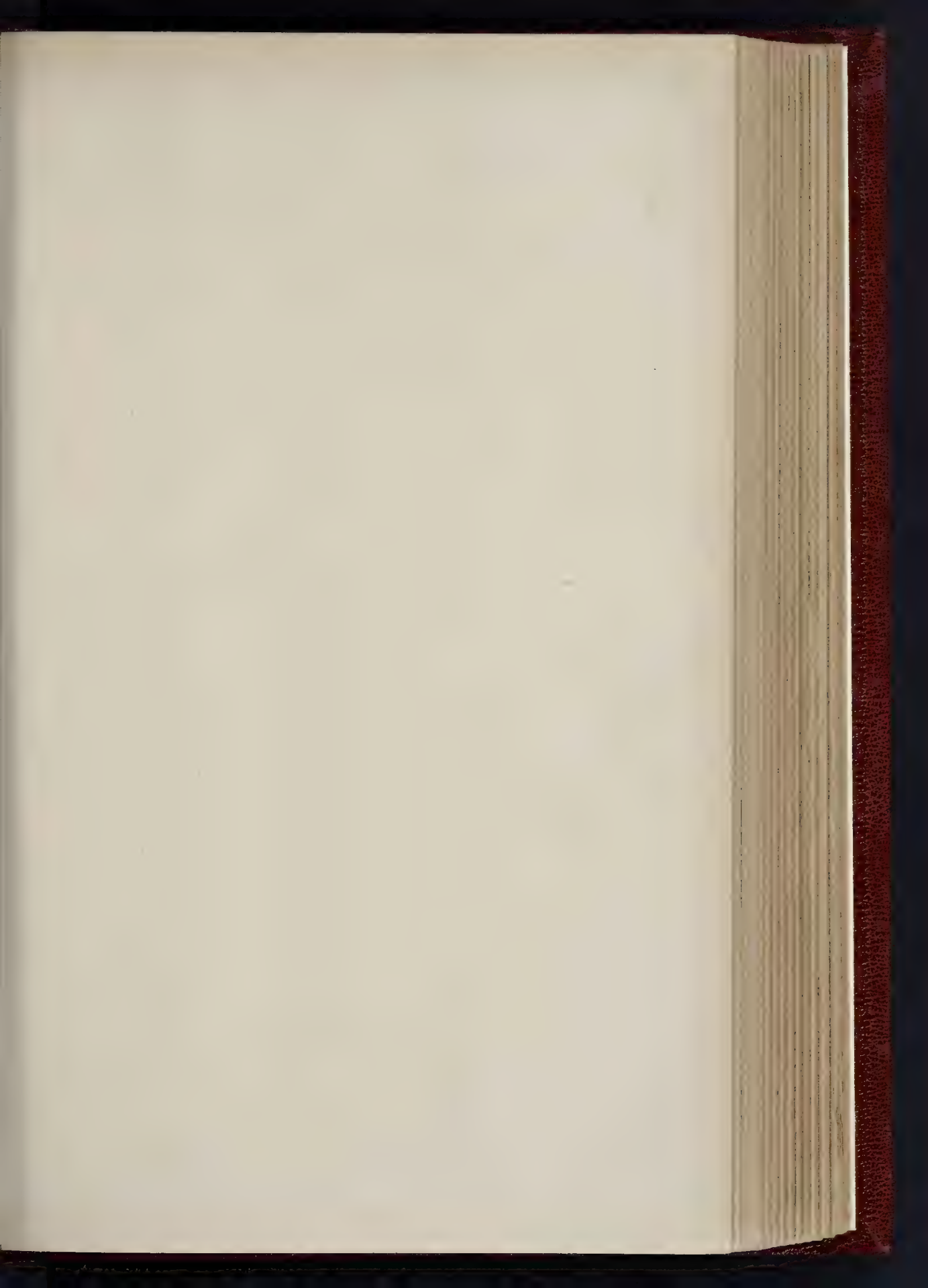


8 Castle St. Holborn, London E.C.

W. HAYWOOD. M.I.C.E. F.R.I.B.A., ARCHT. T.





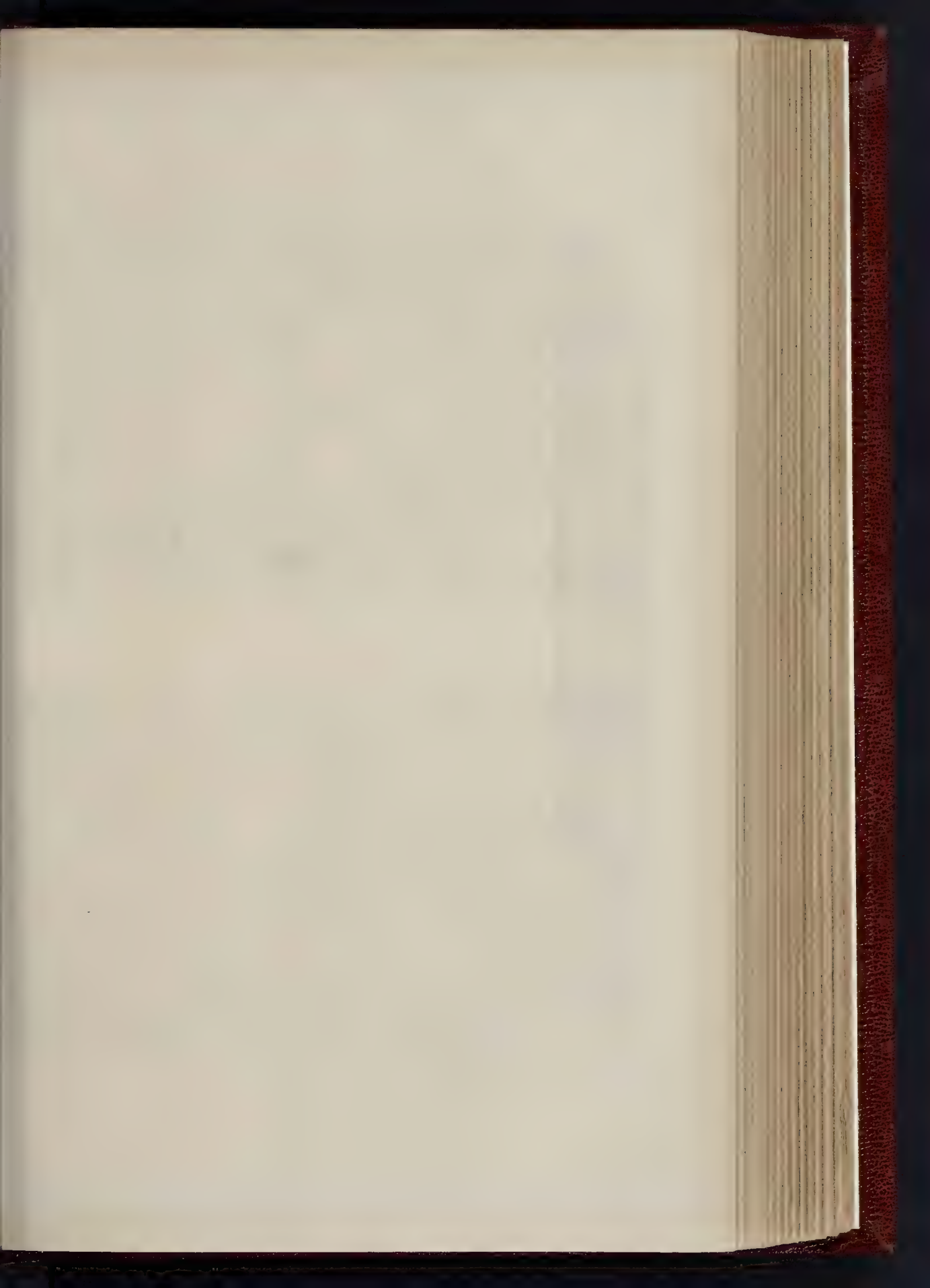


THE BUILDER. SEPTEMBER 26, 1895



THE NEW CANCER HOSPITAL, BROMPTON. MR. ALEXANDER GRAHAM, F.R.I.B.A., ARCHITECT.

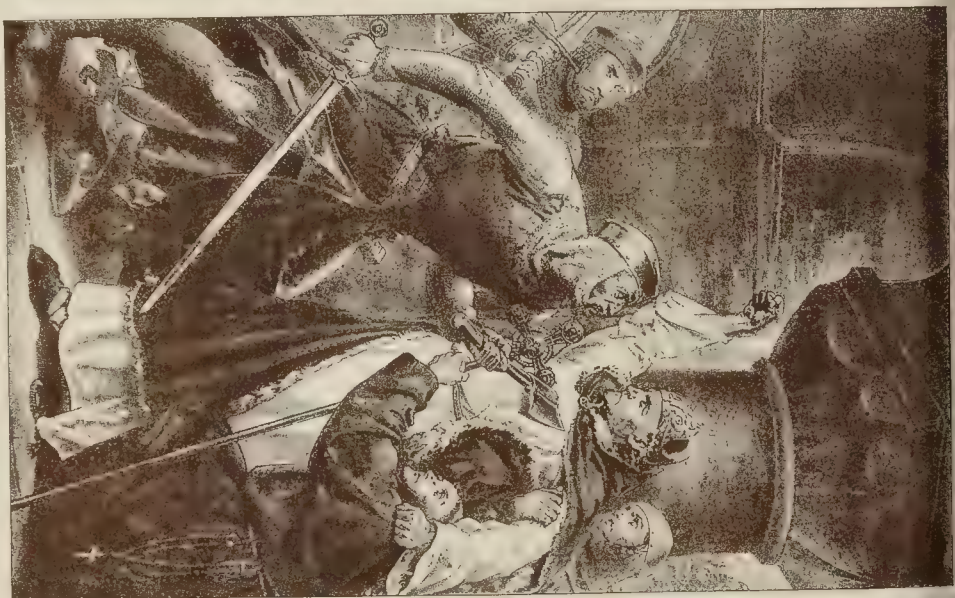






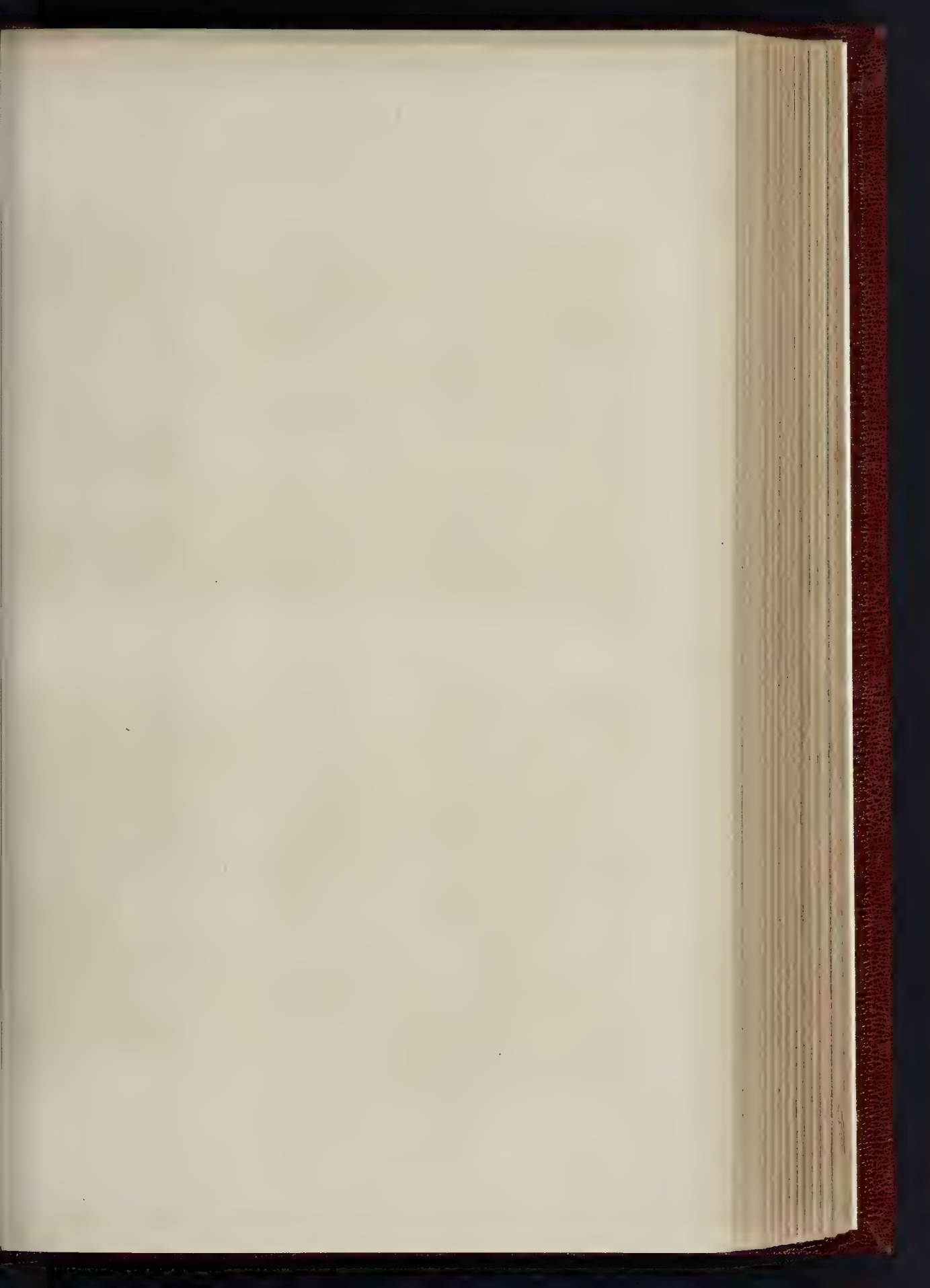
THE SYSTEM OF ST. THOMAS À BECKET GRANTING LANDS TO THE MERCERS.

FRESCOS IN THE CHAPEL OF THE MERCERS' COMPANY, PAINTED BY MR. P. H. NEWMAN

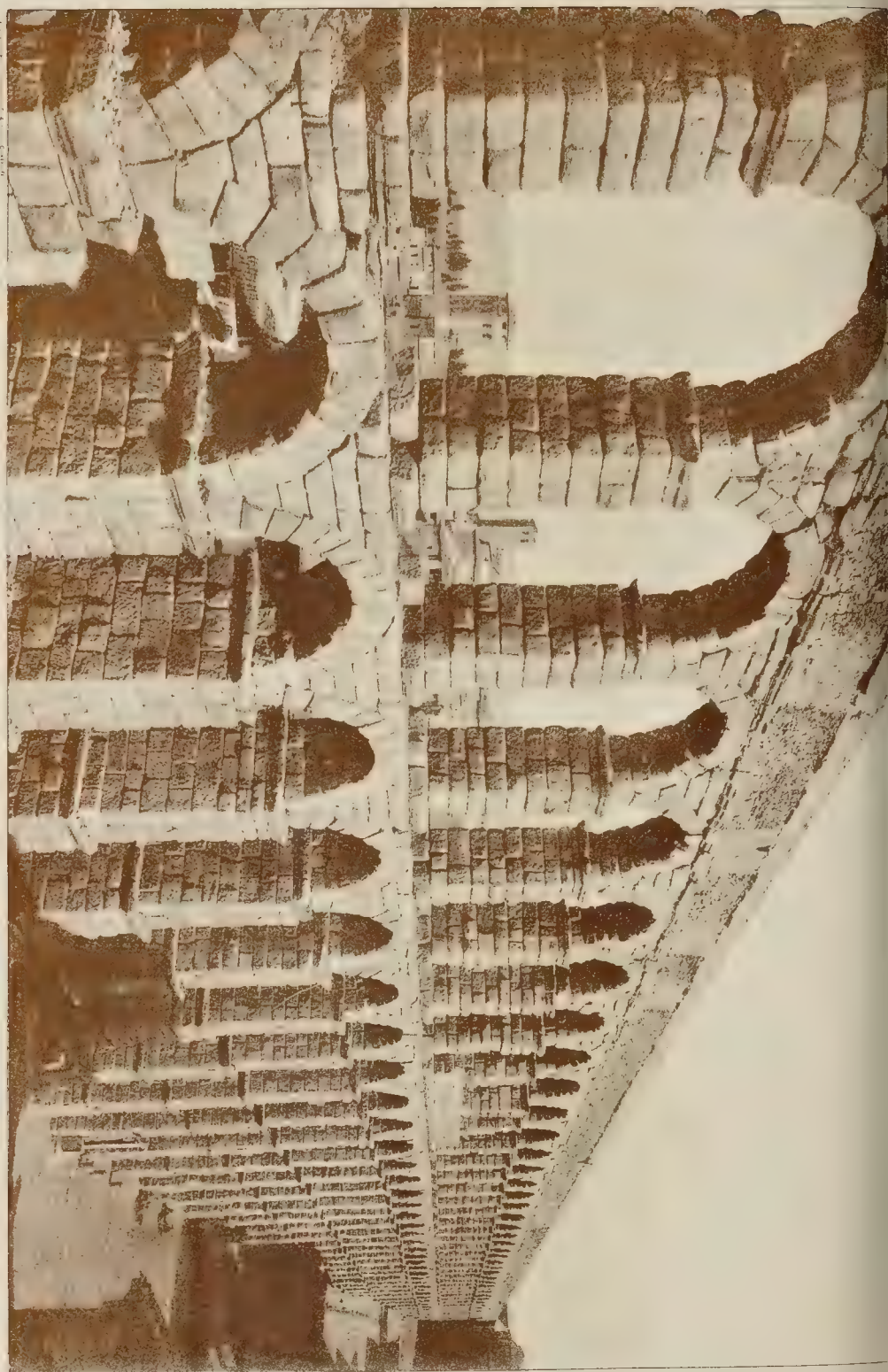


THE MURDER OF ST. THOMAS À BECKET

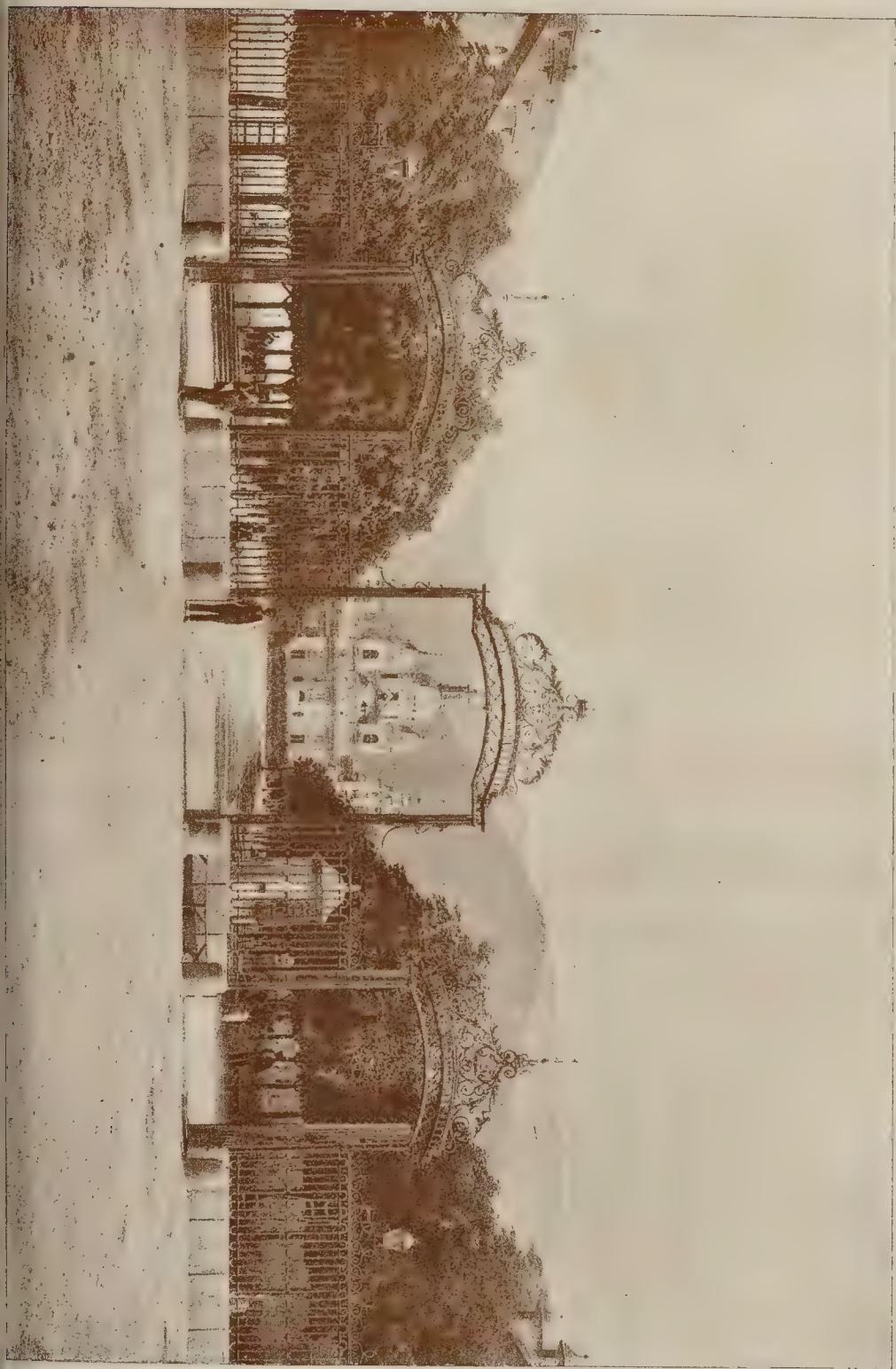




ANCIENT AMPHITHEATRE, SEGOVIA



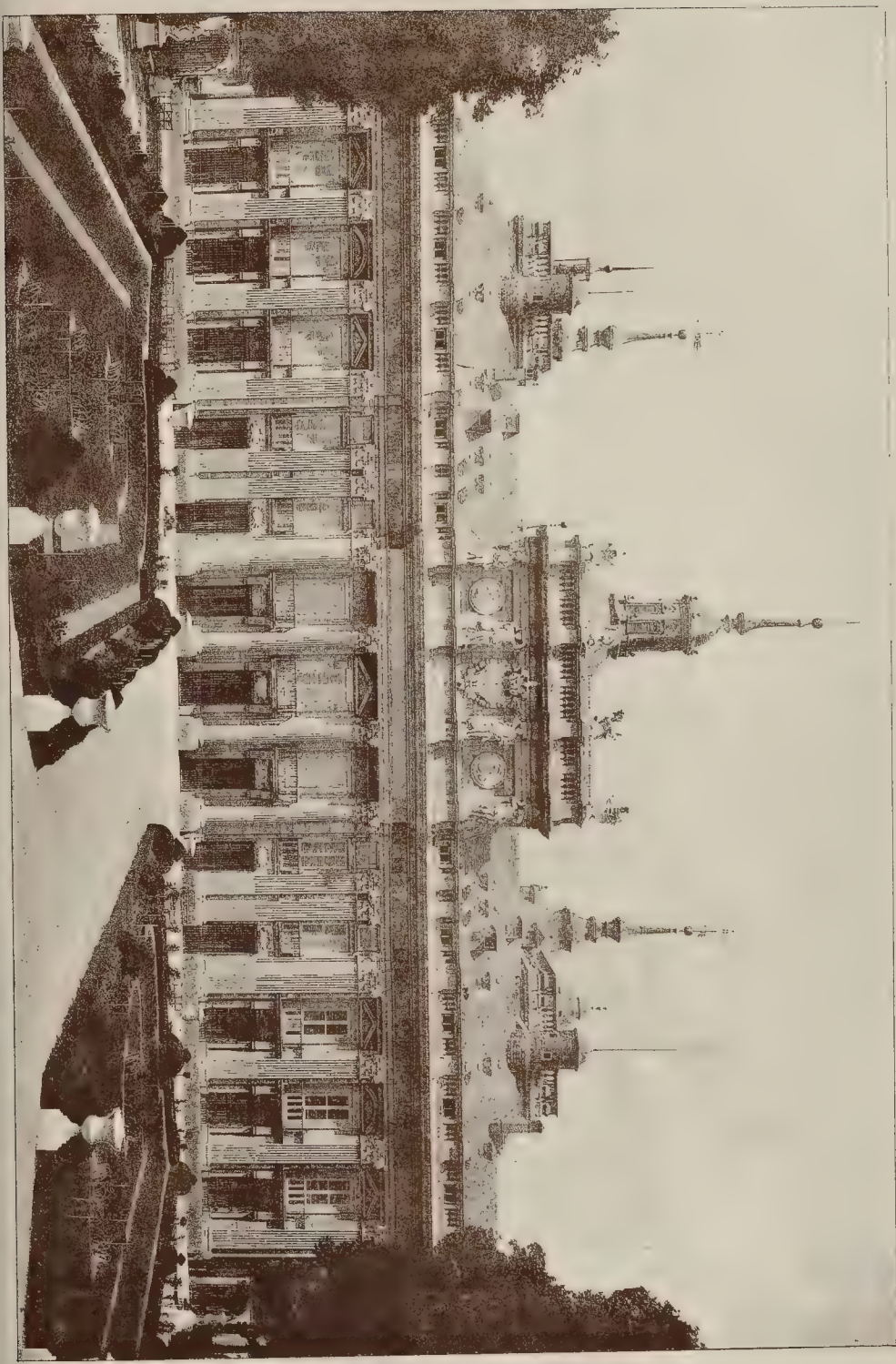








W. PHOTO. STRECHER & CO. LONDON



SAN ILDEFONSO.—CENTRE PORTION OF THE PALACE.



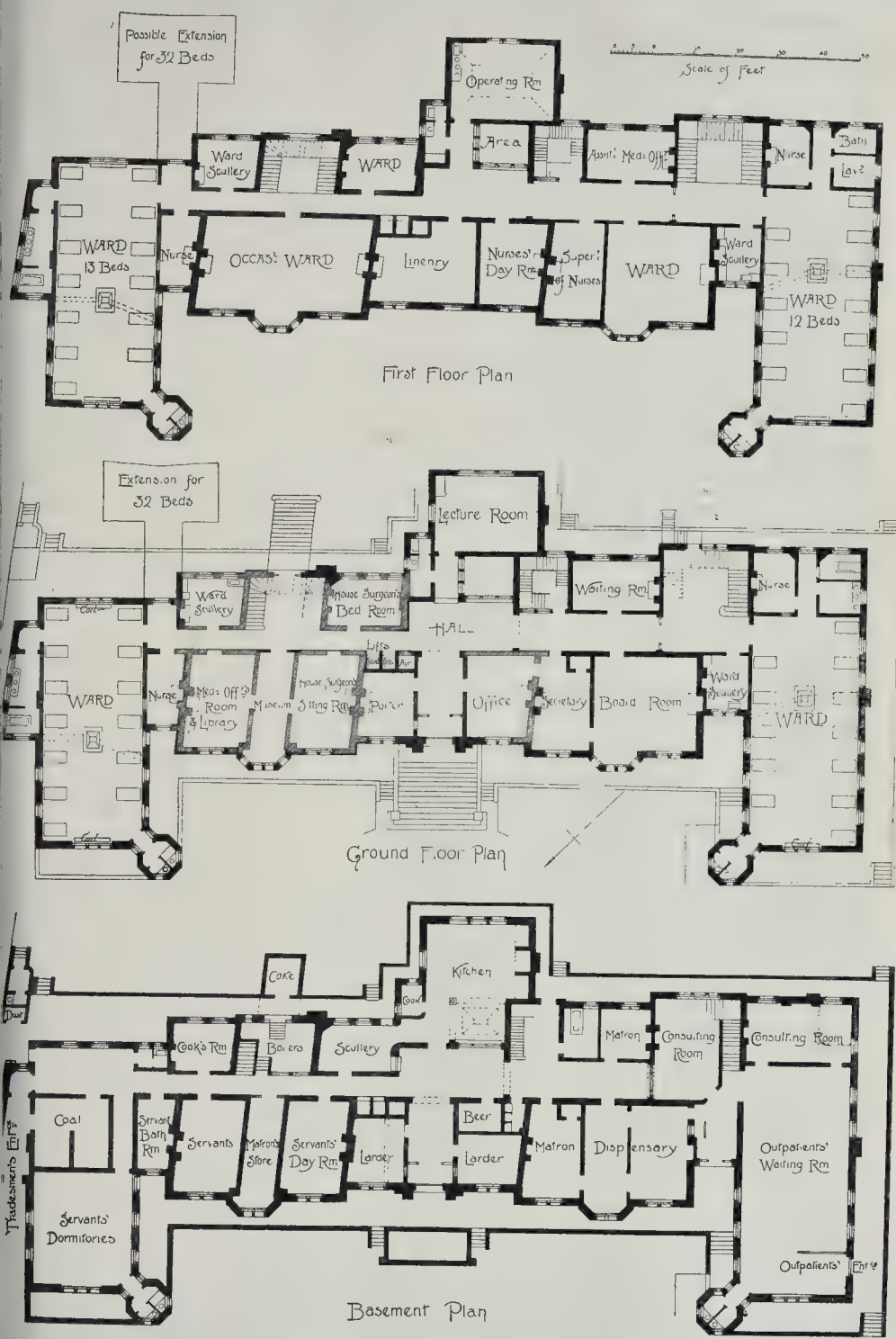




ELJOE RESIDENCE, TAPLOW. MR. I. T. WALFORD, ARCHT. ET.







The New Cancer Hospital, Brompton.—Plans.

# THE HEALTHY HOUSING OF THE PEOPLE.

SANITARY INSTITUTE OF GREAT BRITAIN.

THE address given on Thursday last by Mr. Percival Gordon Smith, F.R.I.B.A. (Architect to the Local Government Board), as President of Section II. ("Engineering and Architecture"), contained some very interesting observations on many of the numerous questions which are included within the scope of those branches of the constructive arts, especially as they affect the physical health of the people. It included a *résumé* of the legislation of recent years as affecting sanitary progress, and a review of the administrative labours of the Local Government Board. Mr. Gordon Smith pointed out that the education of the public in the appreciation of what is healthy, and the desire to adopt proper sanitary arrangements, cannot fail to encourage, among other measures of advancement, the adoption and efficient application of proper codes of by-laws as a means of controlling the details of the construction of domestic buildings; and this,—the value of which can hardly be over-estimated,—is, he thinks, gradually progressing in a surprisingly rapid manner. Looking back some fifteen or twenty years, how rare was it then to find even such common arrangements as disconnected waste-pipes and ventilated soil pipes, arrangements which now-a-days many people look for in one form or another as a matter of course. Then there are the arrangements for drain ventilation, for rendering building sites wholesome, for securing adequate open space about houses, for ensuring a proper kind of closet, proper privies and ash-pits, and a host of other details of importance. The education of the people in the importance of sound and healthy dwellings might, he urged, be expected to bring about improvement, for at present it frequently happened that, owing to the apathy of the ratepayers who annually elect the members of the local sanitary authorities, the successful candidates were persons who were directly or indirectly interested in evading some of the most valuable by-laws, with the main object of effecting some saving in the first cost of building. Sometimes a candidate would advocate his claim for support at a local board election on the ground that, being a builder, he is a "practical man," and, therefore, would be more eligible for the post than any one else. Another candidate asserts that his first object on election will be to oppose expenditure. Mr. Gordon Smith said that such candidates deserved no support at the hands of the ratepayers. The so-called "practical man" was generally one of the most impractical, who had some other object in view than the common interest of the district. The Sanitary Authority had, or ought to have, competent skilled advisers in the persons of the medical officers of health, the surveyor or engineer, the clerk or lawyer, and so on; and they should appeal to those officers for advice on the several matters with which they are respectively concerned, and then use their own common sense in the adoption of that advice just in the same way as any individual who consults his doctor, architect, or lawyer, uses his own judgment as to the adoption of the advice he receives. Again, the man who went on to a local board to oppose all expenditure clearly was unfit for the post, as he overlooked the fact that the *raison d'être* of the Board was to perform certain duties necessary to the health and well-ordering of the district, and that the question of finance was necessarily a secondary though not much less important matter, the duty attaching to this being to secure the most complete efficiency at the least possible cost to the ratepayers. After discussing the question of by-laws and also the requirements of water-supply and efficient sewerage, Mr. Gordon Smith made the following observations with regard to the housing of the working classes:—

We have heard a great deal during the last few years about the dwellings of the poor, and quite recently we have had the advantage of considering the reports of the Royal Commission on the Housing of the Working Classes. It is, however, often forgotten that the subject is an old one. Shortly after the first constitution of the Poor Law Commission, about 1835, the condition of the labouring classes attracted attention, and in 1839 the Poor Law Commissioners were directed by the Queen to make an inquiry on the subject, and in 1842 the results of that inquiry were framed by the secretary of the

Commission, Mr. Edwin Chadwick, in a report which, to this day, is regarded as quite a standard work on the subject. The author of that report, I am pleased to say, is still among us, and actively works to promote the sanitary welfare of all classes. The name of Edwin Chadwick, C.B., will ever be honourably associated with the subject of sanitary engineering and architecture. That report also contains a plan suggested by Mr. Sydney Smirke, the eminent architect of that day, for a so-called "public lodging-houses," containing in three stories some fifty or sixty separate single-room tenements. Shortly afterwards, societies were formed for the purpose of improving the condition of the dwellings of the labouring classes, and one of these societies, under the presidency of the Prince Consort, exhibited at the Great Exhibition of 1851, a block of model houses. Other societies, having similar objects, became established in the provinces, and various model villages were formed, as at Saltaire, near Bradford, Ackroyd, near Halifax, &c. Still later, we have the effects in the metropolis of Sir Sydney Waterlow's Society, and the trustees of the Peabody Bequest, besides numerous other societies which have produced numbers of small houses, such as those of the Queen's Park and Shaftesbury Park Estates in London, and others elsewhere.

There is thus evidence of much useful work having been done in the way of providing improved dwellings for the people, and some idea of the extent of it may be inferred from the fact that in London alone no less than twelve millions of money are said to have been invested in buildings containing separate tenements for the accommodation of the working classes. But notwithstanding all that has been done in this direction in the last fifteen or twenty years, the problem seems still as difficult as ever, and, according to evidence taken by the Royal Commission, the condition of the working classes is still, in many places, more or less a scandal to the times. The normal death-rate of London, as a whole, is about 21 per 1,000, and when we read that in some parts of the metropolis the death-rate is stated to have reached, in 1882, 44 and 53·7 per 1,000, while the rate, calculated for a small number of houses in one particular part, reached 70 per 1,000, or two or three times as great as the average; and in certain parts of some of the large provincial towns the rate is still said to be "very high," the necessity for agitation, in order to remedy this state of things, is at once apparent. There appears in this, as in other matters demanding attention, to be a vast quantity of remedial power available, but a lack of readiness on the part of those in local authority to apply that power. Here, again, we come to the necessity, as it seems to me, for stirring the public to demand that those elected to positions of responsibility in the matter should use the powers vested in them for dealing with these important subjects. Important they certainly are, for the results of neglect to use the existing powers already possessed have led to such serious overcrowding as to affect the health and working power of the inhabitants in a manner that altogether fails to be illustrated in the death-rate returns, even high as they are. The children are permanently injured by it, and the adults are likewise injuriously affected by it in health as well as in means; for it has been found on inquiry that, on the lowest average, every workman or workwoman in certain overcrowded localities, lost about twenty days in the year, not from illness, but from sheer exhaustion and inability to do work; and this at a very moderate wage per diem would amount in the aggregate to a not inconsiderable sum in the year. Overcrowding in a house is, by statute, a nuisance which can be dealt with by law. Local authorities, moreover, have, or can have, full power to control the number of persons, not members of one family, who may occupy a house, or part of a house, which is let out in lodgings; they can also have such houses registered, inspected, and put into and kept in proper sanitary condition. But hitherto very few authorities have assumed these powers, while many that have been invested with them have entirely failed to enforce them. The provisions of the Artisans' Dwellings Acts of 1869 and 1882 (Torrens), and of the Artisans and Labourers' Dwellings Improvements Acts of 1875 and 1882 (Cross's Acts), and the Labouring Classes' Lodging-houses Acts of 1851, 1866, and 1867, contain very extensive and useful powers for dealing with the subject where

desired by the local authority. Local authorities throughout the kingdom have been reminded of these powers, and useful digests of the Acts have been sent to them, and still all the evils,—moral and sanitary,—of overcrowding continue. Let us hope that one of the useful result of this Congress will be to help to stir up the public to demand energetic action of sanitary authorities to use the powers they already possess, and thus diminish the scandalous conditions which have been recently referred to in the Report of the Royal Commission on the Housing of the Working Classes.

With regard to the blocks of artisans' dwellings and model lodging-houses which have sprung up in various parts of the metropolis, and in some of our more populous provincial towns, all will agree that the clearing of crowded areas covered with the worst forms of dwelling-house is in itself a most excellent move; but I look with grave apprehension upon the vast piles of buildings that are often erected with the avowed object of affording accommodation for the people who have been displaced, but which actually get occupied by a different and higher class occupier, thereby tending to aggravate the overcrowding already existing in neighbouring districts. One sees huge blocks,—five, six, or seven stories high,—sometimes singly, and sometimes detached, but in such close proximity to one another that the sun can never reach parts of the internal open spaces and so that the air in those spaces must be more or less stagnant. Some of these buildings contain hundreds of separate dwellings, each dwelling holding on an average four or five persons. Such buildings, I maintain, are unworthy of their prime object. They may deceive their promoters at first by appearing fairly wholesome and, in comparison with the houses and tenements previously occupied, as being an improvement; but I fear that after the lapse of so many years they will become unwholesome and be regarded with diminished satisfaction, while their death-rate, which in their early years is generally low, will increase. Indeed, in some of the blocks that have been erected in London, there are not wanting indications that, from some cause not at present definitely explained, the infant death-rate has been excessive, and even greater in the block of dwellings than in the surrounding unrefined neighbourhood.

I am confident that the massing together of vast numbers of human beings in dwellings of great height and capacity,—rooms piled on upon another to a height of 60 ft. or 80 ft. or more,—is not a proper system. We cannot with impunity crowd an unlimited number of human beings on a given area. This has been decided with respect to the sick, and is equally evident with respect to children, and similar conditions will, I believe, come to be recognised with respect to people of ordinary health and habits. There are doubtless degrees of relative proportion of people to area according to their condition, and to a certain extent according to the character of the building and its surroundings; but hitherto we have not arrived, so far as I am aware, at the precise limits of proportion of ordinary population to area. The subject is one which deserves careful attention, and, indeed, has not been altogether overlooked by some of those concerned with the more recently designed blocks of dwellings in London. The danger of piling up these dwellings in buildings of great height has received illustration in the older parts of Edinburgh, where the houses, as you are aware, reach eight or nine stories in height, and have no internal connexion with drains; the refuse is removed in tubs daily; and there is an excellent water supply. I am assured on high medical authority that notwithstanding these arrangements, the first cases of typhus almost invariably occur in the upper stories.

It has been my good fortune to have opportunities of noticing the arrangement of various institutions having for their object the housing of large numbers of persons both in health and in sickness of body and mind, of old and young. I look back at many old buildings, whether hospitals, asylums, workhouses, schools, and the like, and find enormous blocks containing wards ranged along both sides of main passages, and holding vast numbers of human beings under one roof in practically one atmosphere. That arrangement of building may no longer be regarded as wholly obsolete, and as having given place to what is known as the pavilion



om, under which the building is sub-divided into a number of separate blocks or pavilions, containing a comparatively small number of inmates, and affording far greater facilities for effectual ventilation of the apartments, as well as for the access of light and circulation of air about the pavilions. This system in one form or another is now, in principle at any rate, universally adopted for all well-arranged institutions intended for large numbers of persons, but many instances I have noticed that the advantages of the separate pavilion system are completely counteracted by the way in which several pavilions are joined together, solely for administrative reasons, by enclosed corridors, passages, ground, and one-pair stories, and, by means of lifts for coals, lifts for patients, shoots for dust and for soiled linen, recess well-holes, and the like, the several blocks or pavilions have been most successfully transformed into one uniform building, losing one and the same atmosphere throughout every part of it. The objections to these arrangements, by which the prime object of the pavilion system is defeated, are perhaps more numerous when adopted in buildings occupied by a number of sick persons or by children, than by any other class of building, and I am under the impression that in England, while we attain much success at perfection in detail arrangements, we are considerably inferior in the execution of the broad principles of arrangement to some of our Continental neighbours. The hospitals erected in the last eight or ten years in some of the Continental cities and towns are specially worthy of attention in these respects. They lead over large areas of ground,—in some instances perhaps needlessly large,—the wards being only one story high, absolutely detached from another or having only a covered way between them, and being limited in size to the requirements of some fourteen to twenty beds, being raised on arches well above the ground, and arranged so that the patients while in bed may be wheeled into outside balconies, so as to have the advantage of treatment in unenclosed air. Such hospitals, and they have been fully described in recent works on the subject, seem to me to approach nearly perfection of arrangement, and to afford examples such as it is difficult to find at home. In respect of children's buildings, too, the dangers of concentrating large numbers of children in dormitories, or, indeed, any confined space, have long ago been demonstrated as tending to impair the health of the inmates, and to aggravate any tendency to disease. There is no necessity for placing many children in dormitories, and the massing together of large numbers in school and class rooms is only required by reason of the comparatively short hours those rooms are occupied. And even here could be a boon, having regard to the small amount of space usually allowed to each child, if the school and class rooms could be completely vacated, as recommended by Mr. C. E. St. John, for ten minutes or so every hour, and, by means of open windows, they could be completely flushed out with fresh air at frequent intervals. The system of arranging domiciliary wards upon what is known as the cottage-home principle, has so many advantages, sanitary and otherwise, that it deserves attention by all who are concerned in the welfare of the young. It has been adopted in recent years for many infirm and poor-law institutions, and I have frequently heard it spoken of most favourably. The schools of the Leicester Poor Law Union, which are at Countesthorpe, are upon this plan, and will well repay a visit.\*

#### CIRCULAR HOSPITAL WARDS.\*

My proposition for constructing hospital sick wards upon what is known as the "Circular Ward" was first made in this country during the latter part of 1878, about the same time that the foundation stone was being laid in honour of a hospital intended to be built upon the same principle.

The design for this building, the Antwerp Hospital, having received the approval of the Municipal Administration of the town, was referred to the consideration of the Council of the City of Antwerp, but this body strongly opposed the erection of circular wards upon the plan which, now the building is erected,

Health Exhibition Literature, vol. 1, p. 378. A paper by Mr. H. Saxon Snell, F.R.I.B.A., read at the Congress of the Sanitary Institute of Great Britain, at Leicester.

would appear to have been correct. Nevertheless, the work was proceeded with, and the building is now opened, and may be inspected by those interested in the question.

No other Continental nation has, to my knowledge, considered this new system worthy of imitation, but in England many similar hospitals have been erected, and it is, I believe, in contemplation to erect others.

There is something very fascinating about the conception of a circular ward, and superficial consideration of the question would lead to a belief in the soundness of the arguments advanced in favour of the system; indeed, I was myself disposed, before critically examining the matter, to allow that this adoption might possibly be productive of some, if not all, the benefits promised by its advocates. This illusion was, however, dispelled when lately I had occasion to study the question in all its aspects for the purposes of a report to a public body prepared to erect this class of wards upon my recommendation, and I propose now to show the reasons that led me to the conclusion that parallelogram-shaped sick wards are in every respect much more economical both in first cost and in management, and that no advantage is to be attained by the increased outlay consequent upon the erection of wards of circular shape.

My present remarks will be confined to a consideration of the erection of wards for general hospitals, and I do not propose in this paper to deal with the question in its application to fever or other wards for special cases. Nevertheless, I am equally convinced that the circular system as now advocated is wrong in any kind of hospital building, whatever be its special use or locality; but to deal with the question in its application to other than ordinary hospitals would involve considerations which the time at my disposal on this occasion will not allow of being entered into.

It will be well to consider what are the conditions necessary to be observed in the planning and construction of general hospital wards.

First as to the number of patients. I have the authority of Miss Nightingale, and of many hospital superintendents, for stating it to be essential that, besides the ordinary nurses and attendants, every ward should have the constant presence of one head nurse in the day time and of one nurse at night time, and that those head and night nurses could each properly overlook forty patients as a maximum; but taking into consideration all the essentials for proper discipline and facility of administration, the number of patients in any one ward should not exceed thirty-two or be less than twenty; also, that in all cases one or at most two separation wards, each for the accommodation of one or at most two patients, should be attached to the large ward, but not so as to communicate with it directly. All the wards should, however, adjoin the rooms occupied by the nurse having charge of the patients contained in them.

Except in the case of separation wards, wards of small size are decidedly objectionable, because they are (says Miss Nightingale) "unfavourable to discipline, inasmuch as a small number, when placed together on the same ward, more readily associate together for any breach of discipline than a larger number." And it is also pointed out by her that one head-nurse, or one night-nurse, could not so efficiently superintend and overlook a number of small wards as one large one.

Each large sick ward, whether it contains ten or thirty patients, must have attached to it at least two water-closets, and a slop-sink, separated by cross-ventilated lobbies. A bathroom should also adjoin each large ward. It is therefore clear that the fewer the patients in each ward the larger will be the total number of nurses required in the establishment, and the greater will be the multiplicity of nurses' rooms, water-closets, slop-sinks, bathrooms, and other sanitary offices.

Suppose a hospital, to be designed for the reception of 576 patients, 540 of whom are to be placed in eighteen parallelogram-shaped wards containing thirty each, and the remaining thirty-six in smaller and adjoining separation wards. If the buildings are three stories in height there would be six pavilions, but if, as I shall show, twenty-two patients only are to be placed in the large wards because they are of circular shape, then eight pavilions would be required instead of six, and twenty-four wards

instead of eighteen. In both cases these wards and pavilions are assumed to be of the same size.

It has been shown that the services of one head and one night nurse must be provided for each large ward, and it therefore follows that the adoption of this circular plan would involve the additional cost of twelve nurses for the six extra wards.

The two extra pavilions containing these six wards would also necessitate the additional services of one scrubber and one porter for carrying coals and meals and attending the fires, furnaces, &c., and the salaries, uniforms, and maintenance of these fourteen additional officers cannot be put at less on the average than 50*l.* a year each, or a total of 700*l.*

The additional cost of fuel for the warming and hot water supply to these two extra pavilions may be put at a minimum sum of 200*l.* per annum, and the outlay for soap, soda, &c., for cleaning, and the periodical white-washing, painting, and repair cannot be put at a less sum than 100*l.* per annum. Therefore, the total additional establishment charges consequent upon the adoption of the circular system would be 1,000*l.*, as follows, viz.:

|                              |                                |        |     |
|------------------------------|--------------------------------|--------|-----|
| 12 extra nurses              |                                |        |     |
| 1 " scrubber                 | at 50 <i>l.</i> per annum each | 2700   | 0 0 |
| 1 " porter                   |                                |        |     |
| Extra fuel                   |                                | 200    | 0 0 |
| Soap, soda, &c., and repairs |                                | 100    | 0 0 |
| Total                        |                                | 21,000 | 0 0 |

This sum capitalised at three per cent. (thirty-three years' purchase) would amount to 33,000*l.*, and this represents the additional cost of maintaining the 576 patients supposed to be housed in wards designed upon the circular system.

The additional cost per 1,000 patients would be 57,321*l.*, and this cannot be considered a large estimate, seeing that Miss Nightingale in her work on hospitals shows that where nine patients only are contained in a ward as against thirty-two patients in a ward, the additional capitalised outlay, for nursing only, would be 196,775*l.*

Now, as to the relative cost of erecting the buildings,—a question involving primarily a consideration of the requisite sizes for the wards.

There must be much diversity of opinion amongst medical men and other authorities upon this point if we are to judge from the dimensions of recently-constructed hospitals.

Captain Douglas Galton considers that between 1,200 and 1,300 cubic feet of air space per bed is all sufficient. Miss Florence Nightingale asks for from 1,200 ft. to 1,500 ft. Dr. Parke, speaking of hospitals generally, says that the space should be from 1,500 ft. to 2,000 ft. (the latter quantity referring, no doubt, to fever, and the former to general hospitals). Dr. de Chaumont in his report upon the Norfolk and Norwich Hospital, shows, upon mathematical bases, that where good ventilation exists no advantage is gained by making the air space of large wards greater than 1,200 feet per patient.

The report of the committee appointed to consider the cubic space of metropolitan work-houses and infirmaries states that the cubic space to be allotted to ordinary sick patients in large wards "should not be less than 850 ft.," but it is stipulated that no space above the height of 12 ft. from the floor line shall be included in the calculation. This committee consisted of the following eminent authorities, viz.:—Drs. Thomas Watson (chairman), Henry W. Acland, Francis Sibson, W. O. Markham, and John Randall, Captain Douglas Galton, Messrs. Uredale Corbett (Local Government Board Inspector), Timothy Holmes, F.R.C.S., and Charles Hawkins, F.R.C.S.

In my own practice, I have erected four large parish infirmaries, holding in the aggregate upwards of 2,500 ordinary sick patients, with less than 950 cubic feet of space to each, and the medical officers of these establishments have not found it necessary at any time to order the removal of any of the beds (as was contemplated), should one or more extraordinarily severe cases at any time be developed, and seem to call for increased space.

The Moabit Hospital at Berlin gives a space of only 864 cubic feet for each ordinary patient; but in this building one-fourth of the cases treated are stated to be of an acutely infectious character,\* and we may presume that a larger space would be allotted for this class of patient.

\* Notes on Hospitals, by Florence Nightingale. 1863.

\* Hospital Construction and Management, London. 1883.



Yet the death-rate at this establishment, I am assured by eminent men who have examined the returns, is not above the average of other German hospitals.

The proper size of hospital-wards is not, however, to be determined by mere considerations of the greater or less quantity of air-space requisite for the well-being of a patient, for Dr. de Chaumont, in his report before referred to, has clearly shown that where, by good ventilation, a proper change of atmosphere is constantly effected, it matters not, within reasonable limits, what is the size of the ward. The question must be decided principally by consideration of floor-space, and here, again, examples and opinions are sadly diverse.

The Moabit Hospital, and the four parish infirmaries previously alluded to, contain about 70 superficial feet of floor-space per ordinary patient, and this is the quantity recommended by the before-mentioned committee of experts.

Capt. Douglas Galton asks for from 90 ft. to 112 ft., Miss Nightingale from 100 ft. to 104 ft., and Dr. Parkes and Dr. de Chaumont, from 100 ft. to 120 ft. In each case these authorities seem to determine their maximum and minimum by the question of whether or no accommodation is to be provided around the bed for students, i.e., whether the hospital is or is not to be designed for a medical school.

The disposition of the superficial space determined upon, whatever it may be, involves two important questions, viz., the width of the ward, and the distance apart of the beds. Twenty-four feet is conceded to be, for all purposes of administration, an all-sufficient width for any hospital ward, and, inasmuch as it is of the highest importance that each bed should have the largest possible space surrounding it, this width would, I apprehend, never be exceeded, were it not for the desirability of reducing the length of a ward to within a limit not exceeding 120 ft.

In parish infirmaries the prescribed distance apart of the beds, i.e., the bed-space, is 6 ft.; but 7 ft. 6 in. or 8 ft. is the width more generally adopted; and hence it comes about that the breadth of the wards is necessarily increased in some buildings to as much as 30 ft. And here I would point out that the advocates of the circular ward system invariably and wrongly use the term "wall-space" as synonymous with "bed-space," or the distance apart from centre to centre of the beds, and they often improperly calculate this distance a part of the beds, by dividing the total length of the circumference of the circle by the number of beds, and so arrive at a deceptive result.

Take, for example, the description given in the *Builder*, of May 9th last, of "A projected Military Hospital," designed upon the circular system. It is there stated that the wards are each to be 66 ft. internal diameter, and that they are to hold twenty-six patients: thus (says the description) "each patient will have a wall-space of 8 ft."

As a matter of fact, if this military hospital is ever erected, and twenty-six patients crowded into its wards, each will have a lineal wall-space at the head of his bed of 7 ft. 4 in., but the corresponding distance at the bottom of the beds will be but 6 ft. 3 in.—that is to say (the beds being 3 ft. wide), the distance apart of them will be 3 ft. 3 in. only; and, therefore, if it is required to know what really will be the space given per bed in this proposed hospital, as compared with the quadrangular plan of ward, we must calculate the average distances apart as given above the beds at the heads and at the feet, and then, instead of the delusive 8 ft. of wall-space, we shall find that the actual bed-space per patient in this proposed hospital would only be 5 ft. 9½ in.

The above results would be arrived at by deducting 6 ft. 6 in. in width for each of the entrance lobbies, and then planning out the feet of the beds at an equal distance apart, and radiating them towards the centre of the circle.

Then, with regard to the height of hospital wards. It is only Professor Chaumont who expresses any decided opinion on this point, and the conclusion he arrives at, that 12 ft., or at most 13 ft., is all-sufficient, has since been confirmed by the results of experiments made by two eminent American physicians, Drs. Cowles and Wood,\* who proved to their satisfaction that no benefit arises from making wards higher than 12 ft. It is also, no doubt, upon these

conclusions that the recommendations of the cubic space committee before referred to were based.

Most other authorities regard the question of height as quite subsidiary to that of floor-space, as decided by considering the width of the ward and the distance apart from centre to centre of the beds.

I have been particular in citing the opinions of these great authorities as to the requisite dimensions of ordinary wards, because I am about to show that it is practically impossible to design a circular hospital ward within the limits they have laid down without causing a needless multiplication of wards, ward offices, nurses, and domestics, resulting in an enormous and wasteful outlay, first in the erection of the buildings, and for all time in the annual establishment charges; and my argument would therefore admit of contention if it could be shown that in the illustration I am about to give I exceeded these limits, for it will be seen hereafter that the smaller we take the units of space the greater will be the cost of the circular as compared with the parallelogram-shaped ward; and I therefore propose to take for illustration a ward of dimensions which shall approach, as nearly as possible, the maximum quantities asked for by the before-mentioned experts.

A parallelogram-shaped ward (see fig. 2),

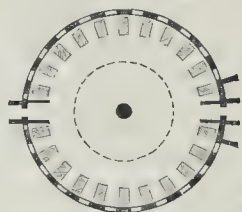


Fig. 1.

containing thirty beds, and being 28 ft. wide, 120 ft. long, and 14 ft. high, will contain 1,568 cubic feet, and 112 ft. of floor area per patient, whilst the bed space will be 8 lineal feet per patient.

A circular ward (see fig. 1) of equal superficial floor space would be 65 ft. 6 in. in diameter, and if it is required (as for proper comparison it must be) to keep the beds the same distance apart as in the parallelogram-shaped ward, this space would not contain so many even as twenty-two beds. For, if we consider the feet of the beds to be 7 ft. distant from the outer wall (6 ft. 6 in. for the length of a bed, and 6 in. space between it and the wall), and the width of the two lobbies as 13 ft., we find that if there are twenty-two beds the lateral distance from centre to centre of the feet of each is 6 ft. 9 in., and the corresponding distance between the heads 8 ft. 8 in., thus giving an average distance of 7 ft. 8 in. only as against the 8 ft. space of the parallelogram-shaped ward. The result is that by the adoption of the circular plan we should have a ward containing less bed space, and, in round numbers respectively 41 superficial and 571 cubic feet per bed more than we started by admitting was necessary for the healthy condition of patients.

The dotted line upon the plan (fig. 1) encloses the centre space thus wasted in each ward amounting respectively to 896 superficial and 12,553 cubic feet.

Various ingenious suggestions have been made for the disposal of part of this space. One proposes to erect a staircase which, according to his plan, would occupy 250 superficial feet out of the 896, and at the Antwerp Hospital, a still less quantity is enclosed to form a room (ostensibly, but never, I believe, in reality) for the use of a nurse. But besides the practical inutility of adopting these expedients, it will be seen that any such obstruction would only augment the difficulties of cross ventilation already created by the necessity of having the windows between 60 ft. and 70 ft. apart.\*

What, then, is to be done with this superfluous space? It has to be built, to be kept clean, to be ventilated, to be heated; but, worst of all, it has to be paid for; and at what cost I will now consider.

The two additional pavilions previously shown to be necessary would cost, including heating, lifts, and gasfittings, 26,800l., and the outlay for the additional accommodation of twelve nurses, including furniture and accessories, would amount to about 700l., or together to 27,500l. It will be observed that I have not taken into account the fact that the six remaining wards being built upon the circular system must of necessity be of more costly construction than if they were built up on the parallelogram principle.

This sum of 27,500l. represents the additional cost for 576 beds, and is at the rate of 47,743l. per 1,000 patients. Adding to this the capitalised cost of nursing these 1,000 patients, previously shown to amount to 57,392l., we find that if the circular system is to come into vogue, we must be prepared for indulgence in the luxury (if it is one) at the rate of 105,135l. for every 1,000 patients.

Should it suggest itself to any one to inquire how a circular ward compare with a parallelogram-shaped ward if both were designed to contain thirty beds, an average distance of 8 ft. apart, it would be found that the circular ward must be 87 ft. 9 in. diameter, and consequently the waste or unnecessary space in the centre of it would amount to no less than 2,705 superficial feet. Moreover, it would be evident that the height of such a ward must be raised con-



Fig. 2.

siderably if any sunlight at all is to approach the centre of it, and supposing this additional height to be, say 3 ft., the quantity of waste or unnecessary space in one ward alone would amount to 64,180 cubic feet. But this is not all, for it would follow that the adjoining offices, separation wards, nurses' room, staircase, &c. must also be raised.

It will hardly be necessary, I think, to trouble you with the figures which would show the additional cost of this plan to be even greater than has been proved to result from a comparison of two wards of equal area, but with fewer beds in the one of circular shape. Neither need I point out to you how much all the other difficulties in regard to ventilation, lighting, heating, and want of cheerfulness would be enhanced.

Advocates of the system, however, say "we have nothing to do with the cost; what we desire is to erect that description of building, whatever it may be, which best adapts itself to the cure of the patients to be contained in it," and within reasonable limit this view of the question is no doubt a right one.

But I have searched in vain for any substantial arguments showing that from this point of view the circular is any improvement upon the parallelogram shape of ward, and I have little doubt that no such arguments could exist unless it can be shown that in contravention of Nature's laws air would as freely pass through a room from one side to another when the windows are 60 ft. or 70 ft. apart, as it would if those windows were from 24 ft. to 30 ft. apart. It would also have to be demonstrated that, in defiance of all mathematical rules, when the sun was shining, or the wind blowing, against the straight wall of a parallelogram-shaped ward, less air and sun would penetrate through its window openings than would penetrate an equal number of window-openings of the same size contained in the wall of a circular ward. And then, having proved this anomaly, it would be necessary to define the process by which as large a quantity of air and sun could be brought into the circular ward through its twenty-two windows as could be brought in through the thirty-four windows of the parallelogram-shaped ward.

This being made evident, the contention must be upheld that a ward having the distance of its parts from the windows varying from 1 ft. to 33 ft., is as cheerful as one the parts of which

\* Report of the State Board of Health of Massachusetts, 1879.

\* We pointed out the absurdity of this proposed use of the centre space long ago, in regard to the published plans of this hospital.—Ed.



similarly from 1 ft. to 14 ft. only. And it be shown that this cheerfulness will not be diminished by the height of the circular ward, one-fifth only of its diameter, as compared with the parallelogram-shaped ward, the height of which would be one-half its width. But, supposing all these difficulties to be surmounted, it will only have been shown that, in points referred to, the circular is as good as parallelogram system, and then what is left to compensate for the 105,000l. outlay before tried?

It cannot be contended that, for the purposes of a medical school, where it is desirable the most space for students shall be given round about the patient, the constriction of the feet of the beds, consequent upon their position towards the centre of the circle, is an advantage. It cannot surely be argued that the desirable arrangement to place a nurse (as the Antwerp Hospital) in the centre of a sick ward, breathing all day its more or less foul atmosphere, rather than that she should be placed in an adjoining room, having a window through which she could overlook the patients. For can it be said that, if this central space occupied by a staircase, such staircase should not be better placed (as in the parallelogram system) away from the ward and adjoining and giving direct access to the nurses' offices, separation wards, and other offices, and avoiding the necessity of all persons and goods passing through and disturbing the occupants of the large ward.

And if, then, these deviations from past practice cannot be shown to be improvements, it is left for those who would still be adherers of the new system to put forward as an aim for its superiority over the old one? I do not say, neither can I imagine.

#### TEMPLE BAR.

THE statement which we quoted from the *Metropolitan* three weeks ago, that Temple Bar to "re-appear in all its old historic and ætological proportions" (!) at the Albert Palace, Battersea, was, with much show of authority and superior knowledge, flatly contradicted by the *City Press* at the time. Nevertheless, the first-named journal seems to have been better informed on the subject than the *Metropolitan*, for at the meeting of the Court of Common Council on the 17th inst., Mr. Messrs Rogers, chairman of the City Lands Committee, presented a report on behalf of that committee, recommending that the several lots of Temple Bar, now lying near Kingston-street, should be given to the Albert Palace Company for the purpose of being erected at Battersea Park or on the confines thereof, of the removal and reconstruction being aided by the company, and the Committee advising such supervision and requiring such guarantee for the erection of the same in a satisfactory manner as they may consider necessary. We are glad to see (and especially now the Albert Palace is "in Chancery") that the absurd proposal was not adopted with the city that its proposers could have wished. Manners very properly pointed out that it did not appear from the report whether they were giving the stones of old Temple Bar to Battersea Park or to a Company. If only to latter, he should very strongly oppose the plan, and, in order that the information might be supplied, he moved the adjournment of the consideration of the report, which was accordingly adjourned.

A quote from the *Times* the following paragraph against the carrying-out of the ridiculous proposal of the City Lands Committee:—

"The destination of Temple Bar could not be decided by a single debate, we will venture to urge on the part of the proposal, which is being seriously made by members of the Court, to set it up as a kind of monument to the Albert Palace in Battersea Park. Nothing incongruous could well be devised. Surely the City has done injury enough to the fine old relic by giving it the Griffin in its place, without for ever converting it to become the ornament to a speculative place of amusement. The right place for Temple Bar is its days is amid the quiet and relative solitude of the Temple Gardens; and we had fondly hoped that this gem, so natural and obvious, had been already done."

It is not (as was suggested in the *Builder* a month ago) utilise the old gateway as an annex to the Temple from Temple-street, in the ramshackle wooden gateway which does duty there? The improvements now effected just outside this part of the

Temple would seem to give opportunity for this being done by co-operation between the Corporation and the Benchers of the Temple.

#### AWARDS AT THE ANTWERP EXHIBITION.

THE following are among the awards granted to British exhibitors in the Industrial and Manufacturing sections of the Antwerp International Exhibition:—

**Diplomas of Honour.**—West Central Sanitary Company, London; Otto Gas Engine Company (Crossley Brothers), Manchester; St. John's Ambulance Association, London.

**Gold Medals.**—F. C. Calvert & Co., Manchester; H. C. Stephens, London; P. A. Malmgren, London; Glenboig Union Fireclay Company (Limited), Glasgow; R. Hornsby & Co., Grantham.

**Silver Medals.**—Nettlefolds (Limited), Birmingham; Ed. Brooke & Co., Huddersfield; P. L. Simmonds, London; E. Renton Gibbs, Liverpool; Thomas Heron, London; Musgrave & Co. (Limited), Belfast; Saxby & Farmer, London; Wake & Dean, London; Revolving Ball Filter Company (Limited), London; Ipsen Terra-cotta and Fine Art Pottery, London; Ed. Smith & Co., Coalville; T. Bradford & Co., Manchester; Oakley Slate Quarries Company, Portmadoc; W. Smeaton, London.

**Bronze Medals.**—E. Smith & Co., Coalville; North British Rubber Co., Edinburgh; Glenboig Union Fire Clay Co., Limited, Glasgow; Scott & Cuthbertson, & Co., London; George Farmiloe & Sons, London; Archibald Smith & Stevens, London.

**Honourable Mention.**—George Wright & Co., London.

In the Fine Arts section, the following awards have been made:—

Sir F. Leighton, Diploma of Honour.

G. F. Watts, 1st Class Medal.

Philip R. Morris, 3rd Class Medal.

H. Moore, Honourable Mention.

H. Thornycroft, 2nd Class Medal for Sculpture.

#### ALLEGED "SHORT" QUANTITIES.

THOMPSON V. GETHING.

THIS action, which was brought by Mr. Richard James Thompson, builder, of Kidderminster, against Mr. Josiah Morris Gething, architect, of Kidderminster and Stourbridge, and set down for hearing at the Birmingham February Assizes, was referred to Mr. E. R. C. Kettle, of the Oxford Circuit, with Mr. Yeoville Thomason, architect, of Birmingham, as his assessor.

The action was brought to recover 280l. 19s. 5d., amount of damages alleged to have been sustained by the plaintiff in consequence of defendant's negligence and want of care and skill in not taking out the quantities carefully for the building of the Lea-street Board Schools, and for extras, knowingly and wilfully disallowed by defendant as architect to the Kidderminster School Board. The plaintiff sent in a claim against the School Board for about 280l., of which the defendant certified for 93l., and refused to reconsider his certificate. Plaintiff issued a writ claiming the whole amount from defendant, and refused to present his certificate for payment by the School Board.

Sittings were held by the arbitrator at Kidderminster and Birmingham. Mr. Miller Corbet, of Kidderminster, conducted the case on the part of the plaintiff, and Mr. Thomas Horner, of Brierley Hill, for the defendant.

The plaintiff subsequently abandoned his claim for extras disallowed, and increased his claim for loss by quantities to 397l. 14s. 10s. A great mass of evidence and figures was gone into, the hearing occupying twelve days.

The arbitrator has now published his award, which finds that the plaintiff suffered no loss from the defendant's negligence and want of care and skill as quantity surveyor, and adjudges the plaintiff to pay defendant his costs of the action, and of the reference and award, including the costs of the assessor. —Communicated.

#### "THE TROCADERO."

SIR,—In your issue of last week [p. 412] you attribute the design of the Trocadero Palace to M. Bourdais. If you allude to the building (now a museum) erected on the heights of the Trocadero for the 1878 Exhibition, it was designed by the late M. Davioud. R. PHÉNÉ SPIERS.

\*.\* The paragraph alluded to by our correspondent was simply a quotation from the *Standard*, and printed as such.

#### FIREPROOF PACKING.

SIR,—Having a number of hot-air flues to insert between joists, I should feel greatly obliged if any of your readers could inform us of the best material to use for preventing any chance of firing the woodwork? The lighter the material the better for the work. H. G. F.

#### "RANDOM COURSES."

SIR,—It was stated in a contemporary that to a Congregational Church at South Woodford, "externally the whole would be faced with Kentish rag stone, squared in random courses." Will any of your readers kindly inform me to which of the following that description applies.



Random Work.



Drop Courses, sometimes described as Coursed Work.



Irregular Courses.



Regular Courses.

In the description of all Kentish rag stone work it should always be stated if with rock face projecting, or hammer-dressed on surface, also if pointed in white or black putty.

WILLIAM H. PIPE.

#### HOW TO KEEP LEAD GUTTERS FROM BEING BLOCKED BY SNOW.

SIR,—As the winter season is drawing on, allow me to describe, and to give the public the benefit of, a plan by which, for more than twenty years, I preserved my house from overflow by any fall or accumulation of snow in lead gutters. It is very simple, inexpensive, and most effective.

Place stools or forms on legs in the gutters. Let them be of such a height that their edges shall be lower than the eaves of the tiles or slates by about a quarter of an inch, and let them extend in width on each side (if the gutter be between two eaves) half an inch under the eaves. If the width of the gutter requires the top of the stool to be of more than one board, it will be as well that the boards be not too closely jointed that the drip may pass through. The snow will lodge upon the stools, and, as it thaws, the water will trickle down from the roof under the snow and over their edges, and find a clear course beneath them. This plan renders altogether unnecessary any clearing by shovel or otherwise, which is most undesirable and often mischievous.

If the gutter be behind a parapet, let the stool on one side touch the inner wall of the parapet. The stools are best housed in summer and autumn, but this is not necessary if they be kept clear of leaves and nests, and be strong enough to bear the weight of a man or boy. J. G.

#### REINDEER INN, BANBURY.

SIR,—Referring to the drawing of the panelled room in the Reindeer Inn, Banbury, it may interest your readers to know that the present proprietor showed the members of the excursion a photograph from a painting of "A Roundhead Council of War," the apartment in which the council took place being a very faithful reproduction of the room. He stated that the figures were drawn by Mr. Orchardson.

Do any of your readers know of such a painting, or where photographs of it can be obtained? JOHN L. ROBINSON.

#### WROUGHT-IRON CHIMNEYS.

SIR,—A short time ago a friend wrote me from Spain asking for information similar to that sought by your correspondent in last week's issue. I was enabled to oblige through seeing an advertisement in the *Builder* of a book on "Tall Chimney Construction," which I obtained from Messrs. Spon, of the Strand, and sent out to my friend.

There are descriptions in this work of five wrought-iron shafts, and an elevation and section is given of one built in America. Perhaps this will assist "O. F." in his inquiries. J. BERRADO.



## Books.

*The American Journal of Archaeology and of the History of the Fine Arts.* Vol. I., Nos. 2 and 3. London: Trübner & Co. Baltimore. July, 1885.

SOME time ago we suggested that our own Journal of Hellenic studies would do good work if it were to devote a few pages annually to a summary of the archaeological news of the year, and to an epitome of the chief contents of European archaeological publications. This very useful task is undertaken, and, we think, carried out almost to excess, by the American Journal, the first number of which we had occasion to welcome in the spring, and the second and third simultaneous issues of which we have just received. Spite of her school at Athens, in which matter she is as yet ahead of us, the slender archaeological resources at the disposal of America and her scholars are obvious enough. In a volume that takes in (to our regret, as we have said before) the wide fields of Christian and early American, as well as Classical archaeology, we have the most curious disproportion of contents. Out of in all 212 pages, 145 are devoted to the task we advocated, i.e., the summary of archaeological news, contents of journals, proceedings of meetings, and review of books, sixty-seven only are reserved for, what should be, after all the main work of the Journal, i.e., original articles and the publication of monuments. Some of these original articles are mere jottings of notes, nor do they profess to be more. Among the most interesting is the first article by Mr. Henshaw on the "Aboriginal Relics called 'Sinkers' or 'Plummetts,'" but which, from examination of the customs of the modern Santa Barbara Indians, turn out to be "medicine stones" employed for all manner of odd magical purposes. This method of elucidating ancient remains by the custom of the modern savage is, since Mr. Lang became its eloquent apostle, and, — we may almost say, — founder, as fashionable as it is reasonable. Christian remains are represented by an article on "The Lost Mosaics of Ravenna" and another on the "Abbey of Jumièges." The most valuable contribution to classical archaeology comes from England; Mr. Ramsey contributes a paper on "Notes and Inscriptions in Asia Minor." We notice specially an interesting inscription relating to the Association of Worshippers of Ganymede (Ganymedeital) at Smyrna; little is known of the society, but from the patron's functions we fear its distinguishing characteristic may not have been total abstinence. Another inscription refers to an ancient guild of porters (*πορτιγγοι*). If porters were as pleasant and serviceable a class of old as now we should be glad to know more of their confraternity. Mr. Alfred Emerson discusses "two modern antiquities." One of them, a bas-relief, once in Verona and published by Heydemann scarcely needed comment. It is true that Otfried Müller and E. Braun, and, following them, Heydemann himself, accepted it as classical work, but the thing is too obviously modern and sensational, the whole conception as well as treatment too obviously non-classical to need discussion. A note to record the mistake would have been valuable, but to reproduce the plate and discuss it at length is waste of time and space. More interest attaches to the second supposed modern antique, the somewhat famous Herakles drawing the Bow, of the Carapanos collection. It has been universally accepted as classical. We cannot give in our adhesion to Mr. Emerson's new view without examining the original. (We may note in passing that the Carapanos collection, famous for its fine bronzes, is now, by the kindness of its owner, open to the public at Athens). The bronze in question is well known from the admirable heliogravure in M. Rayet's "Monuments de l'Art Antique," and, again we will ask why reproduce it instead of making simple reference to a book accessible to any archaeologist? A note follows on Dörpfeld's "Restoration of the Propylæa," which we have already noticed in detail. It is, perhaps, excusable at the other side of the water that there should be a certain "backwardness" in the news. Mr. Goodyear's account of the Charvet collection of ancient glass now in the Metropolitan Museum, New York, is lashed avowedly on Freehner's "La Verrerie Antique." Among the "correspondence" is a valuable letter from M. Ernst Babelon on Punic archaeology; no one speaks with more authority on this point than M. Babelon, who has just

returned from a systematic exploration of the ruins of Carthage.

We pass to the larger and more important half of the book, the archaeological summary. Here we can afford almost unqualified praise; occasionally, as in the matter of the "Mycenaean Sword-blades," we have a touch of the aforementioned "backwardness," but as a whole the result is invaluable. No English reading scholar need now complain that the field of archaeology is too wide for at least a survey. News that before was obscured by the medium of Italian modern Greek or technical German is now plainly Englished, and the property of the laity. Details we need not note, as nearly every item of news has appeared from time to time in the pages of the *Builder*.

*Gas Engines.* By WILLIAM MACGREGOR. London: Symons & Co.

GAS engines have during the last few years advanced rapidly in public favour, and where small powers only are required their economic advantages have been fully recognised. The literature of the gas engine is, however, so far extremely scanty; in fact, the book before us claims the honour of being the first English work on the subject; but we trust that at some future time the author will use this book as a foundation on which to build another and a better one. The author commences with the early history of the gas engine, gathered chiefly from the various patent specifications, and dating from the powder-exploding machine of Abbé Hauitefeuille, in the year 1678, and he traces the various developments of the engine up to the present day. This part of the book should be useful for reference.

Chapter II. treats on gas engines working with compression, and illustrations showing the arrangement of Otto's engine are attached. This is followed by some matter translated from the German, and gives the opinions of Slaby and Wedding as to how the gradual or supposed after-combustion of the mixture takes place after the charge which gives the impulse to the piston has been fired. The author's notes as to fixing and working the engine should be useful.

Further on the author compares the relative economy of gas, steam, and hot-air engines, but he very wisely confines the size of his gas engine to 8-h.p., as above that power there is little doubt the comparison would ascend very rapidly in favour of the steam engine. The author says the consumption of coal per effective horse-power per hour by small steam engines is about 7 lb. We should be glad of further details here as to what type of engine and boiler the author refers to, the statement being much too general.

Clerk's engine, which receives an impulse every revolution, is clearly described and illustrated, and other engines of the same type, including those by Turner, Atkinson, Robson, Maxim, and Siemens, are briefly noticed. The remainder of the book treats on the theory of the gas-engine, and contains a number of more or less reliable figures and statements collected and translated from various sources, with certain remarks and deductions by the author. Chapter VIII. is an able one, for which the author is indebted to Mr. Dugald Clerk. It treats on pressure, gas mixtures, combustion, and the general theory of the gas-engine.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

6,920, Portable Structures for Field Hospitals, &c. C. D. Abel.

Arched bars of H section spring from a sill running round the bottom of the structure, and are fixed at their upper ends to a ridge bar. At about half their height they are tied together by an angle-iron rib. The covering fabric rests on a wooden beam over the ridge-bar, and its bottom edge may be fastened to the sill by tent-pegs, or be extended outwards, and supported to form a verandah. A lining is attached by S hooks and cords to the bar, so that the enclosed air-space may be varied as required. Sheet metal, &c., or linoleum, may be used for covering.

7,946, Ventilating and other Flues. H. Talbot.

Special bricks are made, with which flues may be built, even in thin walls, without showing any projection from the wall. For vertical flues, holes are made through the bricks near one end, so that by alternating the position of the bricks the holes form a continuous flue, still preserving the bond of the brickwork. In thick walls, where larger flues

are required, the bricks are of an irregular shape, pieces being cut from the corners. Horizontal inclined flues are made in a similar manner to vertical flues, and special bricks are made for the junction of flues, and or to provide inlets to rooms. Flues opening into the lower part of a room may be connected with spaces behind the fire-grate and thus warm air may be supplied. The entering air in summer may be passed, if desired, over water or ice to cool the same.

9,003, Securing Thatch, Feaces, and Thatched Work. T. B. Burns.

The appliance is made of galvanised or other wire in the form of a net, the loops of which are of equal size, and joined to each other by cross-ropes to form a secure and flexible joint. The arrangement may be applied for fencing, or as thatched work, &c.

10,198, Furnace. T. R. Crampton.  
The bed of the furnace is formed of slag, sand, such like material, the sides or top, or both, formed part of a steam-boiler. Upon the bed streams of air and powdered fuel are directed, so that steel or other metal may be melted upon it.

10,299, Ventilating Drains, &c. A. Rumley.

To prevent the passage of sewer-gas into buildings, the soil, drain, and sewer pipes are fitted with intervals with normally closed valves, which open the direction of flow. Ventilation is effected forcing air in at points along the course.

10,295, Stained Glass. W. R. Pullen.  
White or coloured "crystalline" glass is used as a groundwork, on which is produced any design stained or coloured crystalline or other glass. The design is limited by stamped outlines in paper, cardboard, or the like, which may afterwards be silver-gilded, or coloured.

## APPLICATIONS FOR LETTERS PATENT.

Sept. 11.—10,760, G. Carson, Suspended Bedstead.—10,761, C. Smith, Facing Tiles or Plates for Concrete Connections.—10,772, J. Johnson, Construction of Cows.

Sept. 12.—10,802, S. Adams, Improvements in Flushing Syphons.—10,811, J. Hatch, Construction of Purins for Glazing Purposes.—10,813, W. and Barker, Improved Manglepieces, Chimes, &c., &c.—10,819, W. Brownie, Burglar Alarm.—10,840, L. Mensing, Locks and Latches.

Sept. 14.—10,860, H. Sulley, Improved Spring Locks.—10,861, J. Macleish, Improvement in Bramah Water-closet fitted with a Metallic Grou Valve.—10,863, R. Oates, Water Waste-Preventer for Water-closets.—10,880, W. Barlow, Improvements in Cooking Stoves.—10,882, H. Leim, Improvements in File Drivers.—10,884, J. W. Manufacturers of Bricks, Tiles, Pipes, &c.—10,891, W. Wilkinson, Construction of Footpaths, Rways, and other Floorings or Pavings.—10,895, Johnson, Construction of Silos.

Sept. 15.—10,905, C. Fellows, Sustaining Window Sashes and Shutters without the aid of S Weights.—10,915, H. Hartung, Improvements in Door Checks.—10,923, A. Common, Improvements in Water-closet.—10,934, R. Stone, Manufacture of Cement.

Sept. 16.—10,960, D. Law and Others, Fastenings for Rain Water and other Pipes, &c.—10,982, J. W. Thomas, Liners or Cords for Supporting Window Sashes, &c.—10,988, W. Wright, Mounting, Balancing, and Securing Window Sashes.—10,993, J. Still, Improvements in Locks.—11,000, W. Hassall, Composition for use in Joining Stone, Concrete, or other Pipes.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

8,368, R. Roberts, File Guard for Sharpening Saws.—8,394, E. Chatham, Apparatus for Cutting Dressing Stone.—8,409, C. Williams and H. Stann, Construction of Floorings of Bridges, Piers, &c.—8,437, S. Ingham and Others, Working Machinery.—8,483, D. Hall, Woodworking Machine for Staircases.—8,546, C. Thorne, Fastening Window Sashes when either shut or partially open.—8,577, J. Ellis, Casement Fastener.—9,400, R. Thomas, Improved Ball Cook.—15,932, W. Day, Apparatus for Planing and Shaping Machinery.—8,552, S. Ingham and Others, Woodworking Machinery.—9,822, A. Gamble, "Joiners" and of Bevels.—9,987, J. Costello, Joining or Coupling together Lead Pipes.—10,000, H. Salas, Parallel Duplex Rulers.—10,051, C. New, Socketed Drain and other Pipes.—10,561, J. Thomas, Improved Letter Box.

## COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

14,974, T. Freese, Domestic Fire Grates.—15,000, W. Gadd, Apparatus for Joining Lead Pipes.—15,454, A. Hutchison, Construction of Bathing Machines.—15,525, W. Lake, Water-closet Apparatus.—15,540, R. Chantry, Water-waste Preventer.—15,805, Buchanan, Ventilators.—4,419, W. Stein, Improvements in Bakers' Ovens.—9,584, J. Cartland, L. Springs.—9,707, A. Allan, Water Supply Apparatus for Water-closets.—9,732, D. Tennant, Siphon Water Traps.—15,014, J. Thompson and J. Bry, Artificial Stone.—15,408, H. Hadden, Machinery for Sawing or Dressing Stone.—15,701, S. Gos, and J. Brown, Water-waste Preventer and Flush Cistern.—9,716, B. Phillipson, Drains and Drain Traps.



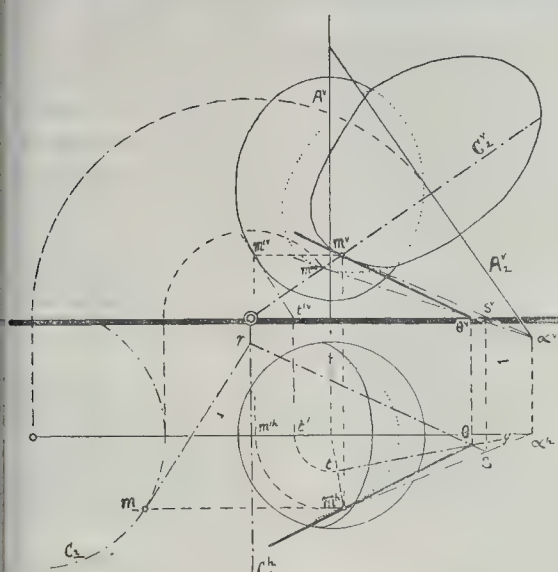


Fig. 167.

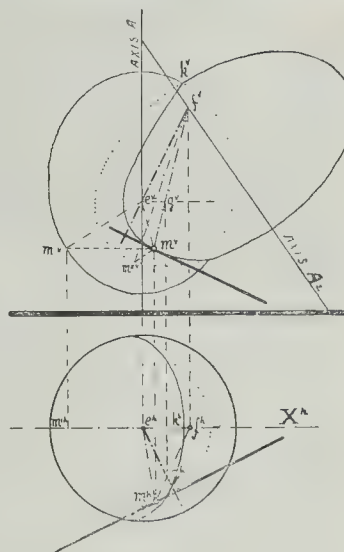


Fig. 169.

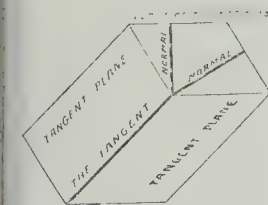


Fig. 168.

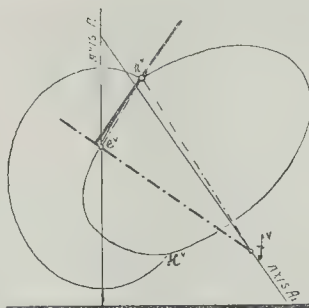


Fig. 170.

# The Student's Column.

## DESCRIPTIVE GEOMETRY.—PART II.

XVIII.

AS we have done in former problems, we shall find the tangent to the intersection in a point  $m$  of the same. We have said before that tangents assist us in drawing curves, but, for architects and builders, they have a far more practical importance, considering that the principal condition of good masonry is that the joints be normal to the surface of the vaults: this means that the joints be perpendicular to the planes tangent to the surface at any point of the surface.

To find the tangent in the point  $m$  to the intersection of the above surfaces of revolution, we may use the general method we have used for finding the tangent to the intersection of cones and cylinders; for the tangent to an intersection of two surfaces is always the intersection of the planes tangent to each surface at the same point.

Round the axis  $A$  (see fig. 167) we rotate the meridian on which the point  $m$  is situated until it comes to  $m^1$ . After this rotation we can draw a plane tangent to the first surface, its vertical trace will be  $m^1v^1$ , and its horizontal trace will be the line which connects  $d^1$  and  $t^1$ ; when the point  $m$  is brought back to its original position, the horizontal trace of the tangent plane contains the line  $ty$ . The next step is to find the horizontal trace of the plane tangent to the point  $m$  to the second surface of revolution. The tangent to the meridian of the second surface is a line belonging to the tangent plane,

and to this tangent plane belongs also the tangent to the circle or parallel of the second surface on which the point  $m$  is situated; connecting the feet of these two tangents, we shall get the horizontal trace of the plane tangent to the second surface. Rotating the point  $m$  to  $m^1$  round the axis  $A_2$  we can draw the circle  $m^1a$ , which cuts the axis in the point  $a$ , and when the point  $m$  is brought back to its former position the tangent will still cut the axis in the same point,  $a$ ; this allows us to draw the tangent  $ma$ , and mark its foot  $s$ . To find the foot of the tangent to the parallel, we have only to turn down the plane of that circle round its horizontal trace,  $C^2$ , then draw the circle and its tangent, the foot  $r$  of which will be on the horizontal trace,  $C^2$ . The trace of the plane tangent to the second surface of revolution is the line  $rs$ , the intersection  $\theta$  of which with  $ty$  trace of the first tangent plane gives us one point of the tangent required;  $m$ , of course, is another point, so the tangent to the intersection is the line  $m\theta$ , its elevation is  $m^v\theta^v$ , and its plan is  $m^h\theta^h$ .

With surfaces of revolution normals are very easily drawn; for, if we produce a normal to the outline on the elevation (see fig. 169), say on the point  $m^1v$  the normal will go and cut the axis  $A$  in a point  $e$ , and when we rotate the point to any other position, say  $m$ , the normal will still go through the same point  $e$ : so that  $e^v m^v$  is the elevation of the normal to the first surface, and  $e^h m^h$  is its plan. Likewise we get the projections  $f^v m^v$  and  $f^h m^h$  of the normal to the second surface; and then we know that the plan of the tangent will go through  $m^h$  and be perpendicular to the horizontal trace of the plane which contains the lines  $e m$  and  $f m$ , or, what is equivalent, the plan of the tangent will be perpendicular to  $e^h g^h$  plan of a horizontal line of that plane. The elevation of the tangent will go through  $m^v$  and be perpendicular to  $e^v f^v$ , for this line is the intersection of the plane of the normals by the plane  $X$  parallel to the elevation plane, and therefore  $e^v f^v$  are parallel to the vertical trace of the plane which contains the normals.

In short, this method of finding the tangent to the intersection consists in drawing the normals  $e m$  and  $f m$ , producing the horizontal  $eg$ , and drawing the tangent through  $m$ , the plan perpendicular to  $e^h g^h$ , the elevation perpendicular to  $e^v f^v$ . This method is not only more rapid than the general method of the tangent planes, but it offers the advantage to be applicable to certain points, where the other method would fail.

In the point  $k$  the tangent to the curve of intersection is perpendicular to the vertical plane of projection; the tangent is, therefore, projected in a point and cannot assist us in drawing the curve of intersection on the elevation. What we want is a tangent to the elevation of the intersection considered as a curve contained in a vertical plane. We have seen (fig. 169) that the tangent on elevation is perpendicular to  $e^v f^v$ , and that this occurs for any point  $m$ ; we conclude, therefore, that it will also apply to the point  $k$ . We draw for  $k$  the normals  $k^v e^v$  and  $k^v f^v$ , join  $e^v f^v$  and make the tangent perpendicular to that line (see fig. 170). We can consider that tangent as the projection of a tangent in a point infinitely near to  $k$ . On account of the symmetrical arrangement of the drawing, it can be very easily proved by algebraical calculation that the vertical projection of the curve of intersection is in our case a curve of the second degree, either a portion of an ellipse, a parabola, or a hyperbola. We have made a similar observation when treating of the intersection of two cones, for we shall find these useful in delineating the intersections.

## RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

SEPT. 8.

By VENTMOT, BULL, &amp; COOPER.

|                                                 |        |
|-------------------------------------------------|--------|
| Kendal, near—"Low Underbrow Farm," 57a. 3r.     | 22,500 |
| 12p., freehold                                  | 10,880 |
| "Nailand Hall Farm," 146a. 1r. 16p., freehold   | 2,525  |
| "Crow Park Farm," 33a. 3r. 33p., freehold       | 2,850  |
| "High House Farm," 44a. 1r. 37p., freehold      | 2,575  |
| "Nailand Abbey Farm," 46a. 0r. 35p., freehold   | 365    |
| Several cottages, and moss land, 10a. 0r. 30p.  | 800    |
| Various chief rents, amounting to 44l. 0s. 11d. |        |

SEPT. 10.

By WORSFOLD &amp; HATWARD.

|                                                           |     |
|-----------------------------------------------------------|-----|
| Dover—24, Albert-road, 80 years, ground-rent 2l.          | 305 |
| 48 and 52, Clarendon-street, freehold                     | 380 |
| 10, Ellingham-crescent, 41 years, ground-rent 1l.         | 480 |
| 4, Church-road, freehold                                  | 320 |
| 68, Sgarate-street, 10 years, ground-rent 1l. 4s. 6d.     | 72  |
| Folkestone, near—Freehold house and 15a. 1r. 4p., in lots | 787 |

By VENTMOT, BULL, &amp; COOPER.

|                                                              |        |
|--------------------------------------------------------------|--------|
| Kirby Lonsdale—"Casterton Hall," and 165a. 2r. 1p., freehold | 17,500 |
| "Casterton Old Hall" and grounds, freehold                   | 750    |
| Numerous freehold farms, containing 939a. 0r. 14p.           | 40,710 |
| The "George and Dragon Inn," freehold                        | 750    |
| Several freehold cottages and gardens                        | 1,830  |

SEPT. 14.

By Mr. Woods.

|                                                    |       |
|----------------------------------------------------|-------|
| Hounslow—"The Poplars," and 2a. 3r. 23p., freehold | 1,625 |
| Two freehold meadows, 2a. 2r. 16p.                 | 1,000 |

SEPT. 16.

By H. S. WOODCOCK.

|                                                                   |     |
|-------------------------------------------------------------------|-----|
| Battersea—55, Church-road, 67 years, ground-rent 5l.              | 175 |
| Layevend-hill—65 and 67, Bassett-road, 51 years, ground-rent 10l. | 420 |
| 141, Beaufort-road, 83 years, ground-rent 5l.                     | 210 |

SEPT. 17.

By PROCTER &amp; FRASER.

|                                      |     |
|--------------------------------------|-----|
| West Ham—"Belle Vue House," freehold | 810 |
|--------------------------------------|-----|

By A. BOOTH.

|                                    |     |
|------------------------------------|-----|
| Plaistow—72, High-street, freehold | 550 |
|------------------------------------|-----|

By D. YOUNG.

|                                                        |     |
|--------------------------------------------------------|-----|
| Bristol—6, Brighton-terrace, 20 years, ground-rent 4l. | 175 |
|--------------------------------------------------------|-----|

|                                                                |     |
|----------------------------------------------------------------|-----|
| Clapham-road—20, Binfield-road, 54 years, ground-rent 7l. 10s. | 450 |
|----------------------------------------------------------------|-----|

By O. C. &amp; T. MOORE.

|                                  |     |
|----------------------------------|-----|
| Bow-road—A plot of freehold land | 265 |
|----------------------------------|-----|

|                                                           |     |
|-----------------------------------------------------------|-----|
| Poplar—31, Woodstock-road, 68 years, ground-rent 4l. 15s. | 320 |
|-----------------------------------------------------------|-----|

|                                               |     |
|-----------------------------------------------|-----|
| Mill-end—15 and 18, Longfellow-road, freehold | 745 |
|-----------------------------------------------|-----|

|                                                                           |     |
|---------------------------------------------------------------------------|-----|
| Camden-town—167 and 169, Great College-street, 49 years, ground-rent 16l. | 955 |
|---------------------------------------------------------------------------|-----|

|                                                               |     |
|---------------------------------------------------------------|-----|
| Walthamstow—2, St. George's-villas, 64 years, ground-rent 3l. | 295 |
|---------------------------------------------------------------|-----|

SEPT. 18.

By WESTON &amp; SONS.

|                                                       |     |
|-------------------------------------------------------|-----|
| Camberwell—52, Paulet-road, 32 years, ground-rent 5l. | 450 |
|-------------------------------------------------------|-----|

|                                                                    |     |
|--------------------------------------------------------------------|-----|
| Knightsbridge—1 to 5, Percy's cottages, 10 years, ground-rent 30l. | 381 |
|--------------------------------------------------------------------|-----|

## Miscellaneous.

**Visciditudes of a Sculptured Bull.**—Some years ago Mr. C. T. Newton, Keeper of the Greek and Roman Antiquities in the British Museum, saw on the lawn of Hillingdon Court, near West Drayton, under a yew tree, and green with exposure, a recumbent bull of Pentelic marble, a work of the Athenian School, and dating (according to the *Times*) so far back as a period not later than the fifth century before the Christian era. It had been brought over from Athens, over sixty years ago, by the late Mr. Charles Robert Cockerell, the celebrated architect and antiquary, and is reproduced in a supplementary volume of the "Antiquities of Athens and other Places in Greece, Sicily, &c., 1830." "In landing it at London," says Professor Adolf Michaelis, in his description of the Ancient Marbles in Great Britain, 1882, "the sailors contrived to slip it into the Thames. The fishing it out cost so much that Cockerell declined to pay the freight. The bull then went to the London Custom-house, where it remained some years, till Mr. James Baudinot got hold of it. He sold or gave it to Mr. Mills, the owner of Hillingdon Court, near West Drayton. I am informed that the marble is still existing in that place, but to what extent, being exposed in the open air, it may have suffered from the destroying influences of the English climate I am unable to say." The bull in question has at length been presented by Sir Charles Mills to the trustees of the British Museum, and made its first appearance in the Elgin Room a few days ago. To its protracted bath in the Thames, alluded to by Dr. Michaelis, as well as to its exposure to the weather at Hillingdon Court, must be partially attributed the tokens of wear and decay, as occasioned by the beating, fall, and dripping of rain, and other distasteful action of water. The figure is about 5 ft. 6 in. in length, and is in a recumbent position, on a rough-worked pedestal of a few inches deep.

## A New Explosive: Gelatine-Dynamite.

Mr. Nobel's latest creation, gelatine-dynamite, combines and gives effect to the powers and qualities of the two great explosives that go to form its name. It has gone little further than the test stage as yet; but the accounts that have reached us of its use in mines, limestone and granite quarries, tunnels and collieries, show that it has advantages which the intelligent workman appreciates; that it does the work of dynamite in places which cannot be well ventilated; and that it leaves so little of an offensive smell that miners can go in almost immediately, feel no bad effects, and get on with their work. If it can maintain this asserted excellence, then Mr. Nobel has added another to the advantages and benefits he has conferred upon the working miner. But that is not all. We know that in what are called fiery mines explosives that emit flame are attended with great risk; but here gelatine-dynamite claims to do the work of powder in coal mines, to get the coal well, and to go through the drift faults with speed, precision, and safety. It may or may not stand the test of experience in coal mines, as well as, or better, than our old friend powder, whose action in explosion it somewhat resembles. Doubtless this will be rigorously tested by scientific and practical men, and if it stands the test better, an additional protection to the lives of colliers will be available. Mr. Nobel claims to be able to make this gelatine-dynamite to suit the mildest work, and also to meet the surroundings of the most difficult Cornish, Welsh, and hematite mining. — *Mining Journal*.

**Cosmic Decoration at Berlin.**—The removal of Dr. Schliemann's collection of Trojan antiquities from the Berlin Museum of Industrial Art has permitted the completion of the decorative work in certain portions of the interior. The *Spektrum* calls attention to the terra-cotta work in connexion with the large doors, as well as the mural tiles in the immediate vicinity. This work is contributed by the Mettlich factory, and will in itself form an interesting permanent exhibit. The ornamentation of these portals is in hard white terra-cotta, with coloured glazed decoration. The work (designed by Herr Schmieden, architect of the Museum, in conjunction with the late Herr Gropius), is characterised by that exactness which, in such a case, is absolutely indispensable, while the effect of the colours is rich and striking; the necessary harmony with the surroundings being duly regarded. This work, in conjunction with the Moorish Court in the Kaiserhalle, gives Berlin two of the most important existing specimens of modern decorative terra-cotta manufacture. Germany would seem to have hitherto been rather behind other nations in general adoption of this description of ornament, although the manufactures of that country have for some time past made it a subject of particular attention, and have brought it as far as possible under the notice of those interested.

**Preservation of Wood.**—The Vienna *Gewerbe Zeitung* alludes to the present extensive adoption of the Guido Rutgers process, by which all kinds of decomposition are arrested. Various Austrian and Hungarian railways have impregnated sleepers and building wood, according to this system, with the result that soft sleepers have lasted fourteen to fifteen years. Although the abundance of wood in Hungary has delayed general attention being given to the impregnation of wood for structural purposes, the application of this process at Buda-Pesth to wood-paving has been attended with results of an eminently satisfactory character. Wood has also, it is stated, been treated by an analogous process, with the result of its being rendered incombustible. Attention has been directed in a special manner to this process, by the samples of impregnated wood shown at the present Buda-Pesth exhibition.

**Publications.**—Messrs. Crosby Lockwood & Co. announce, among other practical works, for immediate publication:—"Land and Marine Surveying," by W. Davis Haskell (new and revised edition); "Practical House Decoration," by J. W. Facey (Weale's Series); "The Metal Turner's Handbook," by P. N. Hasluck, being the first volume of a series of handy books on handicrafts; and "The Engineer's Companion," a practical educator for engineers, boiler attendants, and mechanics, by Michael Reynolds.

## Indicating Door - Fastener.

Messrs. Cross & Co. send us a specimen of their patent fastener, which indicates when a room is occupied, by the appearance of the word "engaged" on an outside circular boss, the word being covered ordinarily by a metal plate, turning a centre. On bolting the door a rack on a bolt turns a small cog-wheel, which causes the metal covering to revolve on the centre, leaving the word visible from outside. The circular action, per the cog-wheel, seems to be the distinctive quality of this patent. It perhaps, the neatest way of doing it, and the best work well.

**Hotel Lifts.**—The American Elevator Company have obtained the contract for supplying one of their standard hydraulic passenger elevators for the South Kensington Hotel, Queen's Gate-terrace, recently purchased by Mr. Jam. Bailey, the proprietor of Bailey's Hotel. It is Mr. Bailey's intention to carry out the American idea of increasing the height of this hotel, by adding another story to it, to make the upper stories equal in their appointments to the lower ones, and to ensure perfect access to the upper floors.

**Amateur Photography.**—We are informed that owing to the great success of the Amateur Photographic Exhibition, held in Bond-street last spring, the directors of the London Stereoscopic and Photographic Company have again secured the same galleries for April and May next, when it is anticipated a still more interesting series of photographs will be brought together. Any profits that are made will be devoted to a charitable object.

**Plympton St. Mary.**—The foundation-stone has been laid of a new vicarage-house for Plympton St. Mary, Devon. The house is to be built of limestone with red brick dressings, and will be in the Gothic style. Messrs. J. Rowell, Son, of Newton Abbot, are the architects; Mr. P. Blowey, Plymouth, the builder; and Mr. V. Shier, of Plympton St. Mary, the clerk of the works. The cost of the work will be 1,900l.

**Bishop Stortford.**—St. Michael's Church, Bishop Stortford, has been re-opened by the Bishop of St. Alban's. The chancel has undergone a thorough renovation. The architect was Mr. A. W. Blomfield, and it was principally through the liberality of Mr. J. L. Wigan that the work has been undertaken and carried on. It has cost upwards of 2,000l.

**The Timber Supply Co.**—This is the title of a company which has been started with the object of supplying timber for contractor purposes, such as Baltic deals, battens, and prepared flooring, in convenient quantities for buyers, direct from the docks, at wholesale prices for cash. Probably this will be a convenience to some purchasers, the cost of cartage and yard expenses being saved to the buyer.

**Sir J. Millais's Works.**—Messrs. Virtue & Co. announce the publication in their "Art Annual" for this year of a series of engravings from the works of Sir John Millais, including "The Huguenots," "Chill October," "The North-west Passage," and other well-known paintings.

**Charterhouse Science and Art School and Literary Institute.**—The winter session of this, one of the largest science and art schools in the United Kingdom, will, under the presidency of the Rev. Henry Swann, M.A., commence on Saturday, October 3rd.

## PRICES CURRENT OF MATERIALS.

| TIMBER.                                | £. | s. | d. | 2. | 3. |
|----------------------------------------|----|----|----|----|----|
| Greenheart, B.G. ....ton               | 6  | 10 | 0  | 7  | 10 |
| Teak, E.I. ....load                    | 12 | 10 | 0  | 15 | 0  |
| Sequoia, U.S. ....ft. cube             | 0  | 2  | 0  | 2  | 8  |
| Ash, Canada ....load                   | 3  | 0  | 0  | 5  | 0  |
| Birch " " " " " "                      | 3  | 0  | 0  | 4  | 0  |
| Elm " " " " " "                        | 3  | 10 | 0  | 5  | 0  |
| Fir, Dantsic, &c. ....                 | 1  | 10 | 0  | 4  | 10 |
| " " " " " " " "                        | 3  | 0  | 0  | 5  | 0  |
| Canada " " " " " "                     | 0  | 0  | 0  | 7  | 0  |
| Pine " " " " " "                       | 3  | 0  | 0  | 4  | 0  |
| " " " " " " " "                        | 3  | 15 | 0  | 5  | 0  |
| Lath, Dantsic " " " "                  | 5  | 0  | 0  | 7  | 0  |
| St. Petersburg " " " "                 | 5  | 0  | 0  | 7  | 0  |
| Wainscot, Riga " " " "                 | 8  | 0  | 0  | 4  | 10 |
| Deals, Finland, 2nd and 1st...std. 100 | 8  | 0  | 0  | 9  | 0  |
| " " " " " " " "                        | 6  | 10 | 0  | 7  | 10 |
| Riga " " " " " " " "                   | 7  | 0  | 0  | 8  | 10 |
| St. Petersburg, 1st yel. ....          | 10 | 0  | 0  | 17 | 0  |
| " " " " " " " "                        | 8  | 0  | 0  | 15 | 0  |
| " " " " " " " "                        | 6  | 10 | 0  | 11 | 0  |
| Swedish " " " " " " " "                | 7  | 0  | 0  | 17 | 0  |
| White Sea " " " " " " " "              | 8  | 10 | 0  | 19 | 0  |
| Canada, Pine 1st " " " "               | 15 | 0  | 0  | 23 | 10 |
| " " " " " " " "                        | 12 | 0  | 0  | 18 | 10 |
| " " " " " " " "                        | 7  | 0  | 0  | 10 | 10 |
| " " " " " " " "                        | 8  | 0  | 0  | 12 | 0  |
| " " " " " " " "                        | 8  | 10 | 0  | 9  | 0  |
| New Brunswick, &c. ....                | 6  | 0  | 0  | 7  | 10 |
| Battens, all kinds " " " "             | 4  | 0  | 0  | 13 | 0  |



| TIMBER (continued).        |       | £. s. d. | £. s. d. |
|----------------------------|-------|----------|----------|
| ing Boards, sq. 1 in.—Pre- | 0 0 0 | 0 13 0   |          |
| pared, first               | 0 7 6 | 0 8 0    |          |
| second quality             | 0 5 0 | 0 7 0    |          |
| er, Cuba, ..... foot       | 0 0 3 | 0 0 4    |          |
| nduras, &c., ..... 4       | 0 0 3 | 0 0 4    |          |
| ustralian                  | 0 0 3 | 0 0 4    |          |
| ony, Cuba                  | 0 0 5 | 0 0 7    |          |
| oming cargo av.            | 0 0 5 | 0 0 7    |          |
| rican                      | 0 0 4 | 0 0 5    |          |
| iasco                      | 0 0 4 | 0 0 5    |          |
| lio                        | 0 0 4 | 0 0 5    |          |
| St. Domingo                | 0 0 8 | 0 1 0    |          |
| to Rio                     | 0 0 8 | 0 1 3    |          |
| ut, Italian                | 0 0 4 | 0 0 5    |          |

| METALS.                |        | £. s. d. | £. s. d. |
|------------------------|--------|----------|----------|
| —Pig in Scotland       | 2 1 6  | 0 0 0    |          |
| r, Welsh, in London    | 4 15 0 | 5 2 6    |          |
| r, in Wales            | 4 7 6  | 4 13 0   |          |
| Staffordshire, London  | 6 0 0  | 7 0 0    |          |
| ets, single, in London | 7 10 0 | 9 0 0    |          |
| ops                    | 6 10 0 | 7 10 0   |          |
| ll-rods                | 6 0 0  | 7 0 0    |          |
| ish, cke, and ingt.    | 45 0 0 | 46 0 0   |          |
| nt selected            | 46 0 0 | 47 0 0   |          |
| ets, strong            | 54 0 0 | 0 0 0    |          |
| India                  | 51 0 0 | 52 0 0   |          |
| ustralian, fine cast   | 0 0 0  | 0 0 0    |          |
| li, bars               | 41 5 0 | 42 0 0   |          |

| METALS (continued).    |         | £. s. d. | £. s. d. |
|------------------------|---------|----------|----------|
| YELLOW METAL.....lb.   | 0 0 4   | 0 0 4    |          |
| LEAD—Pig, Spanish      | 11 5 0  | 0 0 0    |          |
| English, com. brands   | 11 12 6 | 0 0 0    |          |
| SPLINTER               | 14 10 0 | 14 12 6  |          |
| Sileman, special       | 14 7 6  | 14 10 0  |          |
| Ordinary brands        | 14 7 6  | 14 10 0  |          |
| Straits                | 30 10 0 | 31 0 0   |          |
| Australia              | 30 10 0 | 31 0 0   |          |
| English ingots         | 33 0 0  | 0 0 0    |          |
| TINPLATES—             |         |          |          |
| IC coke                | 14 8 0  | 16 6 0   |          |
| Amoyan, in cks.        | 21 0 0  | 25 0 0   |          |
| IC charcoal            | 17 0 0  | 20 0 0   |          |
| IX ditto               | 28 0 0  | 27 0 0   |          |
| OILS.                  |         |          |          |
| Linseed                | 22 17 6 | 23 10 0  |          |
| Cocoonut, Coch         | 31 10 0 | 32 0 0   |          |
| Ceylon                 | 27 0 0  | 0 0 0    |          |
| Copra                  | 28 0 0  | 26 10 0  |          |
| Palm, Lagos            | 30 0 0  | 0 0 0    |          |
| Palmnut Kernel         | 28 0 0  | 0 0 0    |          |
| Rapeseed, English pale | 25 15 0 | 0 0 0    |          |
| do brown               | 23 0 0  | 0 0 0    |          |
| Cottonseed, refined    | 21 5 0  | 23 0 0   |          |
| Tallow and Oleine      | 25 0 0  | 45 0 0   |          |
| Lubricating, U.S.      | 7 0 0   | 10 0 0   |          |
| do Refined             | 8 0 0   | 15 0 0   |          |
| TEMPERATURE—           |         |          |          |
| Amoyan, in cks.        | 1 5 0   | 1 5 6    |          |
| Tar—Stockholm          | 0 19 6  | 1 0 0    |          |
| Archangel              | 0 11 0  | 0 11 6   |          |

## COMPETITIONS, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITIONS.

| Nature of Work.        | By whom required.      | Premium.   | Designs to be delivered. | Page. |
|------------------------|------------------------|------------|--------------------------|-------|
| a for Public Abattoirs | Birkenhead Corporation | Not stated | October 24th             | ii.   |

## CONTRACTS.

| Nature of Work, or Materials.             | By whom required.      | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|-------------------------------------------|------------------------|-----------------------------------|--------------------------|-------|
| ing Barracks, &c., Halifax                | War Department         | Official                          | Sept. 28th               | ii.   |
| group Roads, &c.                          | Wandsworth Bd. of Wks  | do.                               | Sept. 28th               | xiii. |
| ing Works, &c.                            | St. Saviour's Union,   | Jarvis & Son                      | October 1st              | ii.   |
| ges, Roads, Drainage, &c.                 | Sheerness Permanent    | Official                          | do.                      | ii.   |
| Benefit Building Soc.                     | A. Woodhouse           | do.                               | October 4th              | ii.   |
| le Works, Highbridge                      | Exbridge R. S. A.      | Lewis H. Isaacs                   | October 5th              | xiii. |
| Sewers and Alterations to existing Sewers | Worthing Local Board   | Official                          | do.                      | ii.   |
| ing, Tar-Paving, Matting, &c.             | Lewisham Bd. of Wks    | Ellice Clark                      | October 6th              | ii.   |
| ness Flagging                             | do.                    | do.                               | October 7th              | ii.   |
| Posts                                     | Westminster            | Official                          | do.                      | ii.   |
| Sewer.                                    | Vestry of St. James's  | do.                               | October 8th              | ii.   |
| age of Portion of Cemetery, Finchley      | St. Mary, Islington,   | do.                               | October 12th             | xiii. |
| utions, Post-Office, Portsea Hard         | Burial Board           | do.                               | October 13th             | ii.   |
| g Drain-Pipes, and Stores                 | Com. of H.M. Works     | do.                               | do.                      | xiii. |
| ement, Southampton Post-Office            | Croydon Town Council   | do.                               | October 14th             | ii.   |
| ght-Iron Vertical Bar Fencing, with       | Com. of H.M. Works     | do.                               | do.                      | ii.   |
| et-Sea-Wall and Promenade                 | Blackburn Corporation  | J. B. McCollum                    | do.                      | ii.   |
| ete Reservoir                             | Hartlepool Corporation | H. Mair                           | October 23rd             | ii.   |
|                                           | Cardiff Corporation    | J. A. B. Williams                 | October 29th             | ii.   |

## PUBLIC APPOINTMENTS.

| Nature of Appointment.  | By whom Advertised.  | Salary.           | Applications to be in. | Page.  |
|-------------------------|----------------------|-------------------|------------------------|--------|
| teering Draughtman      | Belfast Town Council | 1891.             | Sept. 30th             | xviii. |
| gh Surveyor             | Acton Local Board    | 3500.             | October 13th           | xviii. |
| g Surveyorship, Ireland | Civil Service Com.   | Not stated        | October 23rd           | xviii. |
| of Works                | Acton Local Board    | 21. 10s. per week | Not stated             | xviii. |

## TENDERS.

| TENDERS.                                  |                                         | £. s. d. | £. s. d. |
|-------------------------------------------|-----------------------------------------|----------|----------|
| CKENHAM.—For making up Upper Lennard-road | Mr. Geo. B. Carlton, C.E., engineer and |          |          |
| for                                       |                                         |          |          |
| Langridge, Croydon                        | 2,418 0 0                               |          |          |
| ns & Wood, Birmingham                     | 2,254 0 0                               |          |          |
| Brooker, Beckenham                        | 2,117 0 0                               |          |          |
| L. Hill, High Wycombe                     | 2,684 0 0                               |          |          |
| Botterill, London                         | 1,982 0 0                               |          |          |
| R. Mayo, Brighton                         | 1,857 0 0                               |          |          |
| J. S. B. Marshall, Brighton               | 1,841 0 0                               |          |          |
| John Mowlem & Co., London                 | 1,712 0 0                               |          |          |
| * Accepted.                               |                                         |          |          |

|                                                                                                                                  |          |
|----------------------------------------------------------------------------------------------------------------------------------|----------|
| MBIDGE.—For new chaff barn, mixing shed, &c., little Wilbraham Farm, for Messrs. Foster, Mr. J. St. Jonas, surveyor, Cambridge:— | 2282 8 6 |
| Joifs                                                                                                                            | 180 5 0  |
| John Dawson (accepted)                                                                                                           | 142 10 0 |

|                                                                                                                                                 |          |
|-------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| MBSET.—For drains and other sanitary work at Mington House (exclusive of new wing, lodge, and ews). Mr. Mark H. Judge, architect and surveyor:— | 2172 5 0 |
| Downey, Evershot (accepted)                                                                                                                     |          |

GUILDFORD.—For proposed additional wards, &c., at the Royal Surrey County Hospital. Mr. W. G. Lower, architect, Guildford:—

| Thirty Beds.         |            | £. s. d. | £. s. d. |
|----------------------|------------|----------|----------|
| J. Bottrill          | 45,980 0 0 |          |          |
| Charles & Co.        | 5,893 0 0  |          |          |
| T. H. Kingler        | 5,910 0 0  |          |          |
| Bell & Sons          | 5,733 0 0  |          |          |
| S. Elliott           | 5,595 0 0  |          |          |
| Potterton & Co.      | 5,528 0 0  |          |          |
| Peat                 | 5,508 0 0  |          |          |
| Tompsett & Co.       | 5,502 0 0  |          |          |
| G. Huckle            | 5,369 0 0  |          |          |
| Johnstone & Co.      | 5,305 0 0  |          |          |
| C. J. C. Pawley      | 5,192 2 3  |          |          |
| W. Holt              | 5,190 0 0  |          |          |
| P. Peters            | 5,078 0 0  |          |          |
| J. Longley           | 5,018 0 0  |          |          |
| Bull, Sons, & Co.    | 4,990 0 0  |          |          |
| R. Nye               | 4,877 0 0  |          |          |
| Woolgar & Sons       | 4,825 0 0  |          |          |
| Martin, Wells, & Co. | 4,789 0 0  |          |          |
| Mitchell Bros.       | 4,738 0 0  |          |          |
| Kirk Bros.           | 4,720 0 0  |          |          |
| G. Walker            | 4,393 0 0  |          |          |

| Twenty-four Beds.    |           | £. s. d. | £. s. d. |
|----------------------|-----------|----------|----------|
| J. Bottrill          | 5,580 0 0 |          |          |
| Charles & Co.        | 5,433 0 0 |          |          |
| T. H. Kingler        | 5,440 0 0 |          |          |
| Bell & Sons          | 5,368 0 0 |          |          |
| S. Elliott           | 5,244 0 0 |          |          |
| Tompsett & Co.       | 5,191 0 0 |          |          |
| R. Peat              | 5,180 0 0 |          |          |
| Potterton & Co.      | 5,172 0 0 |          |          |
| G. Huckle            | 4,993 0 0 |          |          |
| W. Holt              | 4,890 0 0 |          |          |
| Johnstone & Co.      | 4,875 0 0 |          |          |
| C. J. C. Pawley      | 4,849 6 5 |          |          |
| P. Peters            | 4,788 0 0 |          |          |
| J. Longley           | 4,730 0 0 |          |          |
| Bull & Sons          | 4,697 0 0 |          |          |
| R. Nye               | 4,578 0 0 |          |          |
| Woolgar & Sons       | 4,535 0 0 |          |          |
| Martin, Wells, & Co. | 4,490 0 0 |          |          |
| Mitchell Bros.       | 4,440 0 0 |          |          |
| Kirk Bros.           | 4,420 0 0 |          |          |
| G. Walker            | 4,370 0 0 |          |          |

|                                                                                                   |            |
|---------------------------------------------------------------------------------------------------|------------|
| HORNSEY (Middlesex).—For new Wesleyan Chapel, Middle-lane, Hornsey. Mr. Elijah Hoole, architect:— |            |
| Williams & Son                                                                                    | 47,180 0 0 |
| Dove Bros.                                                                                        | 6,755 0 0  |
| Smith & Son                                                                                       | 5,977 0 0  |
| Lathey Bros.                                                                                      | 5,900 0 0  |
| MacFarlane Bros. (accepted)                                                                       | 5,478 0 0  |

|                                                                                      |          |
|--------------------------------------------------------------------------------------|----------|
| HORNSEY (Middlesex).—For making up of carriage-way of Granville-road, Stroud-green:— |          |
| W. T. Williamson, Green-lanes                                                        | £715 0 0 |
| Marshall, Brighton                                                                   | 680 0 0  |
| Aspinall & Son, Hoxton                                                               | 680 0 0  |
| Heard, Hoxton                                                                        | 610 0 0  |
| Fizze, Hornsey                                                                       | 608 0 0  |
| Nicholls, Wood-green                                                                 | 592 0 0  |
| Walker, Upper Holloway                                                               | 549 0 0  |
| Jackson & Sons, Denbury Park                                                         | 521 0 0  |
| Mowlem & Co., Westminster                                                            | 498 0 0  |
| * Accepted.                                                                          |          |

|                                                                                                                                       |          |
|---------------------------------------------------------------------------------------------------------------------------------------|----------|
| HORNSEY (Middlesex).—For jeweller's shop-front and sundry repairs, at Stroud Green-road, Mr. W. Smith, Gresham-buildings, architect:— |          |
| Clarke Bros.                                                                                                                          | £136 0 0 |
| Mastock Bros.                                                                                                                         | 125 0 0  |
| Dunford & Langham                                                                                                                     | 118 0 0  |
| J. O. Richardson                                                                                                                      | 77 15 0  |

|                                                                                                 |          |
|-------------------------------------------------------------------------------------------------|----------|
| HORNSEY (Middlesex).—For shop-front at Crouch-end, for Mr. S. Sugden. Mr. W. Smith, architect:— |          |
| Clarke Bros.                                                                                    | £118 0 0 |
| Lark & Son                                                                                      | 110 0 0  |
| Dunford & Langham                                                                               | 99 0 0   |

|                                                                                                                                                                            |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| LEEK.—For partitions, furniture, and fixtures at Silk warehouse premises, for Messrs. Wardle & Davenport. Quantities supplied. Messrs. W. Sugden & Son, architects, Leek:— |          |
| Accepted Tenders.                                                                                                                                                          |          |
| E. Goodall & Co., Manchester                                                                                                                                               | £244 4 8 |
| Jas. Hudson, Leek                                                                                                                                                          | 96 4 0   |
| H. Stevenson, Leek                                                                                                                                                         | 13 18 0  |
| Micah Carding, Leek                                                                                                                                                        | 69 5 0   |

|                                                                                                                                                                   |          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| LONDON.—For making certain alterations and additions to "The Carpenters' Arms," Dante-road, Newington Butts. Mr. H. I. Newton, architect, 17, Queen Anne's Gate:— |          |
| Lamble                                                                                                                                                            | £698 0 0 |
| Burman & Son                                                                                                                                                      | 685 0 0  |
| Walker                                                                                                                                                            | 679 0 0  |
| Godden                                                                                                                                                            | 675 0 0  |
| Cook                                                                                                                                                              | 670 0 0  |
| Canning & Mullings (accepted)                                                                                                                                     | 547 0 0  |

|                                                                                                                                               |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------|
| LONDON.—For fittings at "The Harelock" public-house, Gray's Inn-road, Holborn, for Mr. James Bacon. Mr. Charles Young, architect, Rochester:— |          |
| Cabinet and Bar Fittings.                                                                                                                     |          |
| F. Sage & Co., Gray's Inn-road                                                                                                                | £543 0 0 |
| Joseph Higgs, Dorset-square                                                                                                                   | 510 0 0  |
| Drew & Cadman, High Holborn                                                                                                                   | 500 0 0  |

|                              |           |
|------------------------------|-----------|
| Painters' Work.              |           |
| Banders & Sons, High Holborn | £156 10 0 |
| Thomas Heath, Goswell-road   | 155 0 0   |
| Buckley & Beach, Chelsea     | 152 10 0  |

|                                                                                                                                                                                                        |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| LONDON.—For sundry cleaning and other works required to be performed in the Library at Guildhall, for the Corporation of the City of London, under the direction of Mr. Horace Jones, City Architect:— |            |
| Greenwood                                                                                                                                                                                              | £1,630 0 0 |
| Harrison & Co.                                                                                                                                                                                         | 1,627 0 0  |
| G. Trollope & Son                                                                                                                                                                                      | 1,298 0 0  |
| Phillips & Banks                                                                                                                                                                                       | 1,289 0 0  |
| C. Blyton                                                                                                                                                                                              | 1,034 0 0  |
| Colls                                                                                                                                                                                                  | 970 0 0    |
| Lark & Son                                                                                                                                                                                             | 970 0 0    |
| Dove Bros. (accepted)                                                                                                                                                                                  | 775 0 0    |

|                                                                                                                                     |            |
|-------------------------------------------------------------------------------------------------------------------------------------|------------|
| COVENTRY.—For alteration and extension of the Sewage Purification and Disposal Works. Contract No. 1. Mr. J. C. Mellish, engineer:— |            |
| J. C. Halliwell                                                                                                                     | £8,400 0 0 |
| John Miles                                                                                                                          | 6,300 0 0  |
| W. Boon                                                                                                                             | 5,130 0 0  |
| C. Garlick                                                                                                                          | 4,510 0 0  |
| W. H. E. Hughes & Co.                                                                                                               | 3,951 0 0  |
| T. Mayo (accepted)                                                                                                                  | 3,295 0 0  |
| G. Fushon (withdrawn)                                                                                                               | 3,000 0 0  |

GLONDON.—For alterations and additions at "The Riffin," Leonard-street, Finsbury, for Mr. O'Reilly. Messrs. Gardiner, Son, & Theobald, architects. No quantities.—

|                                     |            |
|-------------------------------------|------------|
| Boydson & Son                       | £1,600 0 0 |
| Johnson & Matthews                  | 1,355 0 0  |
| Homer & Cutler                      | 1,275 0 0  |
| Draw & Cadman                       | 1,237 0 0  |
| J. Axford                           | 1,235 0 0  |
| Staines & Son, Great Eastern-street | 1,158 0 0  |

LONDON.—For works at 18, Ordnance-road, for Mr. J. Chaplin. Mr. Thos. Durrans, architect.—

|                     |          |
|---------------------|----------|
| Edgar               | £174 0 0 |
| Sheerman & Son      | 165 0 0  |
| Bodmeade            | 145 0 0  |
| Atkins              | 119 0 0  |
| Brundell (accepted) | 112 0 0  |

SOUTHGATE (Middlesex).—For alterations and additions to "Trump House," Southgate, for Mr. T. H. Roberts. Mr. J. Kingwell Cole, architect. Quantities by Mr. Pickersen. Messrs. Batten & Co., surveyors.—

|                                     |          |
|-------------------------------------|----------|
| E. J. Chant, Holloway               | £272 0 0 |
| L. & W. D. Patman, Enfield          | 687 0 0  |
| Paime Bros., Stamford-hill          | 670 18 3 |
| J. Pocock, Wood-green               | 627 0 0  |
| Wall Bros., Kentish-town (accepted) | 593 0 0  |

TILBURY (Essex).—For diversion of drain, new culvert, &c., for the Lands Allotment Company. Mr. Bradshaw Brown, Fenchurch-street, surveyor.—

|                  |           |
|------------------|-----------|
| Pearce           | £655 15 6 |
| Marshall         | 645 0 0   |
| Newman, Deptford | 595 0 0   |
| Williams         | 569 1 3   |
| Belgeorge        | 549 0 0   |
| Kirk Bros.       | 510 0 0   |

WALTHAMSTOW.—For the construction of surface soil and water sewers, for the Walthamstow Local Board. Mr. G. B. Jerram, A.M.I.C.E., engineer.—

|                                |             |
|--------------------------------|-------------|
| Butler                         | £12,450 0 0 |
| E. Bentley                     | 10,600 0 0  |
| Bottoms Bros.                  | 10,372 0 0  |
| Botterill                      | 10,098 0 0  |
| J. Mackay                      | 10,034 13 8 |
| J. W. Stuart                   | 9,897 18 2  |
| Currell & Lewis                | 9,739 8 0   |
| C. Killingback                 | 9,400 0 0   |
| North British Plumbing Company | 8,692 0 0   |
| J. Bloomfield                  | 8,622 0 0   |
| J. W. & W. Neate               | 8,599 7 0   |
| Geo. Cadway & Sons             | 8,547 14 8  |
| B. Cook & Co.                  | 8,108 0 0   |
| Geo. Bell                      | 8,074 0 0   |
| Jesse Jackson                  | 7,999 0 0   |
| Eli Wilson, Walthamstow        | 7,921 0 0   |

\* Accepted.

WALTHAMSTOW.—For the erection of engine and boiler-house, mixing-shed, low-level tank, and sewer, for the Walthamstow Local Board. Mr. G. B. Jerram, A.M.I.C.E., engineer.—

|                         |            |
|-------------------------|------------|
| J. Bloomfield           | £4,406 0 0 |
| E. Bentley              | 4,000 0 0  |
| Botterill               | 3,963 0 0  |
| Currell & Lewis         | 3,983 11 0 |
| J. W. & W. Neate        | 3,919 0 0  |
| J. Mackay               | 3,906 8 0  |
| Bottoms Bros.           | 3,814 0 0  |
| Geo. Bell               | 3,604 0 0  |
| C. Killingback          | 3,600 0 0  |
| B. Cook & Co.           | 3,551 0 0  |
| E. Good                 | 3,489 0 0  |
| J. Argood               | 3,350 0 0  |
| Adams                   | 3,467 18 6 |
| Jesse Jackson           | 2,699 0 0  |
| Eli Wilson, Walthamstow | 2,659 0 0  |

\* Accepted.

WALTHAMSTOW.—For two houses and shops, for Mr. Joseph Edwards. Mr. W. Smith, Gresham-buildings, architect.—

|                   |            |
|-------------------|------------|
| Read              | £1,816 0 0 |
| Richardson        | 1,774 0 0  |
| Anley             | 1,645 0 0  |
| Hurst             | 1,643 0 0  |
| Shurmer           | 1,635 0 0  |
| Scott             | 1,633 0 0  |
| Lark & Sons       | 1,629 0 0  |
| Fuller            | 1,481 0 0  |
| Mattock Bros.     | 1,475 0 0  |
| Killingback       | 1,457 0 0  |
| Dunford & Langham | 1,457 0 0  |
| Clarke Bros.      | 1,398 0 0  |
| Chant             | 1,380 0 0  |

WHEATSTONE.—For detached house, Oakleigh Park, for Mr. Palmer. Mr. J. William Stevens, architect, New Bridge-street.—

|                               |            |
|-------------------------------|------------|
| Life, Southgate               | £1,869 0 0 |
| Knight, Southgate             | 1,861 0 0  |
| Noble, Barnet                 | 1,775 0 0  |
| Staines & Son, London         | 1,554 0 0  |
| J. & C. Bowyer, Upper Norwood | 1,548 0 0  |
| Prestige & Co., Pimlico       | 1,488 0 0  |
| Grover & Sons, Islington      | 1,454 0 0  |
| Cornay, Barnet                | 1,350 0 0  |
| Johnstone, Limehouse          | 1,480 0 0  |
| Smith & Sons, South Norwood   | 1,416 0 0  |

\* Accepted.

WIMBLEDON.—For the erection of a Free Public Library, at Wimbledon, Surrey. Messrs. Potts, Sulman, & Hennings, architects. Quantities by Mr. G. Fleetwood.—

|                                  |            |
|----------------------------------|------------|
| Jones, Gloucester                | £2,885 0 0 |
| Schofield, Swansea               | 2,873 4 6  |
| Balsam, Old Kent-road            | 2,770 0 0  |
| Reynolds, Brighton               | 2,694 0 0  |
| Ackerman, Wimbledon              | 2,515 0 0  |
| Gibbs & Fiew, Kennington         | 3,500 0 0  |
| Harner, Wimbledon                | 2,460 0 0  |
| Angood, Finsbury Park            | 2,384 0 0  |
| Roberts, South Norwood           | 2,378 9 10 |
| Potterton, Gould, & Co., Hampton | 2,362 13 0 |
| Harris, Sutton                   | 2,190 0 0  |
| Johnson, Wimbledon               | 2,165 0 0  |

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# The Builder.

Vol. XLIX No 2235.

SATURDAY, OCTOBER 3, 1888.

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### The War and Admiralty Offices Question.

THE model of the proposed new buildings and of the adjacent ground (curiously incorrect and out of date on the latter head) has now been removed from the room in Spring-gardens where it has been exhibited, the authorities being apparently unwilling, and no wonder, to respond to public appeals which have been made to them to leave it open to public view till the assembling of Parliament. The evidence the public prints has shown that dissatisfaction with the whole scheme, on the part of those who know anything about such matters, has deepened with the further contemplation of the proposed designs and the arrangement of the site. In regard to the latter half of the question in particular, the choice and arrangement of the site, the matter is now so old a story with us that we have hardly thought it necessary to join the discussion at the moment, but it may be worth while to recapitulate briefly the grounds of objection to the scheme, and to notice what a very remarkable consensus of opinion has been expressed in various quarters in favour of the views which we have previously expressed.

The story of the old question between the site at George-street and the present one goes far back in the limbo of official history, but has gone back to now. The Great George-street site, incomparably the best available (or even available) for the purpose, was practically lost through official delay and shilly-shally, and it is of no use to lament over it now. In coming to the present phase of the story, in the *Builder* of July 8, 1883, we published the proposed plan of the present site, which was in an entirely new departure, prompted solely by economy; for no other conceivable motive could be imagined for proposing to place a great official building on a site zigzagging in and out behind smaller existing buildings. We then inquired what guarantee there was, independently of architectural effect, that the departments could really be efficiently used on this comparatively limited site, and whether it would not be reasonable to expect the Office of Works, before asking Parliament to sanction the purchase of this site, should convince itself by plans, sections, and elevations, that the scheme it proposed was architecturally feasible and safe, on sanitary and constructional grounds. Then the block-plan furnished a kind of adumbration

of the manner in which the buildings might be laid out, and this general scheme included no less than five closed internal courts. In regard to this feature we then observed:—"By the scheme it is proposed to erect lofty blocks of many-storied buildings around enclosed quadrangles, three out of five of which are palpably inadequate, even presuming that modern science advocated such a mode of arrangement. On the contrary, every effort has been made of late years to abolish the closed square, to build in such a manner as to allow a thorough draught of air to penetrate interior courts and courtyards."

But if this criticism was provoked by the original block-plan, what can be said of the one now proposed? In the block-plan aforesaid the largest court was more than one-third the width of the whole site (not counting the wing projecting towards the Horse Guards), the two large courts together were more than half the width of the whole site; the smallest courts, which we then said were palpably inadequate, were much larger than the smaller ones in the present plan. The one large court on the present plan was only one-fifth the width of the whole site in its original form, and its being widened by 15 ft. still leaves it far narrower than those suggested on the block plan referred to; and as to the smaller courts in the present plan, the official promoters of the scheme dare not have shown such courts in a block-plan (which is the best means of showing the proportion of void space to building); they would have been derided at the outset, and would, probably, have sufficed to quash the scheme. Large floors with all the details elaborated are often very deceptive in the idea they give of the proportional area of inner courts and their effect in the complete building; but a model is as unpleasantly truthful as a block-plan in this respect, and those who have looked down the funnels, rather than courts, in the recently exhibited model, have probably had their eyes opened to the reality of this feature of the plan, if they had not before. This, *bien entendu*, we do not charge as the fault of the architects so much as of those who set them to work on a site on which it is obvious that the accommodation wanted cannot be had consistently with an avoidance of overcrowding. One or two other competitors did better in the scale of their large court; but the small courts, which are the worst of the evil, seem inevitable if the accommodation required is to be got into that site. The original official plan, in fact, was contrived to look as feasible as possible, and the subsequent working out of the problem has shown that it is perfectly impracticable consistently with good sanitary results.

If we come from the practical to the architectural side of the matter, we find three main objections to the scheme and design now proposed; first, the blocking for ever of the chance of a fine combination of the Mall with Charing-cross; second, the retaining of the buildings facing Charing-cross between the New Offices and Spring-gardens, breaking up the new building and sending part of it ignominiously to the rear of lower and inferior buildings; third, the character of the accepted design itself. For the first two of these objections the Government alone are to blame. The opportunity of opening a fine vista from Charing-cross along the Mall is one of a kind which it may be safely said the Government of no other first-class capital would neglect. Only in London are our rulers, in their corporate capacity, apparently entirely indifferent to the opportunity, in connexion with one of the most important buildings of the day, of securing a fine effect which would be a lasting pleasure to the public and a lasting adornment to the city. Indeed, many of them openly boast of their indifference to what they contemptuously call "aesthetic" questions. The great opportunity afforded by the possibility of realising this fine feature in connexion with the site was urged upon the Government by the Institute of Architects, in a memorial (printed in the *Builder* of July 1st, 1882), which, we believe, was not even considered. The memorialists have their revenge now, for there is beginning to be a general cry-out for the adoption of this arrangement by those who are interested in the architectural beautifying of London. The probable bad effect, again, of leaving Biddulph's and Drummond's Banks and the adjoining buildings standing, and carrying the new building round behind them, was pointed out both in the Institute memorial and independently in our columns. But we can truly say that we ourselves scarcely realised the full absurdity of it until the perspective view of the "amended design" was issued to Members of Parliament.\* Anything more mean, lopsided, and unsatisfactory than the appearance of this knot of smaller buildings squeezed into an angle of the large one, and blocking out that portion from the main street, it is impossible to conceive, considering the circumstances and the importance of the work in hand. For a great nation to build one of its official palaces in that kind of makeshift manner is little short of a disgrace; and if the Government or its official advisers do not learn that now, they will when the new building is erected in this manner; it will be plain to very ordinary capacities then,

\* This was reproduced in our pages (v.l. xlviii., p. 492) at the time (April 4, 1883), and those who would realise what is going to be done would do well to look at it.



at all events, what an absurd and contemptible architectural blunder will have been made; but it will be too late then to rectify it. A minor, but still important, drawback in connexion with the proposed retention of these buildings has been pointed out in a letter from Mr. J. Oldrid Scott, in the *Times* of the 25th, in which, after speaking very strongly of the general bad effect of retaining these buildings, he draws attention to the desirability of continuing the gradual widening of Whitehall, which has already been in part effected, and which the retention of the Banks and their adjoining buildings would nullify. He says:—"All recent improvements in this thoroughfare and Parliament-street have had the object of continuing its greatest width through from end to end, with the ultimate intention of making it a magnificent street, unequalled certainly in London. The new Home and Colonial Offices were set back with this object, Charles-street being done away with, and the west side of Parliament-street will follow in one course. But by retaining the two banks at the corner of Spring-gardens, the entrance to Whitehall from Trafalgar-square will be for ever fixed at its present insufficient width. Surely this is a point which should not be lost sight of."

As to the defect of the design in itself, it is simply, as we have already said, that inseparable from an entire absence of genius. Our feeling on first seeing it was that of utter disappointment; but it had been selected with, we were convinced, the fairest intentions, and we were not disposed to take up at once the line of condemnation, and contented ourselves with pointing out some obvious defects, especially recommending that the excessive projection of the columns and their stylobates in the central portions of the façades should be moderated, by the transformation of the columns into three-quarter engaged columns. This advice, we observed, has been followed in the model, we presume by official direction; but unfortunately it does little, after all, to counteract the bad practical effect of the buttress-like masses of the stylobates, which will shut out so much light from the lower windows, nor does it go far to give to these columns and their entablatures any more meaning or point in the architectural ordinance of the building. They are slices from the decoration of the Roman triumphal arch, in fact, repeated along the face of a business building. Among the various criticisms of the whole business, our contemporary, the *Architect*, has published a couple of pithy and trenchant letters addressed respectively to the late and the present First Commissioners of Works, "By a Correspondent," whose identity it is not difficult to conjecture, and who characterises these features as "a sort of Pimlico palatialised in real stone, with statuary for which you know, better than any one, that no House of Commons will consent to advance a penny, and without which a perpendicular excrescence of solid block, column and attic, will appear a motiveless obstruction." Both statements are, unhappily, as true as gospel; but it may be questioned, in addition, whether, even if the statuary were voted, such a ponderous architectural sub-structure is justified for the mere support of a statue. But, independently of these details, the commonplace of the design generally is a matter for great regret, in the case of the most important building of this generation; and this feeling is obviously becoming stronger, or, at least, more widely diffused, than before. It could hardly, indeed, be stronger than it has always been with many people, and if we were to repeat all we have heard said about it from architects (not competitors) and from non-professional men taking an intelligent interest in architecture, it would be seen that our remarks hardly at all represent the extent of disappointment and disapproval in regard to the selection. The letter of Preceptor Venables in the *Times* of the 19th ult. may be taken as an indication of the feeling of architecturally-educated laymen, of whom he is a very fair representative. He uses very nearly our own words in characterising the design; whether this is an example of

what Biblical critics call "undesigned coincidence" we know not; if so, it has the more value as a testimony of independent opinion. He says his first feeling on seeing the model was, "I earnestly hope this will never be built," and that is precisely the feeling we have heard expressed in various words from various quarters. The *Athenæum* goes further, and suggests that the architects should be remunerated adequately, and the whole affair reopened. In fact, we have hardly seen any architectural opinion in favour of it (the members of the committee of selection, of course, not counted), except from those who had obviously an interest to serve in doing "koodoo" to the authors of the successful drawings. The afore-named correspondent of the *Architect* makes merry over the absurd comments in a daily paper, in which the undoubted excellence of the drawings of the accepted design was compared to that of Hollar and Du Cerceau. The wiseacre who could make such a remark could hardly have been acquainted with the drawings of Hollar and Du Cerceau, or he would not have done such injustice to Messrs. Leeming's drawing.\* He had probably got them up as good names to use. But unfortunately drawing is not designing. It is one of the bones of the system of architectural competition that it tends to give greater importance to drawing than to design in the true sense; every competing architect knows that his best chance is through securing fine draughtsmanship; and in this case the blandishments of draughtsmanship seem to have fascinated not only the laity on the committee, but the President of the Institute of Architects himself.

The conclusion of the whole matter, however, is that, independently of all questions of gustibus, the whole site should be remodelled and extended, the buildings which now block the north-east angle of the site purchased for removal, the plan arranged to open a vista into the Mall, and the ground extended so as to allow of the chance of arranging the building upon it without overcrowding. "A Naval Officer" has suggested in the *Times* that the Service do not want to be incorporated with the War Office, and that the Admiralty should have a separate building somewhere facing the river. This is a mere piece of sentimentalism, of course; but there is certainly not proper room for both on the site, within the present lines. The possibility of the removal of the Horse Guards has been mooted in one or two quarters. We should be very much opposed to the removal of so interesting and characteristic an old London building; but we would rather see even that than see a large new building crowded up in an insanitary manner for want of adequate space.

When the absolutely new departure has been made as to the site and its extent and arrangement, it could then be considered what would be the best conditions under which to secure a less commonplace design without injustice to the originally selected architects, who, undoubtedly, according to their lights, worked hard for the piece of good fortune they so unexpectedly attained, and are bound to have a substantial reward in one way or another. As to the question of "glory," the present design will not bring them that; that is the plain English of it, and it is no use saying otherwise; but they might achieve another that would, either alone or in conjunction with a more experienced and artistic coadjutor.

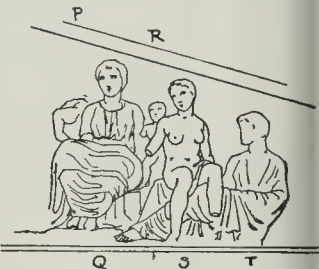
**Architecture at University College.**—Prof. Roger Smith will deliver the public opening lecture of the session at University College, on Monday afternoon next, at three p.m. The subject will be "Westminster Abbey," and a fine collection of architectural drawings of portions of the Abbey will be exhibited. Admission to this lecture will be free and without tickets.

\* This is said, of course, in reference to Hollar's architectural drawings only, which are not only clumsy as architectural representations, but are, as we have before remarked, not even so accurate as records as it is the fashion to suppose. In some other walks of draughtsmanship he was, of course, admirable, sometimes unsurpassable.

## NEW LIGHT ON THE WEST PEDIMENT OF THE PARTHENON.

NOT long ago we had occasion to notice Dr. Waldstein's ingenious interpretation of the "Gaia and Thalassa" of the east pediment. Now, from far-off Dorpat, Dr. Loeschke,\* always a bold and original thinker, sends us a theory as to two figures of the western pediment so startling, and yet, we think, so probable, that it may not be passed by in silence. As we state the theory, we feel that the enemies of archaeology will indeed be tempted to blaspheme. A figure accepted for centuries as Aphrodite we are asked to believe is a Herakles. What certainty, one may well ask, in a science which one day interprets a monument as the most delicate and feminine of goddesses, the next as the most sturdy and virile of heroes. But let Dr. Loeschke state his case before we condemn.

As is well known, discussions about the western pediment turn for the most part, not on statues at all, but on drawings of statues. The group under discussion (usually lettered S, T) is a case in point. This group represents a seated, half-reclining, draped figure, and on its knees a nude, full-grown figure. The marbles, however, have perished utterly; what we possess for purposes of restoration are three sets of drawings made before the destruction of the pediment. These drawings are Dalton's, made in 1749, those known as "Anonymous" made when Nointel was ambassador, 1674; and Carrey's, also made in 1674. These are, so to speak, the text on which every emendation of the pediment manuscript must be made. Dr. Loeschke first clears the ground by reducing our authorities to two. Dalton he puts out of court by showing, in a series of arguments we need not recapitulate, that he made fancy restorations based on other marbles, e.g., those of the Nike balustrade. Plainly, for scientific purposes, he must stand aside. We are left with Carrey and the Anonymous.



The figures on which Dr. Loeschke's argument turns are, first and foremost, the two usually called Aphrodite seated in the lap of Thalassa (T, S) with the child figure close to the group, and usually taken in conjunction with it, called Eros (R), and subordinated to the next figure to the left, a seated woman, usually called Leukothea, and the "standing" boy near her, her son Palemon (P, Q). It may seem to the laity that much time is wasted in argument as to the interpretation of mere drawings, but a moment's consideration will show that dealing as they do with a masterpiece planned by Phidias, these drawings afford a clue to the whole spirit of pediment composition in his days, and, further, we may add that on this figure of the supposed nude Aphrodite in the lap of Thalassa much theory as to the attitude of the Greek mind towards the goddess has been based, which, if Dr. Loeschke's view be correct, falls to the ground.

This nude Aphrodite has always been a crux. We are accustomed to the nude Aphrodites of the days of Praxiteles, but even then the sculptor deems it necessary to provide a motive, the stepping into or out of a bath. Here, a century earlier, in days when art was

\* Vermuthungen zur Griechischen Kunstgeschichte unter Topographie. Athens: G. Loeschke, Dorpat: Programm, 1885.



everely self-restrained, and in matters of religion strictly conservative, are we to accept a nude Aphrodite without motive? No, emphatically. Hence, archaeologists are driven to suppose that he motive is the birth of the goddess from the sea; hence the woman figure (T) in whose lap she lies is Thalassa. One error begets another. Dr. Furtwaengler, puzzled by the nude Aphrodite, has even gone so far as to suppose he was a sort of copy or reminiscence of the nude idol worshipped at Kolias,—a relic, no doubt, of Phœnician days. But let us turn to the facts of one case, i.e., the two sets of drawings. Suspicion is aroused at once; in the anonymous drawings the nude figure is evidently intended for a male. In the *repro- ductions* of Carrey's drawings usually current (i.e., those of Overbeck and Mitchell) the nude figure is undoubtedly female, drawn distinctly with female breasts. Turning, however, to the earlier fac-similes of Laborde, the drawing of the breasts is quite absent; the figure is full but not the least necessarily masculine. Michaelis himself, speaking of Carrey's drawings, argues from the fullness and pose of the figure, not as he naturally would, did it exist, from the conclusive fact of the drawing of the breasts. There is, therefore, no certain evidence that the figure is female; much probability that it is male. The small figure (Q) of a child has hitherto, owing to the Aphro- dite interpretation, always been called Eros, but, abolish the Aphrodite certainty, and grave doubts as to the Eros arise. The figure as no wings. In the frieze of the cella Eros is a youth of very tender years (*μειλίχρως*). Why should he here, on the same temple, be a baby boy, and thus anticipate the Græco-Roman fashion? Everything except the supposed relation to Aphrodite makes against the Eros attribution. One naturally asks, why, then, has this nude figure been so unanimously decided to be female? The answer is not far to seek. Interpreters saw, or fancied they saw, a great awkwardness in supposing that a full-grown male figure was seated in the lap of an evidently female figure. But what is odd and clumsy to modern eyes had no strangeness to the Greeks. In a picture by Aristophanes, the kinsman of Polygnotus, Alcibiades was depicted "seated in the lap of the nymph Nemea." It has been often mooted that the case of the lovely group, which Dr. Waldstein calls Gaia and Thalassa, was suggested to Pheidias by the composition of a group in the paintings of Polygnotus at Delphi, i.e., the Chloris leaning against the knees of Thyia; possibly, then, this very group of what we now consider the male figure resting on the knees of the female was suggested by this very Alcibiades and Nemea. We should have, instead of Aphrodite and Thalassa, a hero seated in the lap of some nymph, to whom he stood in close relation, as son or husband. Looking at the Anonymous drawing, it is (according to Dr. Loeschke) not difficult to decide that hero and what nymph. The nude figure is of muscular build, with short-cut hair; his right arm is outstretched, and must have held some attribute, of which faint traces remain in the drawing, which seem to indicate a tub. Over the left thigh a small bit of rapery is cast, which may be a lion's skin. The hero is Herakles. This hero, Herakles, was bound by intimate ties to no local deme in the land of Attica; he loved to eponymous nymph Melite. From his marriage with her sprang the dwellers in the deme. This deme of Melite, it will be remembered, takes in the rocky summit of the Pnyx, the Barathron, and reaches north to the Cerameikos. The name comes up again and again in Attic history and literature. Themistokles dwelt there, Plutarch tells us (Them. 2), near the sanctuary of Artemis; Aristophanes (*Aves*, 117), crossing the path of the market when he was on his way to Melite; Arisphanes (*Frogs*, 501) calls Herakles the "sorry name of Melite." We remember, too, that for Herakles, localised as hero of the deme Melite, Herakles, master of Pheidias, made a statue. Herakles had a famous shrine there reared to him under the title of "Defender from Evil" (*Ἀντικακός*). It was built during a great

pestilence to appease the hero, and the plague was immediately stayed.

We have, then, in the group S, T, not a clumsy depiction of the birth of Aphrodite, but a sort of landscape group thoroughly in the Attic topographical manner. The interpretation is the more satisfactory, because it offers a new solution to the next group also, the so-called Leukothea and Palamon. Next in honour to Herakles in the deme was held the Thesmophoric goddess, Demeter: she it is who sits by the side of Melite, the nurse and guardian of her children. We have, indeed, as Dr. Loeschke suggests, just such a family group as appears time after time on Greek grave reliefs, though but seldom in its entirety, father, mother, nurse, children. These children of Herakles and Melite are to us nameless, but no doubt the Athenians of the time of Pheidias gave them distinct title and character. This interpretation has a yet further advantage: it obeys the strict law of symmetry, so binding in pedimental composition. The family of Herakles and Melite on the right balance the family of Kekrops on the left. Any one who has studied Greek pedimental composition will know how important an element this must always be in any scheme of permissible interpretation. Further,—and this is the point on which Dr. Loeschke lays special stress,—we gain by this view a glimpse far back into the remoter days of Attic local topography and state organisation. Before Athens ruled the united city, the hero Herakles held sway over the rocky summit of the Melitean Pnyx. This falls well into the general scheme of interpretation propounded by Dr. Brunn, which demands that all the figures in the western pediment should represent local gods, nymphs, and heroes in possession of the Attic land before the coming of Athene and Poseidon.

We cannot call Dr. Loeschke's theory exactly proven, but we think it comes with that cumulative probability always nigh akin to conviction.

#### NOTES.

**R**ECENT accounts of the financial state of the city of Paris reveal a munificence of expenditure which can hardly fail to have grave political consequences. Since 1852 the sum of 74,600,000*fr.* has been laid out in the rebuilding and embellishment of the French capital. In the outlay are included the sums of 33,360,000*fr.* spent on streets, 11,360,000*fr.* spent on the Hôtel de Ville, together with schools, churches, hospitals, municipal buildings, and markets; 8,000,000*fr.* on the four public parks of the Bois de Boulogne, the Bois de Vincennes, the Parc Monceaux, the Parc de Montsouris, and the squares and gardens; and 6,280,000*fr.* on water conduits and sewers. The annual rental derived by the city from the last item of expenditure amounts to 400,000*fr.*, or 6½ per cent. on the outlay. The rents of the central halls, markets, abattoirs, and cab-stands come to 880,000*fr.* per annum; and the city has to raise 840,000*fr.* by annual imposts in order to make up the charge of 1,720,000*fr.* per annum for interest and amelioration of the outstanding loan debt of 40,360,000*fr.* During the period in question the population of Paris has risen from 945,000 to 2,300,000. The area covered has increased from 8,400 acres to 19,270 acres; 100 miles of sewers, and 87 miles of new streets have been built; and 30 miles of old streets, having a width of less than 23 ft., have been removed. The disposable property of the city is valued at 64,640,000*fr.* This does not include 3,702 acres of streets, which are valued at 120,000,000*fr.*; or the half share of the property of the Paris Gas Company which, together with the gas conduits which will become the property of the city in 1906, is valued at 6,120,000*fr.* The rateable value of Paris, containing 77,000 houses, was estimated by Sir Joseph Bazalgette last year at 24,000,000*fr.*; that of London, including the disproportionate number of 500,000 houses, being 28,000,000*fr.* The length of streets were respectively 582 and 1,800 miles.

**N**OTWITHSTANDING the number of

Electrical Exhibitions which have been held in various parts of the world, and the awards which have been made to the different kinds of exhibits, it has been a very difficult matter to obtain a thoroughly satisfactory test of incandescent electric lamps. This has been owing to the impossibility of obtaining either the necessary conditions to ensure scientific accuracy or the requisite time to carry out the investigations. The need for some such exhaustive examination was felt so strongly during the holding of the Philadelphia Exhibition, that the Franklin Institute in that city appointed a committee to carry out a thorough-going test both of the efficiency and durability of incandescent lamps, and their report has now been published. This report appears to us by far the most complete that has ever appeared on the subject, and the only cause for regret is that several kinds of lamps, among them that which is best known and most widely used in this country, the "Swan," were not included in the examination. The report describes minutely the method of testing employed, and shows that the greatest care was taken to avoid error, and to obtain average results. For instance, the exact form of the cross-section of the carbonised filament in a lamp influences considerably the amount of light passing in one definite direction, but as lamps are required to shed light in all directions it is the mean spherical intensity of illuminating power which is the real standard of efficiency, and a very ingenious arrangement is described by means of which the candle-power of each lamp was tested at thirty-eight different points on its surface, and the mean illuminating power was thus arrived at. The real test of an incandescent lamp is its efficiency and durability combined, and for testing the latter quality most elaborate arrangements were made, the examination lasting from April 11th to May 28th, a total duration of 1,066 hours, and the candle-power was taken at regular intervals, so that the effect on the efficiency of the lamp of continued burning could be ascertained. In every case it was found that after a time the resistance of the lamps gradually increased and the candle-power diminished. The lamps experimented upon were the Edison, Woodhouse-Rawson, Stanley-Thompson, and Weston, and the results are minutely tabulated for each lamp. The whole report must be of the greatest interest to electricians, and it would be very desirable to institute such a series of comprehensive experiments in this country.

**O**N the subject of the discussion between "Sanitary" and the members and officials of the Board of Works, Mr. Mark H. Judge has published, under the heading, "Wanted, an Answer," his letter to the *Times* on Monday last in regard to the manner adopted of dealing with the case at the meeting of the Board, by referring it to the Works and General Purposes Committee. Mr. Judge points out that the Works and General Purposes Committee is practically a private meeting of the whole Board, from which reporters are excluded. This has not been contradicted, so that the Board are to sit in judgment on themselves in private in regard to a public accusation against one of their members of owning and drawing exorbitant rent from property in an insanitary condition, and which had been formally condemned as insanitary. As we have said, we should have thought more of "Sanitary" if he had signed his name to his charges; but they have been publicly made, and a great many people believe them, and public opinion will not be satisfied without a public answer.

**W**E commented the other day on the action of the "Telluric Cement Company" in sending round circulars to architects with the offer of a commission for specifying their commodity. An architect has sent us another document of the same kind, being a letter, marked "private," and signed "J. E. Locking," and setting forth the excellencies of the "Gran-metallic Stone Company," with the postscript, "I may mention that a commission of 5 per cent.



is given." Accompanying the note was a printed business-card of "The Patent Granolithic Stone Company," with the name of "J. Locking" added in MS. Have the company in question commissioned this gentleman to offer bribes to architects in their name? If not (or whether or not) they had better look to it. This sort of thing must be stopped. The oddest thing about the business is that Mr. Locking's letter bears the stamped heading, "The Times, Printing-house Square," and concludes with a request that replies may be addressed to him there! It is grotesque enough to find this kind of epistle dating from the office of a journal which is so fond of publishing attacks on the ability and even the *morale* of the architectural profession; but we may presume that the managers of the *Times* hardly contemplated that any one in their employ should make use of their address and their stationery in the pursuit of the ingenious vocation of offering underhand commissions to architects.

THE accounts of the Scottish railways, which terminate their year on the 31st of July, instead of the 30th of June, are not encouraging. The Caledonian, indeed, has maintained its dividend on ordinary stock at the rate of 4½ per cent. per annum, although it has carried 47,690 fewer passengers, and received 10,776l. less for fares, than in the last corresponding half-year. There is a reduction of 14,000l. in mineral traffic, but an increase from other sources of revenue. A saving of 12,723l. in locomotive power is attributed to improved engines, and reduction in the price of coal. On the North British Railway, a falling off in the receipts, both from passengers and from goods, amounting to 14,570l., has been accompanied by an increase of 4,500l. in working expenses. In the corresponding period of last year, the dividend on the North British ordinary stock was 3½ per cent.; and ½ per cent. was paid on the Edinburgh and Glasgow ordinary stock. This half-year the ordinary shareholders in the North British are only to receive 2 per cent., and the Edinburgh and Glasgow shareholders get nothing. It is true that the ordinary capital is unduly small in proportion to the preference and debenture stocks, so that a small increase or decrease in net profits tells heavily on this class of proprietors. But this only illustrates the bad policy of such a mode of raising capital.

DR. HIRSCHFELD has just published a monograph on the rock tombs of Paphlagonia ("Paphlagonische Felsengräber"). He undertook, in 1882, a special journey to Asia Minor, with the object of investigating the remoter districts of Paphlagonia, and the results of his expedition are now, for the first time, before the public. His work has a special interest for English archaeologists because of certain analogies which the rock tombs of Paphlagonia present to those of Phrygia, which have recently attracted so much attention, owing to Mr. Ramsay's discoveries. There are, however, certain well-marked differences in the architecture of the tombs, on which Dr. Hirschfeld lays especial stress. With Dr. Benndorf for Lycia, Mr. Ramsay for Phrygia, and Dr. Hirschfeld for Paphlagonia, the rock tombs of Asia Minor will soon be in a fair way towards systematic chronology and classification. As a link in the overland chain from East to West, they are all important. Dr. Hirschfeld visited especially Hamakaya Iskelib and Kastamuni. Half of his book is devoted to the careful and very detailed description of the tombs of these places; the other half, to his theories as to chronology and the relation of these to other analogous monuments. He gives us four phototype plates of the rock tombs, besides a number of plans and woodcuts; also, a very useful thing, a map of the distribution of the rock graves, and of the so-called (Dr. Hirschfeld very carefully adheres to the "so-called") Hittite monuments. The monograph is a reprint from the "Abhandlungen" of the Prussian Academy of Sciences at Berlin.

WE regret to hear that the picturesque old house in School-hill, Aberdeen, is about to be removed for the building of new premises, consisting of shops and dwelling-houses, the latter chiefly for the working classes. The house is one which has been long known as an interesting specimen of old Scottish architecture, and it has been suggested that it should be purchased by subscription among the county families, and preserved as an example of ancient architecture, and perhaps converted into a museum. Probably many would be glad to subscribe for this object, if it is still possible to preserve the old building. If the large railway carrying company who threaten this destruction require a site for new premises, cannot they find it without destroying so interesting a relic of the past? Probably they would be



ready to do so and to sell the house with the object above suggested, if there are those forthcoming who will find the funds. From accounts which have been sent to us it appears that the architects, Messrs. Matthews & Mackenzie, have given assurance that great care will be taken, in pulling down the building, of any stones or other portions that may be of archaeological value. Seeing that the chief archaeological value is in the building itself, the promise to keep a look-out for anything of interest while you are pulling it down is a delightful touch of Northern cynicism. We shall be glad to hear the other side, if there is one; but from what we can make out a somewhat wanton piece of destruction is contemplated.

UNDER date "London, March 31, O.S. 1749, Hôtel Chesterfield," Philip (Stanhope), fourth Earl of Chesterfield, writes to S. Dayrolles,—"I have yet finished nothing but my *boudoir* and my library; the former is the gayest and most cheerful room in England, the latter the best. My garden is now turfed, planted, and sown, and will, in two months more, make a scene of verdure and flowers not common in London." Later the property of Mr. Magniac, M.P. for Bedford, this house has been purchased by Sir Arthur Bass, and is in course of rehabilitation at the hands of Mr. Robert W. Edis, F.S.A. One or two of the rooms, notably the music-room over the dining-room, and the ante-room, retain much of their original aspect. Mr. W. H. White comments upon this ante-chamber in his paper which will be found in the *Builder* for the 27th of December last. It is the very room whose memory will last so long as that of Dr. Johnson shall endure. For he mentions it in his letter, February, 1751,—to Lord Chesterfield, which that nobleman, with his unflinching astuteness, suffered to lie open on his library table. The library,—at the south-eastern corner of the house and having no floor above it,—is but an *image* of its former self, though the shelving and mantelpiece are appa-

rently contemporary fittings. The house, indeed, has lost what we may term its setting: the "scene of verdure and flowers" is covered by Chesterfield-gardens and other houses: the colonnade on each side of the front courtyard is closed in. It should be observed that the balustrade of the marble staircase, a relic from Canons, is plentifully decorated with the earl's coronet and garter. In some of the rooms the space beneath the flooring is filled in with shells, which must add considerably to the weight the ceilings have to carry.

THE new premises of the London and County Banking Company, which are now being built opposite to the Palace gates, at Kensington, occupy the site of Colby House. This latter, evidently erected less for show than for use, had all the air of Vanbrugh's handiwork. He is known to have been employed here, and to have designed that part of the old parish school, in High-street, which was pulled down in 1878 for the present Town-hall. Colby House was so called after a baronet of that name, *temp.* George I., of whose wealth and parsimony an interesting account may be read in Dr. King's "Anecdotes of His Own Times." Beneath the old, but refronted house next westwards, remains the former entrance to Colby House. Together with its more celebrated neighbour, Kensington House, to the east, it was demolished about thirteen years ago to make way for the mansion which was constructed for the Baron Albert Grant. That again has since given place to the houses of Kensington Court. Formerly the school of James Elphinstone, the translator of Martial, and, as his monumental tablet in the parish church testifies,—the friend of Jortin and Dr. Johnson, Kensington House became a Jesuit seminary for the children of French refugees, under the care of the Prince de Broglie. Here amongst other people of repute had resided the Cosways, and the authoress of "Nature and Art" and "A Simple Story."

AS already announced in the columns of the *Builder*, a project was some time since submitted to the Italian Minister for the construction of a bridge across the Straits of Messina, connecting Sicily with Calabria, the mainland of Italy. The viaduct would cross the Channel at its narrowest point, that is from Cape del Pezzo, on the Calabrian shore to the village of Ganziri on the Sicilian shore between Cape Faro and the City of Messina. It is proposed to construct the work entirely in steel. The viaduct is to have three central openings, each nearly five furlongs in width, and two arches, one abutting on each shore, of 500 metres in width. The foundations are to be of granite blocks, resting upon the bottom of the Straits, and rising to within 20 metres of the level of the sea. Upon these foundations the piles would be constructed likewise in granite, to a height of 10 metres above the level of the sea. The height of the arches would be about 100 metres, or nearly 330 ft. The total length of the viaduct would be two miles and a half.

CONSIDERING that Bentley Priory, near Stanmore, has been deserted by Lord Abercorn's family, and has been converted into a large "residential hotel," it is worthy of notice that the place, after all, has been little changed since the days when it was one of the great houses where the Conservative party used to rally its forces. Except for the large Italian campanile which Sir John Kelk added to the house during his brief occupancy, the Priory is very slightly altered from what it was when occupied by the late Queen Dowager Adelaide. Her favourite drawing-room is now the public drawing-room of the hotel, and the bedroom in which she died now forms the best private sitting-room in the entire mansion. Some of the fine old furniture still remains, and the Italian gardens and cedar gardens, and the long shrubberies of rhododendrons, firs, and evergreens shelter the grounds and park from the north and east winds just as they did when the terraces were paced by the feet of the fair Ladies Hamilton. The lake



ottom of the grounds is as full of fish as ever, and the deer browse as freely as ever or repose among the wild fern and bracken in the park. We described Bentley Priory in considerable detail in the *Builder* for July 2, 1881; and almost the only new feature that it is necessary to record here is the addition of an annex at the end of the conservatory, containing some twenty-five sets of bedrooms and sitting-rooms, and the fact that a four-horse coach now runs daily to Bentley Priory and back, starting from the Hôtel Métropole in Northumberland-avenue.

ACCORDING to the *Bulletin de la Céramique*, wood paving is not the only system lately tried in Paris, the method of employing stone upon concrete having been introduced from England by M. Barabant, principal engineer for bridges and highways. Instead of simply reposing on a bed of sand, the stone is paved in place upon a dry layer of Portland cement, 6 in. in thickness. A hammer is used for laying the blocks, and a horsehair brush spreads on the pavement a cement mortar, which runs into the joints and rapidly solidifies. The pavement thus really forms a solid block of masonry, which is expected to be exceedingly durable.

THE ground-floor of the picturesque building on the west side of Chancery-lane, until recently used as a branch post-office, has been recently altered; the pointed arch next the street has been removed and replaced by a common-place shop-front. The building in question was designed by Mr. Arthur Blomfield some years ago, and was one of the earliest examples in London of what the French call a *pignon sur la rue*, and it must be a matter of regret to the architect to see a work upon which he evidently bestowed considerable care thus maltreated. A similar fate recently overtook Mr. Owen Jones's pretty elevation of Messrs. Osler's premises, on the north side of Bedford-street, where the ground-floor arcade was removed, and large sheets of plate-glass put in its place, to the destruction of the artistic symmetry of the design. There are but few well-designed shops in the metropolis, and the obliteration of any of these few is a source of regret. There is a very prettily composed shop on the south side of Fleet-street on the ground-floor of some premises recently in the occupation of Messrs. Sealey, the publishers, which, in all probability, will not long survive the passion for plate-glass windows. This shop-front has every appearance of having been the work of John Shaw the elder, who designed the Church of St. Dunstan-in-the-East, and the Insurance Company's premises adjoining to the westward, and is an example of the successful treatment of a common-place object, which we commend to the attention of architects.

THE other day we had to express what sympathy we could with "Ouida's" lamentations over the spoliation of Venice. Now, according to a correspondent in the *Pall Mall Gazette* of Wednesday, a place redolent of all more ancient and classical memories is threatened. It is stated that the Villa d'Este, at Tivoli, is about to be sold by its owner, the Duke of Modena, to an industrial company, and that a foundry is to occupy the site of the noble gardens. "Tivoli, the Tibur of the poets, is to become another Birmingham." We would fain hope this were not true, but it too like the way things are going now. One can hardly say, perhaps, that it is anybody's fault in particular. The European world is so full, and every one must struggle for existence; but it is an unhappy and grievous spectacle to see, one after another, the abodes of the beautiful invaded and taken from us.

WE hear with great regret of the death of Lord Shaftesbury, an unselfish and energetic benefactor of his generation, whose life will be regretted by Englishmen independently of either party or profession. To devote a word of honour to his memory is not, indeed, travelling beyond our strict limits, for was one of the first to help on the move-

ment in favour of better and healthier houses for the working classes, a matter so closely connected with the class of subjects with which it is our special duty to deal. But no journal, whatever its special topics, need ask any excuse from its readers for even going out of its way to say a word in recognition of the true greatness and the value to the nation of such a life as Lord Shaftesbury's.

#### LETTER FROM PARIS.

We have several times referred to the industrial crisis which is so severely felt at Paris, and obstructs the undertaking of public works. There are here and there some official operations in peaceful progress, such as the Hôtel des Postes, the Sorbonne, and the Collège de France. But these are insufficient palliatives of the evil from which the building industry, and in consequence the revenue, of Paris is suffering. Accordingly, we mention with satisfaction, as a lift in the cloud, some important constructions undertaken by private means; those, namely, on the large plots situated between the Rue Blanche and Rue de Clichy, behind the Church of La Trinité, and lately occupied by the skating-rink well known to visitors and tourists. An industrial society is to raise here shortly, it seems, a school of music and elocution, a *salle de spectacle*, to seat 2,000 persons, concert and exhibition rooms, a riding-school, a fencing-gallery,—in fact, a great artistic club. If the news is correct, there is a great building yard in prospect; and these diverse establishments created in the midst of a rich and fashionable quarter will replace advantageously the old skating-rink, which has been long out of vogue.

When skating-rinks went out, the Paris public took a rage for panoramas; they were to be seen everywhere. Paris and the provinces were full of them, and painters of renown did not disdain to associate themselves with these enterprises, which were so remunerative. But the panoramas will soon have had their day. Already that of Reischaffen has come to grief, and that of the battle of Champagne, the joint work of Detaille and De Neuville, is reduced to distributing tickets at very low prices in the cafés, restaurants, and tobacco-shops.

Accordingly, in this time of political and electoral fever, artists think themselves fortunate when there is any private enterprise to encourage them. In this connexion we may mention an interesting piece of decorative sculpture which M. Delhomme, a sculptor of ability, and a member of the Municipal Council of Paris, is now at work on. It is only (*horresco referens*) a monumental entrance to a "bazaar." It is true that the popular establishment, well known here under the name of the Hôtel de Ville Bazaar, is the property of a Municipal Councillor possessed of millions of wealth, and of a proverbial philanthropy. This Cæsar on a small scale, whose name is Ruel, has taken to play Mæcenas, and the decoration of which we are speaking is at least thoroughly original. It comprises a façade in which opens a large portal, the frieze of which, loaded with carving, reproduces the thousand and one objects which may be "articles de Paris": toys, jewellery, utensils and instruments of all kinds and shapes. Around all is an egg-and-arrow moulding, in which the eggs are represented by toys, and the arrows by shuttlecocks. Nothing could well be less classic, it must be admitted. At either side of the entrance two tall figures represent respectively Commerce and Industry. The whole is surmounted by a pediment filled with a cartouche bearing the arms of Paris. In spite of its fantastic detail, this design shows that a clever artist can treat heterogeneous details of this kind without losing architectural effect.

This is a bit of artistic decentralisation in the full sense of the word, which leads us to speak by contrast of a more orthodox form of decorative work in the class of industrial buildings. In 1865, three young painters were invited by M. Emile Pereire, the celebrated financier, to execute in one of his premises in the Boulevard des Capucines, the ceilings for a great establishment which took at first the name of "Grand Café." Art criticism was once much occupied about these ceilings, which, under the solvent action of gas and smoke, and little by little nearly disappeared. The "Rente Foncière" became proprietor of the premises, and applied to M. C. Maillot, the usual restorer of paintings in Paris,

to clean and restore these works. The largest of these compositions is by M. Gustave Boulanger, who, in a perhaps rather stiff Academic style, undertook to symbolise the luxuries of the modern Parisian, coffee, champagne, fruit, and tobacco. It was a difficult task to achieve in allegoric form; but the artist contrived to connect it into a harmonious composition. It was then the eve of the Exhibition of 1867, and M. Emile Levy had a large space given him to represent Paris welcoming the foreign visitors. This ceiling has resumed its beauties, and shows again the grace and originality with which the warmly coloured costumes of the Oriental visitors are contrasted with the brilliant figure of "Paris." The remainder of the work, by M. Delaunay, shows figures of "Commerce," "Industry," and the "Plastic Arts," and "Poetry" seated on an eagle, and bearing Virgil's "golden bough." These compositions were accompanied by decorative panels, with figures and attributes, to which M. Maillot has restored their primitive colour.

This subject brings us round to the address of M. Guillaume Dubufe, by whom some privileged persons were invited, a few days since, to see the new ceiling decoration of the public foyer of the Théâtre Français. M. Dubufe, whose principal merit at present is that he is his father's son, is, perhaps, too young to accept salutary criticism with a good grace; but he has great need to study and work more, and we should counsel him above all not to let himself be carried away by the weaknesses and sentimentalities of a school of decadence. His ceiling, which represents "Truth enlightening the world," and surrounded with figures and attributes drawn from the theatre,—Tragedy, armed with a poignard; Comedy with a mask,—is a heavy ill-considered composition, which will certainly not gain in effect when seen by artificial light. We prefer the neighbouring ceiling designed by M. Mazorrolles, which is not, however, a *chef d'œuvre*. It wants vigour and inspiration.

Speaking of decorative work, a word as to the monumental staircase which is being constructed at the Louvre in the Pavillon Daru. The scheme of decoration, which is to symbolise the various schools represented in the Museum of the Louvre, is only complete in the part devoted to the Renaissance, a large rectangular space, at the angle of which are medallion portraits of Michelangelo, Raffaele, Albert Dürer, and Poussin. The vault is lighted by a great oval window filled with four symbolic figures: "France," "Italy," and "Flanders" are complete, and "Germany" is in course of execution. The portion dedicated to the Middle Ages is also rectangular in form, and will be decorated with *motifs* in the Spanish style. The portion representing Antiquity will be decorated with medallions of the principal Greek and Latin artists.

In regard to the Louvre also it should be mentioned that the famous fresco of "La Magliana" will be shortly removed to afford opportunity for the very necessary intercommunication between the "Salle des États" and the great "Galerie du Bord de l'Eau." This fresco, attributed to the school of Raffaele, and which the Government of M. Thiers purchased so dearly, will be installed in an angle of the Galerie Italienne. The Administration of the national museums appear to have it in view to unite at the same point all the frescoes which are now scattered about in various parts of the museums.

The Direction des Beaux Arts is also credited with the intention, or rather the wish, to create at the Louvre a museum of portraits of artists, similar to that in the Uffizi at Florence. M. Turquet, Under-Secretary of State, wishes greatly to put this project in execution, as much by means of works of that class already in various museums, palaces, and public buildings, as by the help of amateurs to whose generosity the Government is appealing. It remains to be seen whether the effort will succeed, but such innovations are not generally successful with us. It will, no doubt, be the same with the descriptive *plaques* which the Municipal Council wish to affix to all the works of sculpture which decorate the squares and public gardens of Paris. At first sight this would appear a simple matter, and its educational value to the people is obvious. But, practically, it will be a difficult matter. It is not only a question of giving the biographies of eminent men in a couple of lines accompanied by dates, but also the description of allegorical works taken from



a mythology of which the public know nothing. We pity the functionary who will be charged with the direction of this course of democratic instruction for the use of a populace always disposed to turn everything into ridicule.

Next week will be inaugurated at Sceaux, near Paris, the new Lycée Lakanal, the first stone of which was solemnly laid on October 5, 1882. The plans of this great establishment are due to M. Bandot, and obtained a gold medal at the London Health Exhibition last year. Just at the gates of Paris, also, is the new Mairie for Neuilly-sur-Seine, inaugurated a few days since, and of which the execution has been entrusted to M. André, as the result of a public competition held in 1881. The fine façade of this edifice has been the object of important sculptural decoration. The frieze is the work of M. Ernest Barrias, who has also executed two statues representing "Bienfaisance" and "Justice." M. Tony Noël has decorated the clock with reclining figures, representing "Civic Rights and Duties," and two female figures symbolising Day and Night. Lastly, M. Charles Gautier has adorned the entrance-doors on the ground-floor with allegorical bas-reliefs personifying the three words of the device placed on all public monuments:—"Liberté, Égalité, Fraternité."

During this month will be placed in the cemetery, Mont Parnasse, the monument to the memory of M. Albert Dumont, late director of the École d'Athènes, who died last year in the prime of life. The monument is the work of M. Regnier. It is very simple in its lines, and surmounted by a very fine bust of the lamented director.

We make a note of a competition opened during last month for the erection of a statue to Dr. Paul Broca, the eminent anthropologist. The statue is to be erected by private subscription on the plot of land situated at the angle of the Boulevard St. Germain and the Rue de l'École de Médecine. A great number of artists have taken part in this competition, but the sketches exhibited at the École des Beaux Arts appear to us absolutely mediocre, not a remarkable work, if we except the model by M. Allouard, who has contrived to make something of the modern costume usually so ungrateful to the sculptor. The definite judgment on the designs will not be made for two months.

In our last letter we alluded to the financial difficulties with which M. Dalou has had to contend in reference to his great monumental group intended for the Place de la Nation. These difficulties have happily been surmounted, and M. Dalou has at last obtained an increase of the absurdly inadequate sum of 70,000 francs, at first voted, to 100,000 francs, independently of the remuneration of 20,000 francs payable at the completion of the work. He has had the same success in regard to the question of the bronze casting. The method à *cire perdue* has been, it is understood, definitely adopted, and M. Bengen, the founder selected by the artist, has been authorised to prepare as a specimen, at his own risk, a cast by this procedure of one of the figures of the monument. If, which is to be hoped, this experiment is conclusive, M. Dalou will have the great honour of having revived, in our days, the system which gave such magnificent results in the great epoch of the Italian Renaissance.

That is the billet of artistic news for the month; we hope to give soon a description of the sculpture projected for the new Sorbonne. We may say now that the principal façade will be decorated with two great allegorical bas-reliefs, for the execution of which it is probable that MM. Barrias and Mercié will be proposed by the Administration.

We will close with mention of the recent death of a conscientious artist, of great talent, Henri Charles Antoine Baron, a painter, and pupil of Jean Gigoux. He obtained numerous medals at various *Salons*, since 1859, as well as a decoration of the Legion of Honour. Among the numerous works which he left may be mentioned "L'Enfance de Ribera," "Une Sieste en Italie," "Andrea del Sarte peignant à Florence," "Les Noces de Gamache," "Les Vendanges de Romagne" (a picture purchased in 1857 for the Luxembourg Collection), and a very fine water-colour drawing commissioned

by the Emperor Napoleon III. in 1867, and representing an official fête at the Tuileries. Baron leaves unanimous regret in the world of Art: he had not an enemy.

#### NOTES IN CHESTER.

If the ancient city on the banks of the Dee has not gone a-head of late in the matter of building to an extent to be expected in the busier centres of commerce, it may be said with truth that what has been done and is now doing is by no means inconsiderable, and therefore worthy of note.

Although there appears to be less inclination towards the half-timbered or "black-and-white" method of construction (which largely prevailed some twenty or twenty-five years ago), yet the designs are prepared to harmonise with the old work, and, in most instances, with no little success. There is strong evidence, indeed, of thorough appreciation of the picturesque beauty of the ancient streets of Chester by the inhabitants, whether proprietors, architects, or builders, and of a desire on their part to maintain and even increase their attractiveness. Not only do most of the buildings exhibit care in design, but, what is equally to be commended, the builders appear to do their work well here.

Some erections of more than ordinary elaboration have been carried out in a highly finished manner, and may be compared favourably with any of a like kind to be found elsewhere. This is a matter of importance, as the effect of an intricate piece of ornamental brickwork, for example, may be completely spoiled if executed in a cheap and scamped way, and it is, therefore, much to the credit of the Chesterians that they value good workmanship in their buildings, at any rate in the more important ones.

Of the more recent erections, the North and South Wales Bank buildings (and Conservative Club upstairs), standing shoulder to shoulder with the Eastgate, may be cited as a great improvement upon that one which formerly occupied the site. Chiefly of red brick, with cut tracery panelling and surface decoration in the best taste, the building, not for its size, but for its lofty proportions and judicious lines of composition, is commanding, and cannot but be approved by all admirers of excellent design and work. There is a slight vertical break that brings the centre forward, and a gable of curves and steps forms the chief skyline, over the entrance at the side; an oriel is carried up the full height of the building, terminating in a spirelet,—the latter feature being the weakest point. As seen from the opposite side of the street the lower portion is concealed by the projecting cornice, giving it the appearance of being too small for its position. When viewed from a distance the effect is better. The windows of the four stories comprised in the elevation vary slightly in design, but may be generally described as flat elliptic-headed with mullions and transoms, some of the latter being double. The building is crossed by a series of panels running over the ground-floor windows, and contain "flat iron" shields placed saltier-wise. The stone carving throughout is excellent. Passing inside we find the telling-room, fitted up in an unusually rich and handsome manner.

The new home of the School of Art and Museum, situate in the Grosvenor-road, close to the Savings Bank, is rapidly approaching completion. It is somewhat in the Jacobean style, the general proportions being good, and the details carefully considered. To overcome the awkward effect the building would otherwise have had at the roof where the return or side elevation forms an acute angle with the front, a bold polygonal turret has been judiciously corbelled out, and promises, when carried to the full height, to be a handsome feature. The doorway is semicircular-headed, flanked with fluted pilasters. The requirements of plan necessitating the departure from a central position, three two-light transomed windows show on the right, and two single windows on the left, of the entrance. By this it will be seen that the composition is not symmetrical, and advantage is taken of this to give play to the fancy. The way in which the window pilasters are double bracketed out laterally on the second floor (over the doorway) is uncommon, if not unique, and is by no means bad. The entablatures that divide the stories are carefully detailed; the dentils of the lower one

being free from that coarseness of effect frequently seen where they are cut a size too large. Small detail ever increases the apparent size of the whole, and if the speculating builder could only be brought to see this, he would cease to indulge in columns to doorways and windows of his small suburban villas, whose roundness would be better suited (in size only) for a cathedral, and whose cornices or gymnastic brackets are apparently designed to do duty for umbrellas.

The plans of the new Museum and Art-Schools have been arranged to make the most of the peculiar contour of the site, and will comprise, on the ground-floor, a Natural History Section, with Library and Reading-room. The staircase, of horse-shoe form, with a well-proportioned arcade across the chord, is centrally placed, and from it diverges, on one side, the Archaeological Museum and Art-Gallery, 59 ft. by 23 ft.; on the other side will be the lecture hall, 45 ft. by 30 ft. The building is arranged for future extension at the rear, which will then be occupied by the contents of the valuable collection of antiquities, in which Chester is so rich. On the first floor, science class-rooms, a laboratory, a committee-room, &c., are provided, the scientific museum being designed to occupy the space above the archaeological museum.

A very picturesque residence has been erected on the Dee Hills estate, for Mr. Thomas Hughes, the author of "Tom Brown's School Days." The peculiarities of the site have been taken into consideration with care, and the result is very satisfactory.

There is a new piece of half-timbered construction to be seen in Whitefriars, and although the building is but a small one the work has been done in a characteristic manner. The ground-story is in red brick, the upper portion being of oak quarterings, with plaster fillings. The companion house opposite, although it is a somewhat different style, in which exposed timbers take no part, is good both in detail and outline, the doorway being very effective.

The Offices of the County Constabulary, in Foregate-street, near the corner of the Grosvenor Park-road, reminds one at a glance of the new bank adjoining the Eastgate, already described, but the details and working out of the elevation, although they may arise from the same hands, are differently treated, to suit the special requirements of the building. The chief feature here, as noticed in the bank, is a large gable comprising the width of the front. Where the site is not wide there is, perhaps, the best for the skyline can take in a picturesque old-fashioned city like Chester, and the Medieval towns on the Continent furnish abundant material for study and adaptation in this particular. The windows of the rooms occupying a gable when it is made a large and important feature give that life to a design which is absent where the gable is merely filled in, if at all, by a panel or shield. The Constabulary Offices are built in light-red brick, stone appearing in the eills and mullions of the windows, which are two lights, except on the ground-floor. The entrance is deep-played and elliptic-headed, the door being hung with plain strap hinges, the whole wearing the air of stern authority, yet by no means disagreeably so. The brick panelling under the windows is well cut, and here, again, the work evinces care in the execution.

The corner of the Grosvenor Park-road at Foregate-street is at present bare, but the Baptist Chapel adjoining, which has been erected about five years, is another instance of the introduction of the picturesque element, which is indigenous to Chester, and although by the symmetrical arrangement of the chancel front, we are obliged to be treated to two lofty spirelets where one, perhaps, would have sufficed, still there are some good bits in the design, notably where the narrow vertical shafts between the main windows are continued down to the basement, with a very happy effect, giving character to an elevation not otherwise prominent, in exhibiting originality. The *flèche* of the roof-ridge, with the upper part covered with oak shingles, is too brusque even for the streets of Chester, ancient as they are, and although *per se*, it may be a sound piece of carpentry, would be stretching a point to say there is much art in it.

Should the plot of land at this corner be occupied in the future by a building designed to harmonise with its neighbours,—and the Chesterians seem to know how to do this work

\* In France, that is to say. The method has already been revived for English bronze sculpture by Mr. George Samonds.—Ed.



ough—a picturesque group will be the result, and a few hundred years hence a student of archaeology mayhap be found jotting down in pencil bits that will have, by that time, become all more interesting through wear and tear, and the sport of the elements.

There is a quaint little building in Frodsham-street, nearly opposite to the Liver Hotel, that in thorough keeping with the locality. This is the Cocoa Rooms, with its octagonal slated roof at one end of the building; it is well proportioned and effective without being costly. Though the Cocoa Rooms nearer the bridge, and a like establishment in Foregate-street, are dealt in a different manner, they are good in design, being unobtrusive and free from any attempt at straining after effect solely for its own sake.

As before hinted, there are no signs of extensive building operations in Chester at the present time. New business premises in Foregate-street, however, just being started, and there are several other improvements contemplated that will occupy some time to execute. There is no talk of widening Northgate-street from Peter's Church to Market-square, which, carried out, will necessitate the removal of the church and the houses in the "row" in the west side of the street.

The Town-hall, with the adjoining Market-buildings and the King's School, opposite to it, (all situated some distance up Northgate-street), would then come into view from East-to-row if this scheme is effected, and the congested traffic at the Cross on busy occasions would be considerably relieved; but the raising of the church and the other buildings comprised in this scheme would remove some venerable, though not very valuable, relics of the past, and thereby give an entirely new aspect to this quarter of the city.

On the north, or in rear of the site of the Town-hall, which was destroyed by fire about three-and-twenty years since, there existed certain erections known as the "Shambles," although so many years have passed since the present town-hall was set back in line with the street, and the square improved, yet these the old structures were permitted to remain until recently, when they were at last destroyed, and the Market-square left entirely free from obstruction.

While the city of Chester must necessarily see its buildings through natural decay, and the exigencies of trade and change in the habits of its inhabitants,—where dwellings are bright, clean, and worthy of admiration in the course of time become deformed, dilapidated, and unhealthy,—in many instances good repair,—it is pleasurable to observe a city animating the citizens for the memorials of times that surround them (of which they are the responsible inheritors), as shown not only by their care in preserving where possible that is of historic value, but by direct evidence of a strong desire to emulate their ancestors by instituting new designs and new work of equal value for the old that passes away, adding to native beauty and picturesqueness of their town, and incorporating at the same time the innumerable advantages of modern sanitation.

#### ON IMPEDIMENTS TO SANITARY PROGRESS.\*

ALTHOUGH sanitation claims to be recognised as a science, it can hardly yet be included among the exact sciences. When we speak of sanitary progress, the results are not infrequently challenged. That sanitary progress is the elimination of extraneous preventable causes of disease, is an abstract proposition to which all will assent, but in the practical application of the proposition we find many shades of difference. For example, the most urgent sanitary question of the day is that of sewage disposal in solution in our rivers; sewage gas in streets and houses. Within the present limits the author had to inspect the condition of a remote borough wherein sanitary principles are almost absolutely unknown; in the course of the inspection an informal meeting of the Town Council was called, in order to convey to the author the respective views of the members upon what they understood by sanitary principles. One worthy alderman

asserted that underground drainage was ruinous to the town, causing great injury to health, low fertility, &c.; that street ventilators were worse than cesspools, and that it is better to live in an undrained than a drained town. Another of the council declared that the universal adoption of earth closets was the only proper method of dealing with the matter. One was in favour of sending the sewage direct to the sea; another was for turning it over the land; while yet another pronounced for the retention of the old-fashioned unadulterated cesspool. Such were the author's instructions. Can we be surprised at the differences of opinion among the inexperienced in sanitary matters in the face of the experiments and the failures, the royal commissions, the local government inquiries, and the Parliamentary committees of the past twenty-five years? Just now, during the "silly season," the pollution of the Metropolitan rivers by the Metropolitan and Local Boards has afforded an opportune subject for the daily papers, and not a moment too soon. We all join in the general confession that "we have left undone those things which we ought to have done, and done those things which we ought not to have done, and there is no health in us"; but we show no signs of repentance. We separate into sects and parties, each shouting its own sanitary shibboleth.

The object, however, of this paper is not to discuss the sewage question, but to illustrate some of the difficulties of putting into effective practice those abstract principles of sanitation upon which we are agreed.

Public health legislation was practically commenced in 1849, and added to year by year till the principal Act and various amending Acts were consolidated in 1875. Ten years of experience and advanced knowledge have shown the conspicuous defects of the 1875 Act, as well as the weakness of that mythical and ever changing body of "Lords and Gentlemen," known as the Local Government Board, they "come like visions, so depart"; but the attention of the Whitehall Ghosts has been called over and over again to these defects, until local authorities who can afford it are driven, in despair, to supplement the Public Health Act by numerous local private Acts to obtain those powers which the Imperial Government fails to grant to the country at large. While grasping after the shadow of party politics, we are losing the substance, the "salus generis humani."

But accepting legislation as it is, how frequently is it a dead letter? There are those who, in the language of the Royal Sanitary Commission of 1871, are "interested in offending against sanitary laws, even amongst those who must constitute chiefly the local authorities to enforce them." What was true in 1871 applies in 1885. The notorious Clerkenwell Vestry, to wit. In the remote borough, previously referred to, the site is honeycombed with the most offensive overflowing cesspools, under the very windows of closely-crowded cottages; some of this filthy property is owned by members of the sanitary authority; aldermen who sit on the magisterial benches, upon whose favour the local officials are dependent, and against whom it would be not only useless, but folly for an officer to take action. Of another district, near the metropolis, within the last fortnight one thus writes to a daily newspaper:—"For years the district has been a gold mine, a happy hunting-place, full of game for surveyors, lawyers, contractors, and jerry builders. The land speculator flourished, and the leasehold system prevailed; by-laws infringed by a member of the board, with the knowledge of the board and its officials, by-laws broken by friends of the members, openly." Yet another instance, adjoining the metropolis, in an important district where buildings are proceeding very extensively, the model by-laws of the Local Government Board have been adopted, and the surveyor honestly endeavouring to enforce them, but the speculating builders have succeeded in returning a majority of their own class as members of the board to frustrate the action of the surveyor, whose master they now are.

In the *Times* of the 16th ult., Sir Richard Cross is quoted as having publicly stated that a great difficulty in sanitary progress was by reason of so many rookeries owned by people who were members of vestries; therefore the efforts of subordinate officials were paralysed. The same letter gives an account of an un-

drained property, and a windowless dwelling-room, recently erected by a member of the Metropolitan Board of Works. In such cases who is to compel the local authority to discharge its duties? What power have dependent officials? "Public opinion," is the glib reply; but we, who know, know too well how local public opinion is manufactured, and what interests control it, what false issues are raised, and, above all, how utterly indifferent the majority are.

The repugnance of self-taxation is another great difficulty the sanitarian has to encounter. To the mere "ratepayer" sanitary science means officials, public works, and taxation; an investment which gives no dividend; matters which may be postponed. The value of health, comfort, and prosperity, or the loss of labour and waste of capital consequent upon disease and pauperism, are matters of social economy, of which the average ratepayer takes no account. He will endure poor-rates, and tax himself for beer, tobacco, and luxuries, but he will not willingly submit to taxation for preventive sanitary measures. What was said by the late Professor Guy still practically holds good,—“Most of our towns, and all our villages, are still untouched by the hand of the sanitary engineer.”

But our municipal system and local government is the very essence of our freedom. With all its littleness and serious defects, it would be as useless and undesirable to advocate centralisation, which practically means red tape and bureaucracy. But there should be some power of appeal, some authority for regulating local authorities and parish cliques; an authority intermediate between the parish and the Imperial department. Such a body is obviously the long-promised county board, which, being local and representative, would command respect, and supply the constitutional machinery for regulating the vagaries of ignorant or interested Bumblebees.

But supposing some Utopian sanitary authority is willing and anxious to discharge the functions for which it is constituted, what is its experience and that of its officers? First, that a cunning jerry builder, with the assistance of a sharp lawyer, can drive the proverbial coach-and-four through every clause of the Act. In so apparently a simple matter as proving bad mortar the builder is always ready with plenty of rebutting evidence of other "practical" builders and surveyors with elastic consciences. The author was present in a case where the Justices decided against the Board because the balance of evidence was in favour of the jerry builder, who had brought some half-dozen witnesses against the Board's surveyor, who, of course, stood alone.

The Local Government Board have issued a voluminous series of by-laws involving very much detail and official inspection; the advantage of their adoption is manifest, but their adoption is optional, and there is a great difference between adoption and observance. Further, some authorities assume the right to suspend their by-laws, deciding each case "upon its merits," consequently there is no certainty, and possible favoritism. The Local Government Board give no assistance with regard to staff for compelling the observance of their by-laws. Large towns, such as Liverpool, Manchester, Birmingham, and this borough of Leicester, so ably supervised by its talented engineer, Mr. Gordon, may supply the necessary staff ungrudgingly, but it is not so everywhere. Ratepayers object to staff, but why should the burden be laid on the rates? London, Bristol, Eastbourne, and West Ham provide effective supervision by means of "building fees" imposed under the powers of private Acts; but it is not every town which can afford the luxury of a private Act of Parliament, and Lord Redesdale, chairman of the Committees of the Lords, opposes private powers on the ground that if such powers are right and necessary, they should be included in a public Act.

But my "lords and gentlemen" of the Local Government Board, while strongly urging the adoption of their model by-laws, have no time or inclination to assist local authorities in the means of carrying them out. To the want of a sufficient and an efficient staff is due most of the sanitary defects of the day, defects which could be obviated by better supervision, the cost of the necessary staff being charged upon those who necessitate it—the property owners.

A paper by Mr. Lewis Angell, M. Inst. C.E., Fellow of the Institution of Civil Engineers, read September 24, 1885, at the Leicester Congress of the Sanitary Institute of Great Britain.



Among the defects in the Public Health Act is the definition of a sewer, especially the exception made in section 13 of the 1875 Act, which may preclude control over a whole estate of streets. Gas and water companies have an advantage over local authorities. No one can touch their mains, but any one can open a street, break into a sewer and lay a drain, upon giving notice; that is to say, the officer of the local authority must attend anywhere and everywhere, at the bidding and convenience of the builder, to inspect his drains; very frequently when the officer attends the work is not ready for inspection; in fact, he may attend half-a-dozen times before the work is ready, but if the officer is not there at the right moment the builder will complain of delay and hasten to fill in his trench. Great indignation is sometimes expressed against the local authority for permitting, as sometimes occurs, a new house to be occupied without having the drains connected with the sewer; it happens thus, a builder is under no obligation to lay his drains at any particular time. When his plans are passed, he can begin when he likes, suspend building, and recommence at his convenience. A jerry builder puts off to the last any expense he can avoid. Laying the drains from the house to the sewer is an expense which he constantly postpones, until one day, finding a tenant, he lets his undrained house. Unless the surveyor watches these houses day by day he will be defeated. It should be within the power of the sanitary authority alone to break into sewers and execute outside work, as in the case of gas and water companies' services, and it should be an obligation on builders to lay the drains as the first work in a building.

There is no power to require a certificate of the sanitary condition of a new house before occupation. There is no power to regulate the minimum height of living-rooms. There is no power to regulate timber round fireplaces. There is no power of control over additions and alterations to new or old buildings, an omission which may render all previous supervision nugatory. A party-wall, a chimney, a window, may have been finished yesterday in accordance with every requirement of the by-laws, and altered and cut about to-morrow without any power of interference. There is power to require the supply of water to a house, but not to a closet, nor power to prevent the pollution of drinking-water. There is not sufficient control over a system of combined back drainage on private premises. The provisions for compelling owners to make up private streets are of the most unjust and unsatisfactory kind.

Whenever there is an epidemic or a cholera scare, people and the press, at other times utterly careless of their institutions and representation, become hysterical as to local management and local officials. With regard to the officials, the author's experience of a very large number with whom he is brought into contact is that they are active, competent, and interested in their work. The critics would do more useful work were they to direct their attention to the defects in legislation and to the composition of the bodies under whom officials have to act.

But after all is said about legislation, local bodies, and officials, by far the greatest impediment to sanitary progress is to be found in ignorance and self-interest. We have much more to hope from education than legislation or officialism. How difficult it is to obtain observance of the most simple and obvious sanitary rules in one's own house. We may provide the cottage with the most perfect sanitary appliances, but all is set at naught and misused through carelessness and ignorance. The principles of sanitation is a vital subject, which should be taught in our board schools, our grammar schools, and our colleges. The public is being taught by the Sanitary Institute and kindred bodies. Neither public officers, local authorities, nor Parliament can accomplish reforms which should arise in ourselves. The efforts of the sanitary engineer, the medical officer, and the sanitary inspector will miss their mark unless assisted by an intelligent appreciation of sanitary principles by the population at large.

**A New Engraving.**—"A Visit to Æsculapius," by E. J. Poynter, R.A., which attracted such attention at the Royal Academy in 1880, has been engraved on steel, and is announced for publication in the November *Art Journal*. Proofs on India paper are also issued.

#### ON THE VENTILATION AND WARMING OF CHEMICAL LABORATORIES AND APPLIED SCIENCE SCHOOLS GENERALLY.\*

The scope of the work of the Sanitary Institute of Great Britain is an ever-widening one, spreading with the growth of general intelligence and the public realisation of the usefulness of its mission. In my anniversary address, delivered in July, 1882, at the Royal Institution, I endeavoured to point out some of its most obvious aims and uses,—incidentally mentioning the fact that "Contemporaneously with the spread of knowledge in sanitary matters in particular, has come a feeling of backwardness in technical education generally, and during the last ten years science schools of the character suggested by the conference of the Society of Arts on technical education of 1868 have been built and are being erected throughout the country, by municipal authorities, as at Nottingham; by trade guilds, such as the City Companies of London and Bristol; and by private benevolence, of which the Josiah Mason College at Birmingham is an eminent example." This year Sir Lyon Playfair, in his inaugural address to the British Association at Aberdeen, has again brought into prominence the immense importance to this country of the scientific side of general education. "My argument is," says he, "that no amount of learning without science suffices, in the present state of the world, to put us in a position which will enable England to keep ahead of, or even on a level with, foreign nations, as regards knowledge and its applications to the utilities of life." Others followed Sir Lyon's lead and enforced the necessity for a more systematic teaching of applied science in buildings erected for the purpose and suitably fitted up.

In January, 1883, I accompanied Professor Armstrong and Ayrton, of the City Guilds' Technical Institute, on a tour of inspection of the science schools of Germany, Switzerland, Austria, and Bavaria, and in May following read a paper at the Society of Arts upon the English and foreign schools and colleges we had visited together, and the systems of education they represented.

The contrast between the provision made for science teaching abroad and at home so impressed me that in 1883 I read a paper at the Royal Institute of British Architects on English and foreign buildings for applied science and art instruction, which I afterwards followed up by papers on the fittings required for such buildings, and the various systems hitherto adopted for heating and ventilating the same. These studies opened my eyes to the fact that, in comparison with the continent, we might be said to have no systematically recognised scientific system for heating and ventilating public buildings in this country, and I resolved to embrace the first opportunity which occurred to introduce the principles in vogue in Belgium and Germany to this country. As a member of the Executive Committee of the City and Guilds' London Institute for the advancement of technical education, I was soon enabled to introduce Mr. Bacon, of Antwerp, to the architects of the Institute, and the Finsbury Technical College and the Central Institution at Kensington were heated and ventilated by the firm established by him in Antwerp and London. The Yorkshire College was also put into the same hands about the same time.

The method of computation by which the amount of heat required to warm the building itself and the incoming fresh air was ascertained, and the system upon which the sizes of the flues for the extraction of foul air were calculated, are given in full detail as an appendix to my paper "On the Relation of Sanitary Science to Civil Architecture," delivered at the Royal Institute of British Architects, in November, 1880, and in a subsequent paper a full description is given of the various systems adopted for heating and ventilating the three institutions already cited, and also a fourth, viz., the Merchant Venturers' School at Bristol.

The provocative cause of my writing the present paper on the ventilation and warming of chemical laboratories, and of science schools generally, is due to the fact that, through the munificence of the Merchant Venturers' Society at Bristol, I have had the opportunity of realising my own views of the requirements of such

schools in the design and erection of the trade and mining school of that city,—the whole expense of which has been defrayed by that society. The confidence reposed in me, as their architect, has given me the opportunity I desired of working out a sanitary problem, especially in connexion with the heating and ventilation of such buildings.

Perhaps there is no class of buildings in which the application of sound sanitary principles is more important than public and private educational buildings, where large numbers congregate and remain for many hours in confined spaces, occupied all the time in work of an absorbing character, and necessitating, in consequence, the free circulation and constant renewal of pure air, and the withdrawal of foul.

But as I have elsewhere shown, in applied science buildings, we have not only to deal with the close atmosphere arising from the congregation of many persons in one room at the same time, and for a long time together, but we have to contend against the obnoxious smells caused by the experiments carried on in the various laboratories. The removal of these fumes with the greatest rapidity and certainty is best accomplished when the current of air in the extracting-shafts of the ordinary room ventilation is in the same direction as that of the draughts in the closets and combustion hood-shafts of the benches or around the walls. This is so obvious when thus plainly put that it will be hardly credited that in the majority of cases the reverse is the practical fact, thus necessitating the closing of the extract gratings for the ordinary room ventilation, that they may not pull against the extracting-shafts from the operating benches and draught-closets.

The velocity at which the extraction of the fumes created should take place in the draught-closets must not be less than 5 ft. per second, or 300 ft. per minute. To ensure this draught at a constant velocity, it is necessary to be independent of casual winds and changing temperature as means of motion. This requires the employment of special apparatus to produce either a propelling or a sucking force, of which the latter has usually been a common upcast shaft or lofty chimney-flue, either heated at its base by a special furnace, or by the product of furnaces required for steam engines or for heating apparatus.

Neither of these, however, can be depended on for constancy, and, therefore, the best motive power is a rotary fan, such as Blackman's or Aland's. The rotation of this fan is to be effected by a steam, gas, or electric engine, where water power is not available, which steadily exhausts the air from the air channels and establishes an upward and outward current in the upcast shaft from the point at which it debouches.

The position in which this extracting fan is placed in the shaft determines whether the vertical air-channels shall have an ascending or descending current established within them, before reaching the shaft. If placed above the roof level the current will be ascending, and if placed below the basement at the foot of the shaft, the current will be descending, to communicate in each case with horizontal channels graduated in size, in accordance with certain formula, until they reach the spot where the fan is situated in the shaft.

Of course, it is apparent that a corresponding amount of fresh air must be introduced to replace the bad air extracted, warmed on its entrance in winter and cold in summer, through vertical shafts or gratings not fixed in the face of the side walls, so as to preserve an upward current.

In summer the room openings or gratings for the escape of foul air must be at the top of the opposite wall to that through which the fresh air enters; but in winter, if openings are not also provided at the bottom of the room, so that the upper can be closed, the warm air may be carried away before warming the room. I either case the air will be pure, because it will never have time to get stagnant, but will always be changing as many times in the hour as may be predetermined, which is usually four times allowing 700 cubic feet per person per hour.

In the chemical laboratories there are horizontal channels of communication between the extract-flues and the operating benches, and draught-closets either over or under the floors.

These channels vary in construction, but may be of calculated graduated sizes, proportionately increasing in size with the number of feeders in their length, allowance being made

\* From a paper by Mr. Edward Cookworthy Robins, F.S.A., F.R.S.E., read at the Leicester Congress of the Sanitary Institute of Great Britain.



friction. Those at Finsbury, very carefully laid down by Dr. Armstrong and Mr. Bacon, of the same depth throughout, but varied in width, and were formed in the floor of concrete, 8 in. thick, laid over the floor of the laboratory, lined with Portland cement, pitched inside, and covered with glass, putted in, over which were movable cover plates set flush with the floor. The pipes from the sinks were carried in similar tunnels to the outfall pipes.

At Manich and Strassburg are asphalted tunnels for this purpose, and for gas and water piping. At the Bristol School these air channels are of wood, pitched inside.

At the Finsbury College, the Central Institution, Kensington, and the Bristol Trade School, have been calculated on the same basis of temperature and volume of fresh air for ventilation, from 60° to 65° Fahr. in the class-rooms, 55° in the entrances, staircases, and corridors, during an external temperature of 25° Fahr.; with a ventilation equal in volume to 12,000 cubic feet per person per hour in the class-rooms, and 3,000 cubic feet per person per hour the chemical laboratories.

At the Central Institution, and at the Yorkshire College, steam-heating has been employed. Air is propelled in each of these cases, and the result has been entirely satisfactory.

At Finsbury, high-pressure hot-water piping has been used, and the piping has been concealed in a chamber, through which the fresh air has been forced by a Blackman's fan, and by vertical shafts in the walls to the various rooms to be warmed.

Concerning this system of warming, Dr. Armstrong makes the following remarks:—"My experience has shown that the system adopted at Finsbury College is, on the whole, satisfactory, but several defects have been observed, which are partly inherent in the system, and partly faults in construction. The merit of the system of propelling fresh air through a heating-chamber by a powerful fan is its simplicity, and provided that the fines are so proportioned as to deliver the exact amount of air required to maintain the various parts at the proper temperature, there should be no difficulty on this score. Although calculated with the aid of Professor Wolpert's elaborate formulae, we find in practice, by careful experiments, that the various fines do not deliver air at just the rate and at just the temperature which is required for the efficient warming of all the rooms, and in some we are over-heated and in others under-heated. Whether this is due to a misapplication of the formulae, or to the omission of sufficient allowance for distance, or to the irregularity in the distribution or formation of the fines, further experiments will probably reveal. The most serious objection to our Finsbury system arises from the fact that ventilation and warming are inseparable; in other words, if the temperature in any room be sufficiently high, and it is tried to introduce more air, this cannot be done by the apparatus only, without also raising the temperature. It ought to be possible to have warm and cold air in varying proportions, which is the same thing, to increase or diminish the supply of air, and at the same time to diminish or increase its temperature, so as to ventilate more efficiently while maintaining temperature constant."

The Josiah Mason College is also heated from a basement chamber, without the employment of a fan, with a similar defective result.

The Merchant Venturers' School, Bristol.

Therefore, in designing the Merchant Venturers' School, at Bristol, I adopted a different plan, the apparent success of which has made me think it worth while to draw the attention of Congress to it. In this case a direct application of the high-pressure hot water system has been employed, the heating surfaces being distributed along the external walls of every part of the building, and concentrated in coils placed in slate-lined chambers in the window sills behind the oak dados; the fresh air being drawn through them by external gratings with iron regulating valves working in wooden frames, while the fan is used as a motor instead of a propeller, so that the air is drawn in through the coils by the action of the exhaust-shafts, in which the air is heated by the action of the fan.

The Heating Apparatus.—There are two coils of pipes, one set in brickwork; half of wrought-iron hot-water piping proceeds

from one furnace, and half from the other. Both furnaces will only be required in very severe weather, when it will be in the power of the stoker to raise the heat considerably above the temperature stipulated.

This building is one of the first to which high pressure wrought-iron pipes have been applied, the external diameter of which is 1½ in., instead of the usual 1¼ in.; and it has been found to be equally manageable, reducing the length of pipe required in proportion to the larger conducting surface obtained.

There are six separate circulations from each of the two furnaces, by which expedient the return pipes are kept at a high temperature. The heat is concentrated in the coils of various calculated sizes enclosed in slate cases, so that the oak dados may be continued round them. The coils are situated in the window backs, and the two flow and two return pipes leading to them are covered with asbestos cement, and give out no heat, harmlessly passing behind the plinth of the dados, so that the system of heating is invisible, though at all times got-at-able. Each coil is thus entirely under the control of the master present, in whose desk is the key which opens and closes the valves or disconnects the hot-water coils. For, observe, each coil may be separately cut off from the general circulation without interrupting the flow elsewhere, or it may be but partially opened, as the temperature may demand, by turning the three-way stop-cocks provided more or less fully on.

To prevent accidents by frost, the pipes are filled with a non-freezing solution of chloride of calcium, and the fresh air is freely admitted at all seasons of the year and passed through the coils at pleasure by the opening or closing of the valves over the gratings for the admission of cold air. To ensure its being well heated on its entrance, the air is conducted in its passage through the coils over horizontal baffle-plates, and so into the room, with an upward current, through the iron grating let into the window-boards over the slate coil casing referred to.

The regulation of the exact amount of heat desired for each room, and the cutting off of any room or rooms not requiring to be heated, is achieved in this way, while the purity of the incoming air is preserved, and the supply given independently of the heating apparatus, with which, however, it may be immediately associated.

The Ventilating Apparatus.—In every room there are at least two extract ventilating gratings opening into the fine or vertical shaft in the thickness of the wall, of calculated area, within which a descending current of air is provoked by the action of an Aland's fan, turned by a gas engine, which is competent to deliver a million and a half cubic feet per hour. These vertical wall-shafts are connected with a collecting horizontal channel of calculated dimensions, situated under the whole length of the central basement corridor floor, and is in direct communication with the fan placed about 10 ft. up the exhaust-shaft. The upper of the two extract-gratings in each room is for summer ventilation, and the lower is for winter ventilation.

A special wall-shaft communicates with the large chemical laboratory, and the various fume-closets and operating-tables, all of which are pitched inside, the air being drawn through them at the rate of 300 ft. per minute. From every part of the building the air is changed about four times in the hour, the provision being generally 700 cubic feet per person per hour.

I think we may now say that Dr. Armstrong's suggestions have been met in the present instance. It may, however, be thought that so much ventilation would produce draughts, but the contrary has been the result. During the testing, to which I will presently refer, I threw my handkerchief against one of the class-room wall extract ventilators and it stuck there, the pull overcoming its weight; but I found by applying the anemometer to the orifice, at a distance of only 12 in., there was not sufficient draught to turn the wheel of the instrument.

I think the results obtained fully justify my recommendation of the system employed, for whereas 1,209,734 cubic feet per hour was proposed to be extracted from twenty-one of the rooms, 1,259,900 cubic feet per hour has been realised.

In the great hall, 350,000 cubic feet were to be extracted in the hour, really 331,000 are extracted, whereas the eight class-rooms were designed to extract 35,000 cubic feet per hour,

and upwards of 41,000 cubic feet are extracted.

The chemical laboratory, at 3,000 cubic feet per person, was to have 120,000 cubic feet per hour extracted, really 123,900 cubic feet are withdrawn in the hour.

Greater variation in detail takes place in other rooms, but these are capable of adjustment. The power of adjustment exists, and will be exercised till the theory and practice coincide, Messrs. Bacon having staked their credit upon the ultimate success throughout.

#### ARCHITECTURAL SOCIETIES.

*Glasgow Institute of Architects.*—On the 24th ult. the Glasgow Institute of Architects held their annual excursion. The places visited were Craignethan Castle, the Church of St. Bride, Douglas, and Douglas Castle. The party left the Central Station at 9.5 for Fhillietudlem Station. They then proceeded to the castle, which is at present undergoing necessary repairs, during the course of which some new features have been discovered. These and the building generally were carefully examined. A short walk down the beautiful valley of the Nethan then brought the party to the conveyance which was in waiting to take them to Douglas. Here they arrived at half-past one, and sat down to lunch at the Douglas Arms, after which the church and castle were visited and inspected. At four o'clock a start was made for Lanark, where dinner was served in the Clydesdale Hotel, and the party left by train in the evening for Glasgow. The weather was fine, and the excursion proved most enjoyable to all who took part in it. Among those present were:—The President (Mr. Sellars), Messrs. James Thomson, John Honeyman, John Hutcheson, W. F. McGibbon, C. J. MacLean, Holmes Sharp, and T. L. Watson, all of Glasgow, and Mr. J. J. Stevenson, of London.

*York Architectural Association.*—A general meeting of the members of this society was held on the 24th ult. There was a large attendance, Mr. Arthur Pollard presiding. The members elected to serve on the council were: President, Mr. Arthur Pollard (re-elected); vice-presidents, Mr. William Hepper (re-elected) and Mr. G. J. Monson, C.E.; hon. treasurer, Mr. Norman R. Yeomans; hon. secretary, Mr. B. Priestley Shires; committee, Mr. J. U. Braithwaite, Mr. A. B. Burleigh, Mr. George Benson, Mr. T. R. Dickinson, and Mr. R. A. Parkin. Mr. B. Priestley Shires announced that the three first prizes offered by and through the association had been very creditably won by Mr. J. E. Jefferson. The second prize only in one class had been awarded, namely, to Mr. S. Kirby. Mr. Shires expressed the hope that in future they would be able to award the whole of the prizes that were offered year by year. He also wished to draw the attention of members to the architectural examination of the Royal Institute of British Architects proposed to be held at Leeds early in the coming year, under the auspices of the Leeds and Yorkshire Architectural Society. He trusted that it would be ably supported by the members of the York society.

#### New Premises, Bishopsgate-street.—A

spacious warehouse, with workshops and show-rooms, has been built at No. 21, Bishopsgate-street Without, for Messrs. Henry Mead & Sons, wholesale and export stationers and printers, on a site where there had previously been a shop and several old and dilapidated buildings in the rear, called Summer-court. In the beginning of the seventeenth century it was probably part of the garden attached to a building standing in Devonshire-street, then better known as Fisher's Folly. In excavating for the basement, two ancient stone windows, apparently of Tudor date, were discovered in the old wall, which were not disturbed when the present new buildings in Devonshire-street were erected. The new building is five stories in height, constructed of red brick, with Tisbury stone dressings. The shop is flanked by polished granite piers, and the supporters of the arms in the time of Elizabeth, a lion and griffin bearing shields. An iron grille and gateway give access to the upper rooms, which are arranged so as to be let off as offices. The architects are Messrs. Wadmore & Baker, of Great St. Helen's, London, E.C., and the builders Messrs. Scrivener & Co., who have carried out the work well and expeditiously.



BELFRY in the MAIRIE  
BOULOGNE



BELFRY IN THE MAIRIE, BOULOGNE.

The citadel at Boulogne contains many interesting pieces of architecture, although the modern Classical cathedral is, perhaps, more of a warning, from a decorative point of view, as to what should be avoided than a thing to study. Conspicuous amongst the principal buildings is the belfry shown in the sketch; its appearance, rising well above the roofs of the Mairie, being very picturesque. There is plenty of open space around, so that it can be seen from many points. It is constructed of rough rubble work and plastered, or rough-cast over; and as the latter has partly peeled off, showing the stones very plainly between the patches, with an occasional clump of herbage growing in the large open joints of the walling, it would make a capital subject for a water-colour study.

A. HENNINGS.

### Illustrations.

#### THE NATIONAL AGRICULTURAL HALL, KENSINGTON.

**N**E gave some particulars of this huge hall at the time of the laying of the foundation-stone in July last, but for the convenience of our readers we recapitulate a few details. To give some idea of the proportions of this new edifice it may be stated that it is one half larger in size than the Agricultural Hall at Islington. The span of the roof (entirely of iron and glass), without the aisles, is 175 ft., the aisles are 40 ft. wide, and the length is, including the aisles, 425 ft.

From the floor to the summit of the roof the height is 100 ft., and altogether the hall will contain the largest area unoccupied by supports of any building in London. The elevation is of an Italian character, with a facade of brick and stone. The principal entrance is under the large archway shown in the centre of the view. The remainder of the front is occupied by an arcade terminating in projections ornamented by Corinthian pilasters in Portland stone.

The minor hall, which will form an annexe to the grand hall (see plan given on p. 477), can be used separately for smaller exhibitions and entertainments, or as a concert and lecture-room; and other apartments will be fitted up as refreshment and public and private dining-rooms. The roof has been designed under the immediate direction of the architect of the building, Mr. H. E. Cox, of Furnival's Inn (who with his late partner designed the Agricultural Hall at Islington) by Messrs. Walmisley & Am Ende, engineers, of 7, Westminster-chambers.

The contractors for the entire buildings are Messrs. Lucas & Son, of Kensington, the amount of the contract being 131,573l.

#### BOOK-CASE PRESENTED TO H.R.H. THE PRINCESS BATTENBERG.

The book-case is of oak, American walnut, and ebony, and was made by Mr. Thompson, of Peterborough, and presented by the ladies of the diocese of Winchester to H.R.H. Princess Beatrice on her marriage. The book-case was fitted with the works of standard English poets, by Messrs. Macmillan. It is from the designs of Mr. Arthur Street.

#### ENGLISH CHURCH, COPENHAGEN.

This church, of which the first stone was laid on Saturday, September 19th, by the Prince of Wales, will be dedicated in honour of St. Alban, whose memory has here a double claim to recognition, both as the first English martyr, and as having been in early times specially selected for distinction in Denmark by King Knud (Kanut), who brought over from England relics of St. Alban and St. Oswald, with the intention of building a cathedral in their joint honour. This project was, however, never carried out. The church now just begun, designed in the First Pointed or Early English style, and consists of nave, north aisle, vestry, chancel and organ-chamber, with tower and spire (150 ft. high) at the north-west corner. The site is close to the moat of the citadel, and near the Custom-house. The spire, when finished, will be a prominent object coming up the Sound. The building will accommodate about 200 worshippers, and is capable of enlargement. In order to preserve the English character of the work, the walls will be faced externally with flints, which, although plentiful and of large size, do not appear to be used here for building purposes as they are in England; the quoins and dressings will be white limestone, from the quarries at Faaborg, about forty miles from Copenhagen. Of the stone there are several different qualities, varying in colour from creamy white to yellow, and in texture from a kind that will take a polish like marble, to another so rough when worked as to be almost like travertine in appearance. The stone will be carefully selected to suit different positions, and it is intended to fit the whole of the internal walls with it. The first contract includes only the building, without fittings of any kind. Of these several have already been made special gifts.

The ceremony of laying the first stone, which was favoured with beautiful weather, was attended by the King and Queen of Denmark, the Emperor and Empress of Russia, and the Duc de Chartres, with their respective suites, the whole of the Diplomatic Corps, Officers of State, several bishops of the Danish Church, and a large number of English residents and others interested in the work. The present wore uniform or full dress. Immediately after the laying of the stone by the Princess, the Prince of Wales delivered a short address, admirably suited to the occasion. Bishop Titcomb was unable to be present, and in his absence the service was entirely conducted by the Rev. C. A. Moore, the English chaplain; the choir of twenty voices led a musical portion in a very efficient manner. The arrangement of tents, platforms, &c., for the occasion was designed by Mr. F. D. Marshall, C.E., and was carried out under his direct supervision with the happiest effect, and with an ease and expedition surprising to any one familiar with such events in England. After the ceremony the Prince and Princess of Wales entertained a party of about seventy at luncheon on board the *Osborne*.

The architect of the church is Mr. A. Blomfield, and Professor Fenger, of Copenhagen, has undertaken the personal supervision of the work on the spot.

#### HOUSE AT KNUTSFORD.

In this house, which is now being built by Mr. Charles J. Galloway, at Knutsford, Cheshire, from the designs of Messrs. Salomon & Ely, of Manchester and London, the whole of the external woodwork will be of English oak. The brick facing is of bricks, showing 7½ in. on the face. The roof and a portion of the walls will be tiled. Internally there will be no painted woodwork.

The hall and staircase, including the ceiling, will be in English oak. The morning-room will be in Spanish mahogany and American walnut with an oak margin to the floor, and a plaster ceiling. The drawing-room in ebonised wood with a parquet margin to the floor, and an ornamental plaster ceiling. The dining-room will be all in English oak, and the floor will have an oak margin, while the ceiling will have pitch-oak beams. The billiard-room will have a pitch-oak ceiling, and the rest of the woodwork will be English oak. The bedrooms will be finished in pitch-pine, and the back parts of the house in pine. All the internal woodwork will be either polished or varnished.

It is intended to furnish the hall and ne-







J. P. Kel. Cut. & Engr.

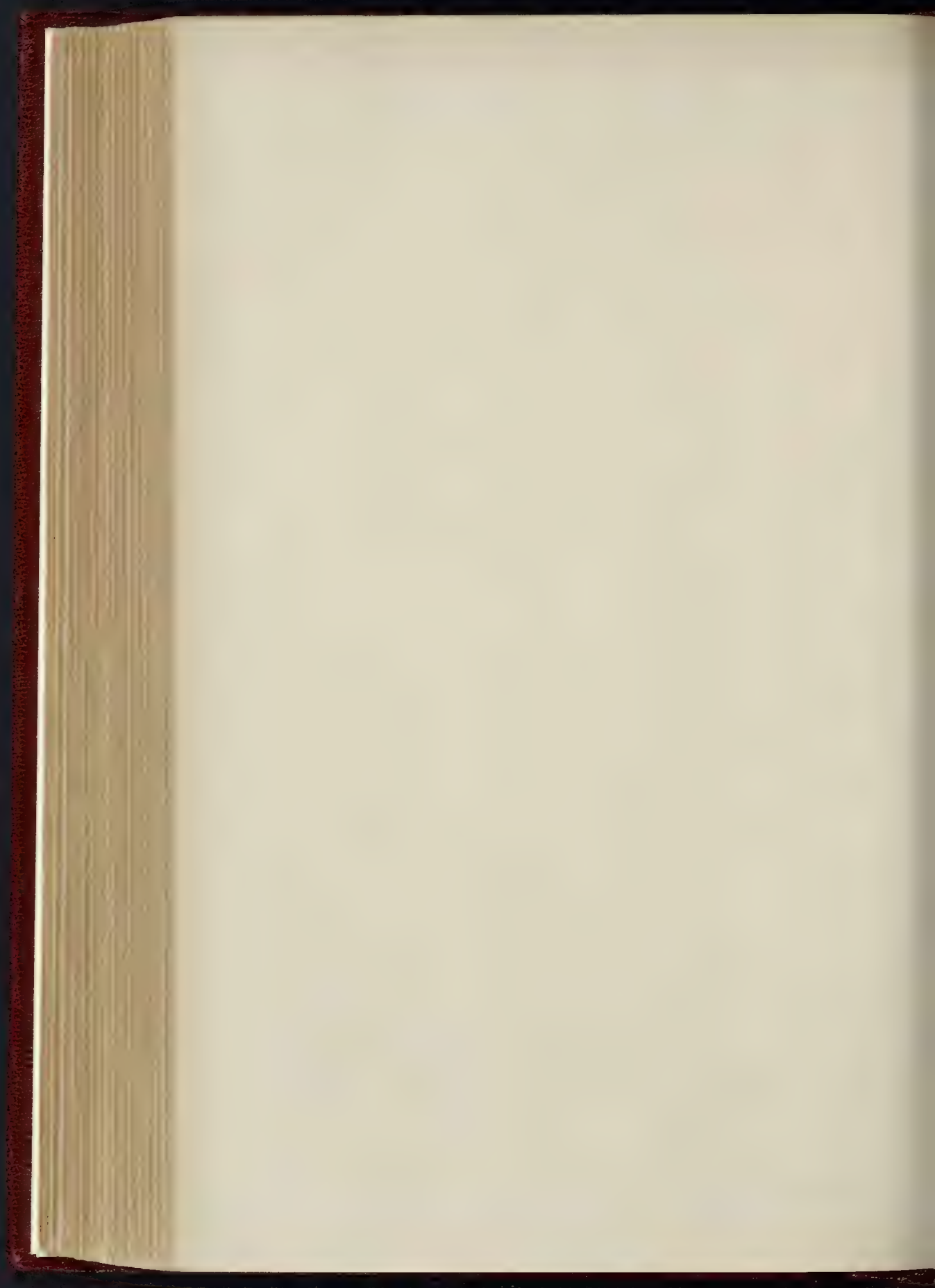
NATIONAL AGRICULTURAL HALL



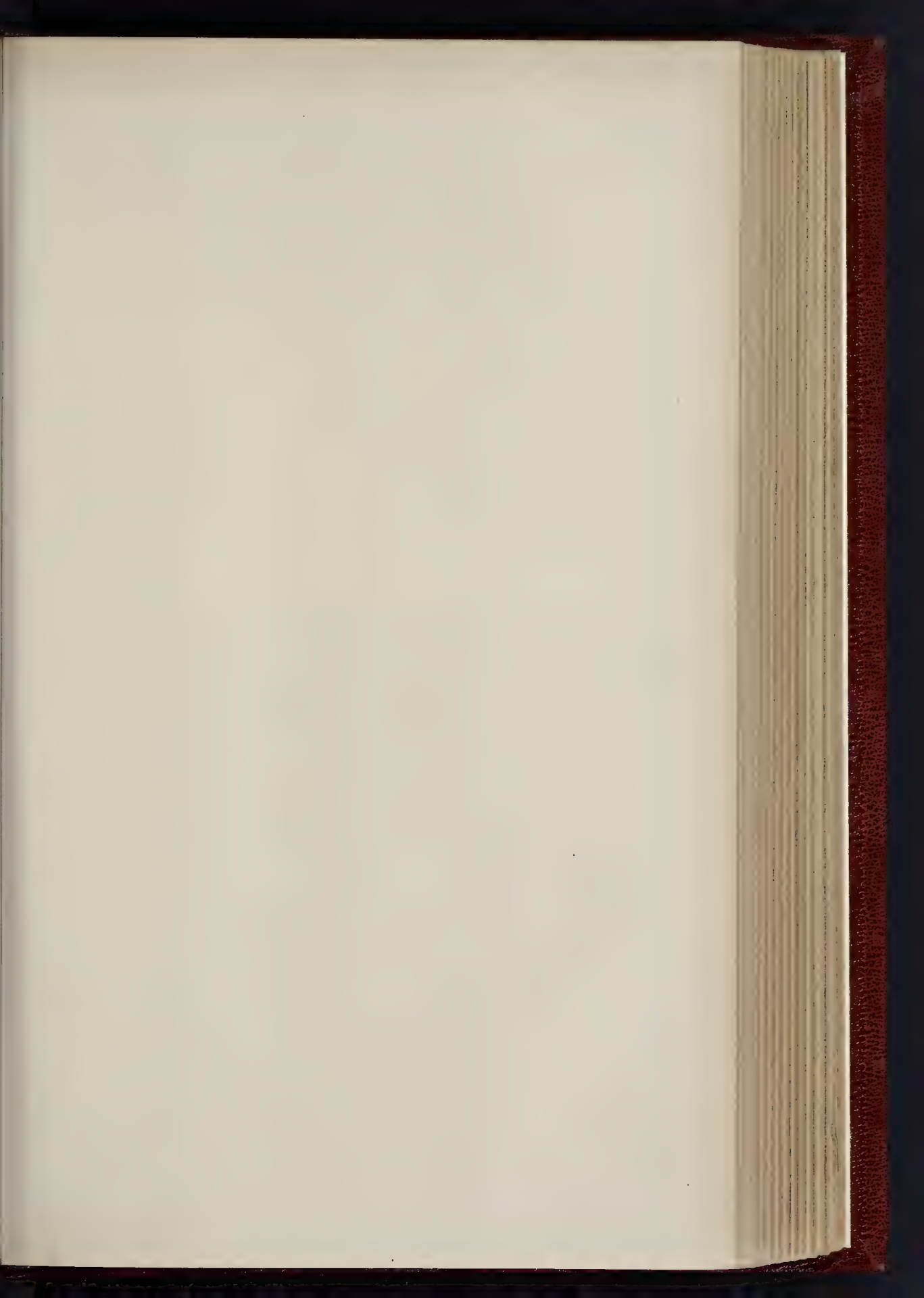


Crystal Palace, London

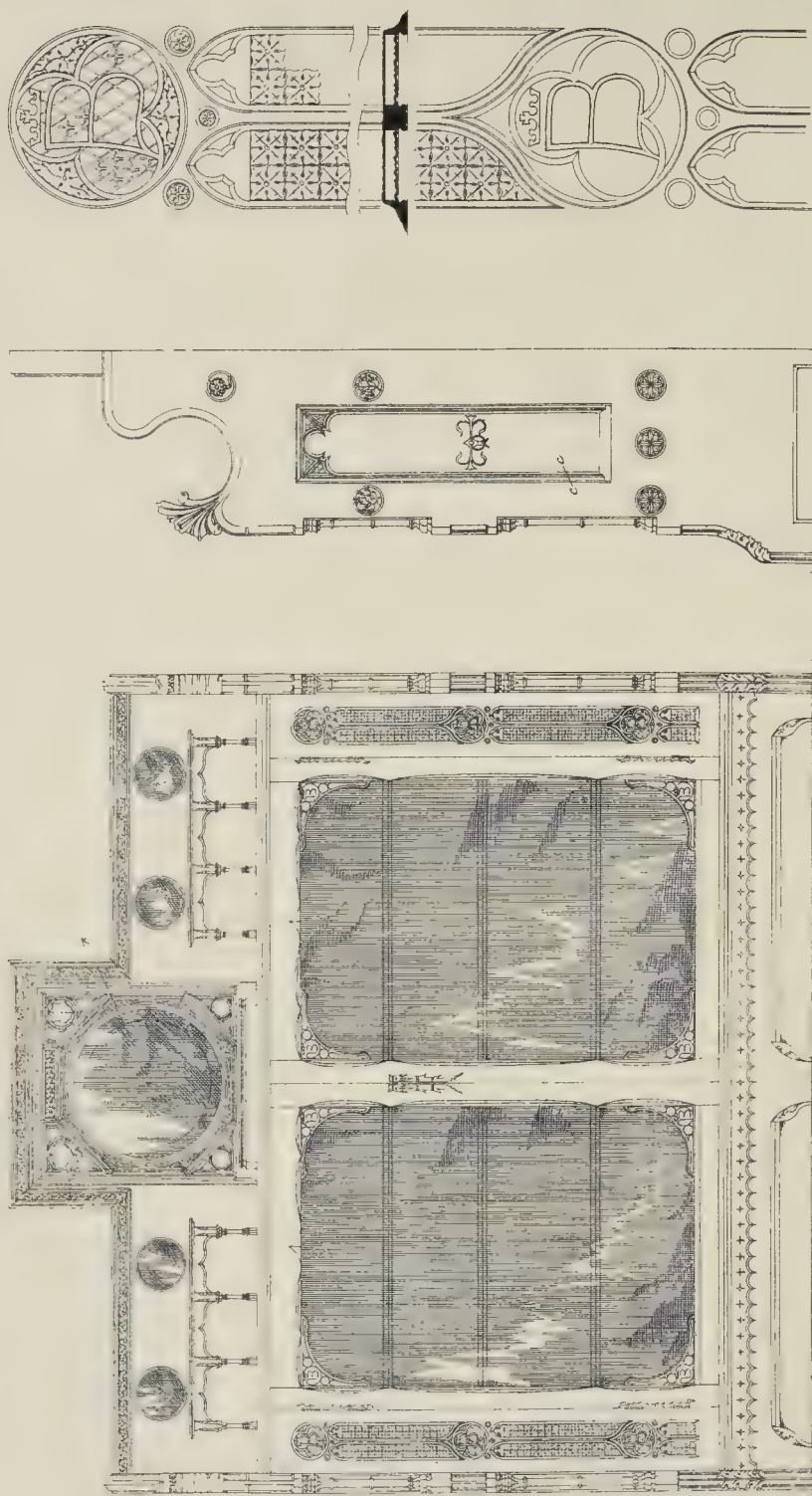
UPON. MR. HENRY E. COE, ARCHITECT.





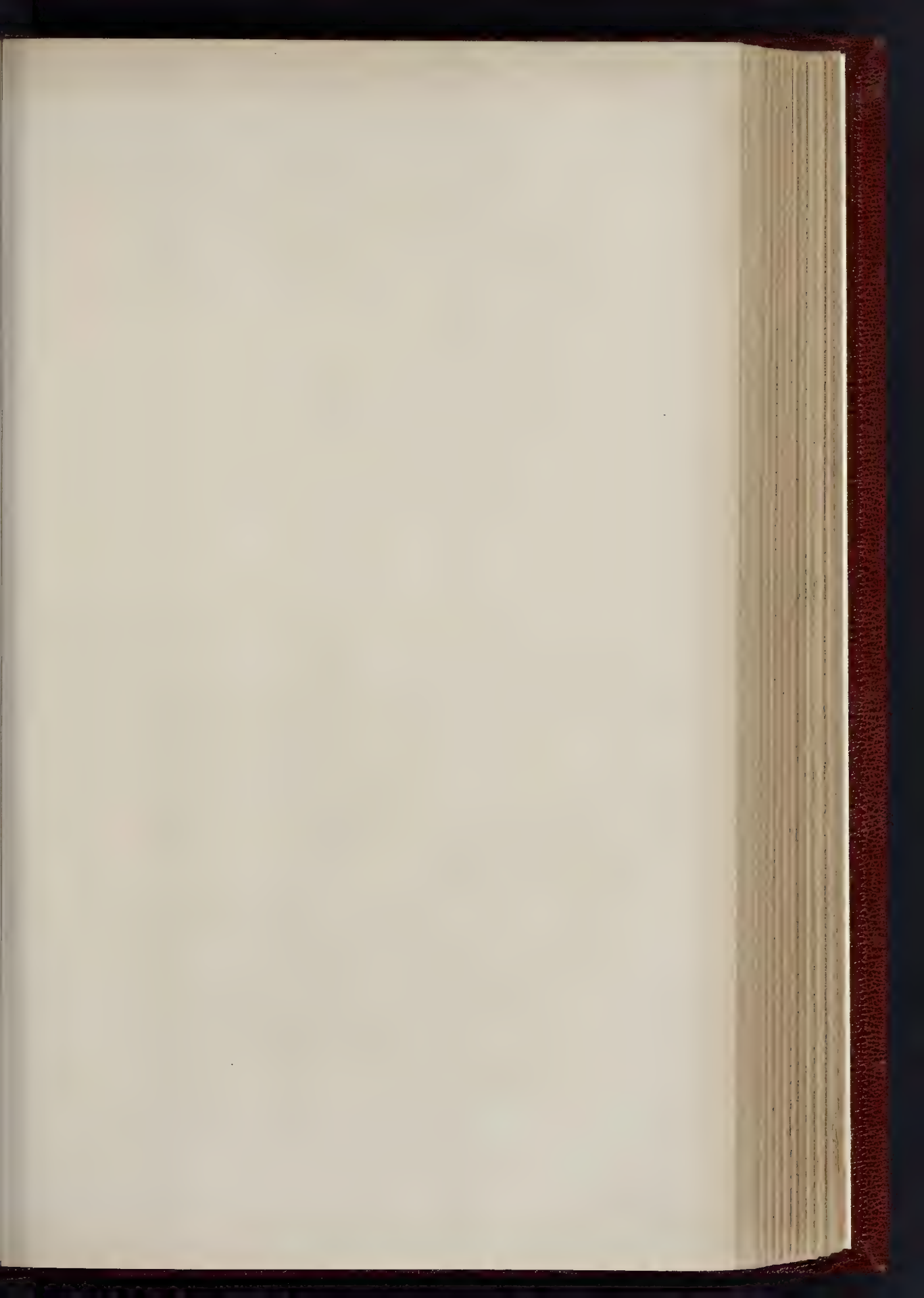


THE BUILDER, OCTOBER 3, 1895.

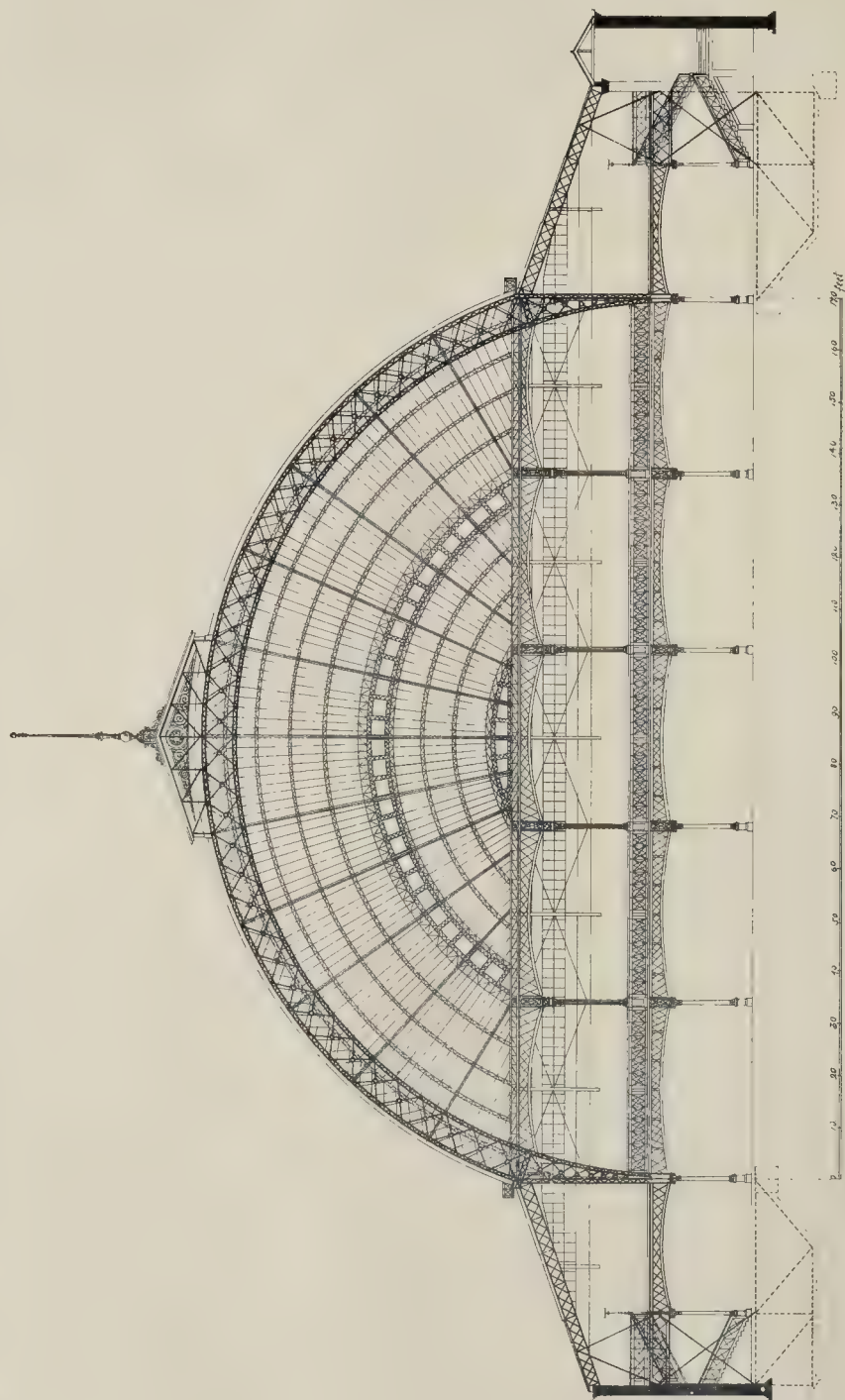


*Tracy Rand*





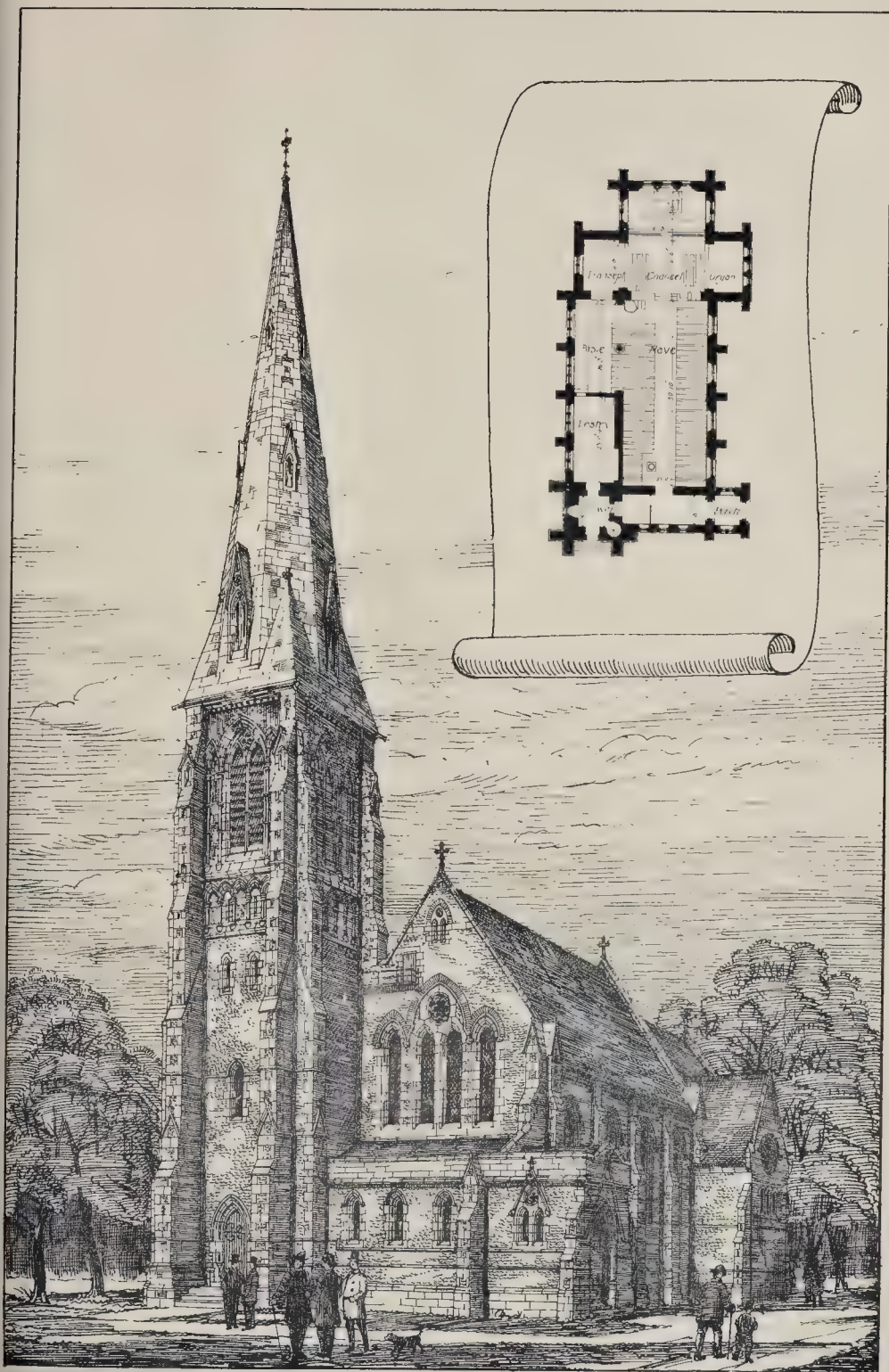
THE BUILDER, OCTOBER 3, 1885.



Drawn by J. L. Smith, Esq., Architect, Kensington, London.

NATIONAL AGRICULTURAL HALL, KENSINGTON. MR. HENRY E. COE, ARCHITECT, }  
 MR. M. AM ENDE }  
 MR. A. T. WALSHBY } ENGINEERS.

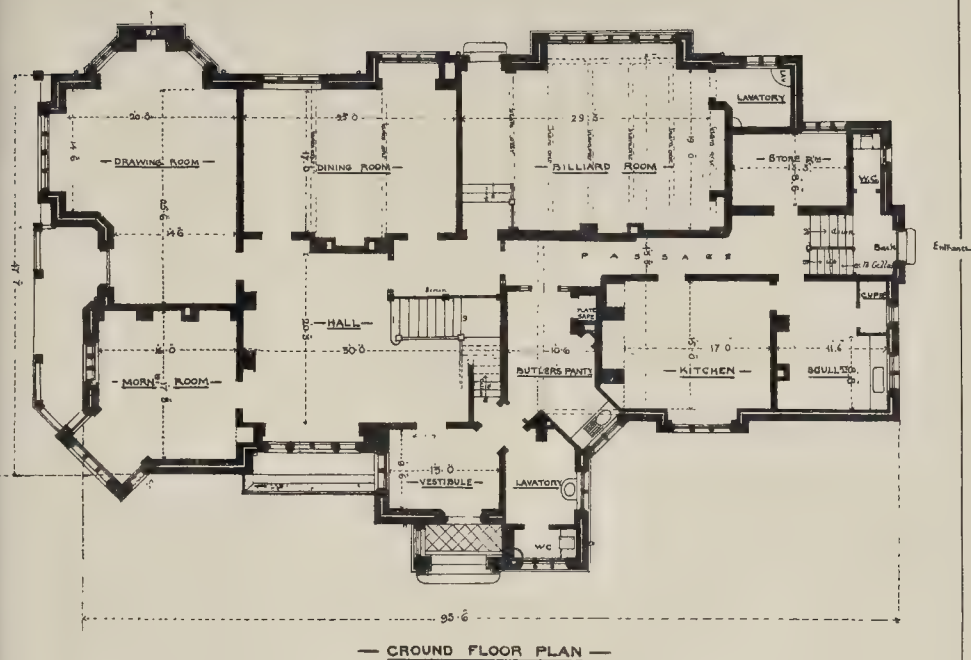




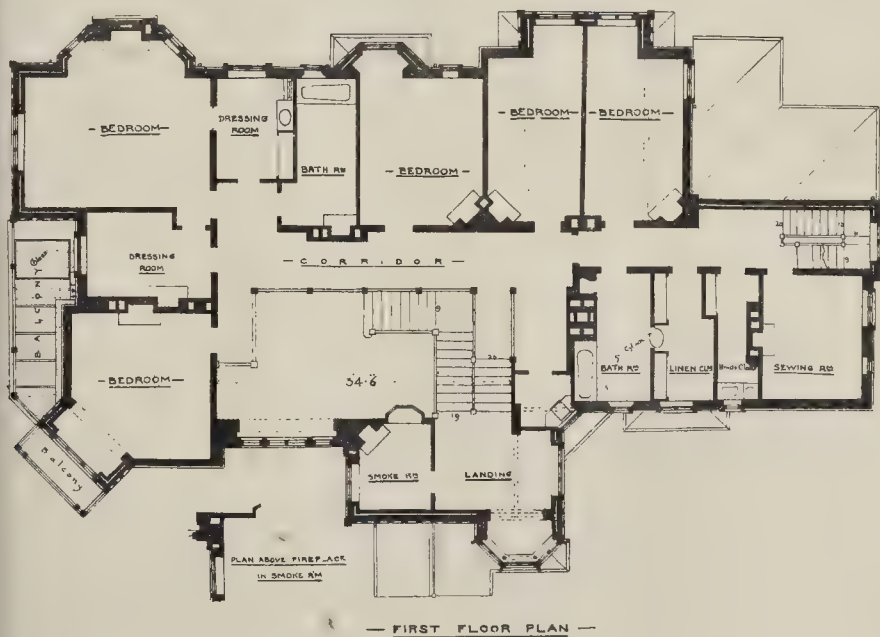
ENGLISH CHURCH, COPENHAGEN. MR. A. W. BLOMFIELD, M.A., ARCHITECT.







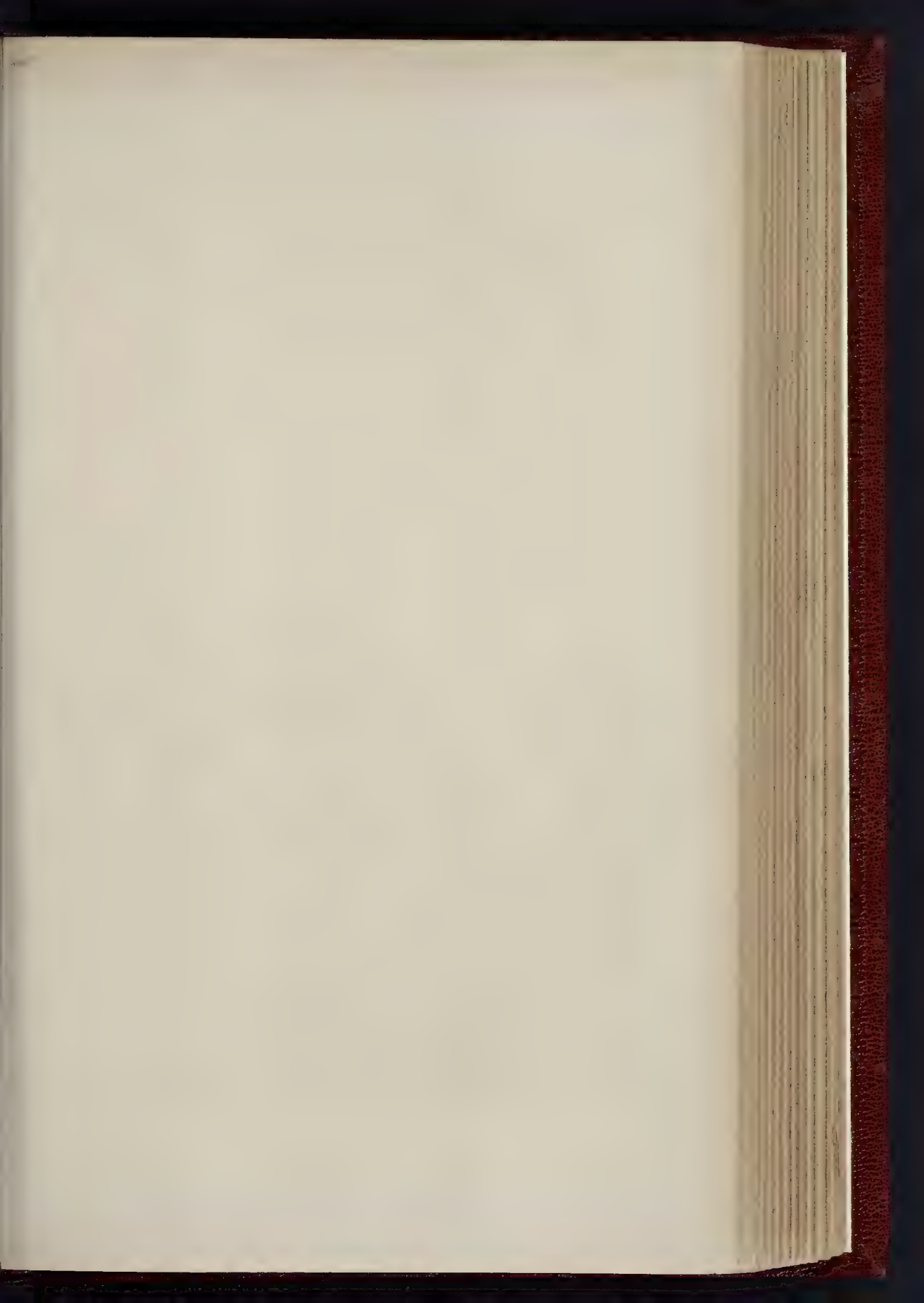
SCALE OF FEET



HOUSE AT KNUTSFORD.—MESSRS. SALOMONS & ELY, ARCHITECTS.









HOUSE AT KNUTSFORD.

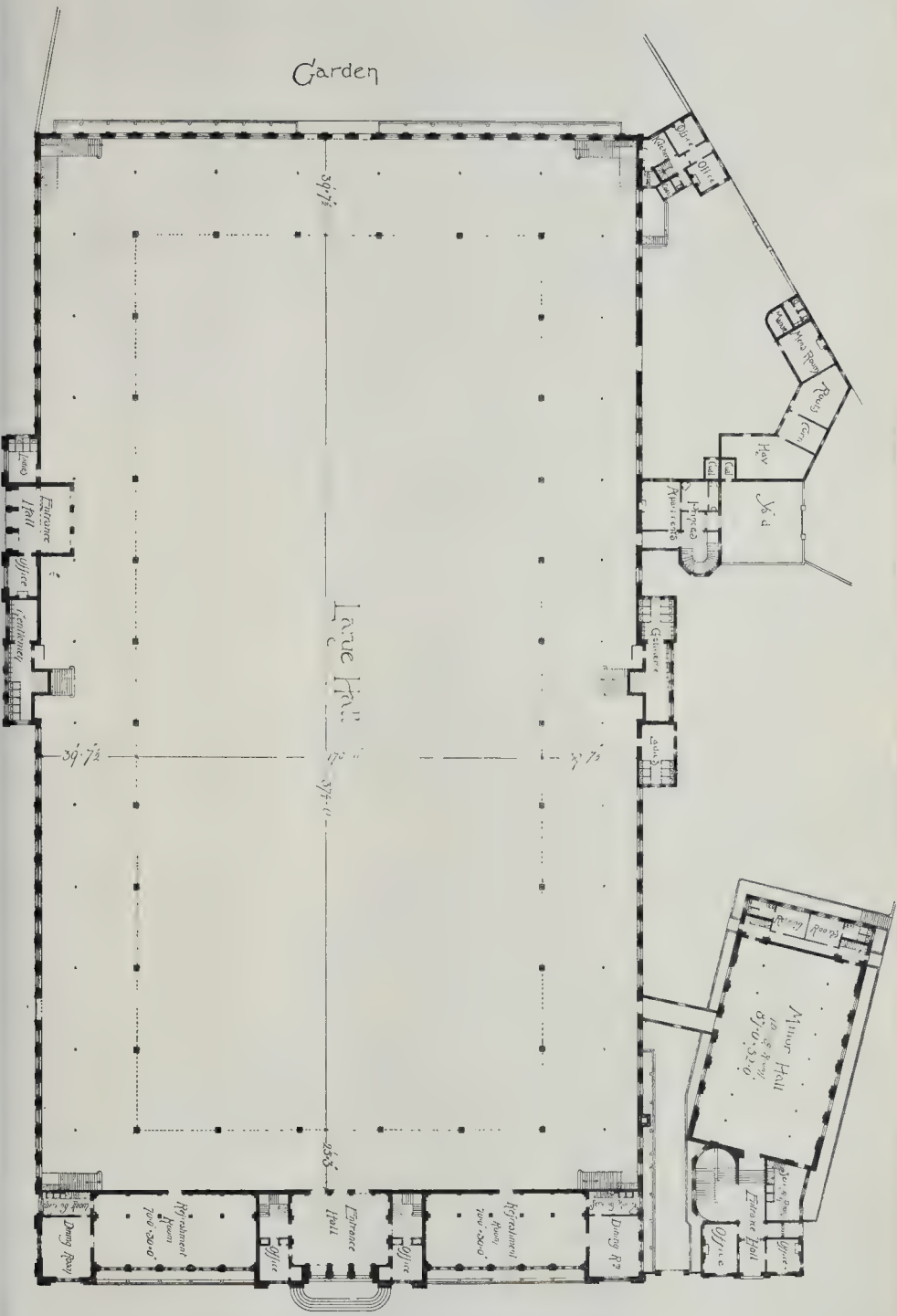




THE PHOTOGRAPH BY J. & J. CHURCH







NATIONAL AGRICULTURAL HALL, KENSINGTON.—PLAN.

as a room, and for that reason separate access to the front door, from the butler's pantry, is provided.

The carpenter's and joiner's work is being executed by Mr. Richard Beckett, of Hartford, Cheshire; the brickwork by Mr. Tickell, of Knutsford; the masons' work by Messrs. Rathbone, of Northwich; the roof tiling by Mr. Spruce, of Knutsford; and the plumbing by Messrs. Jaffrey & Co., of Manchester. Mr. W. P. Samuels is the clerk of the works.

The drawing was accepted for the Royal Academy Exhibition this year, in the first instance, but not hung for want of room.

#### THE ARCHITECTURAL ASSOCIATION. SESSION 1885-86.

THE opening *conversations* of the new session of this Association will take place on Friday next, October 9th, in the Galleries of the Royal Institute of Painters in Water Colours, Piccadilly.

The following is the syllabus of papers for the session, as far as arranged at present:—

1885.  
Oct. 23.—Address from the President, Mr. R. C. Pirk.  
Nov. 6.—"Italy." Mr. Thos. Blashill.  
Nov. 20.—"The Connexion between Dress and the Art of Composing, illustrated by various Examples taken from the late Prof. Somper's *Lessons on Style*." Mr. L. Harvey.  
Dec. 4.—"Ventilation of Private Dwellings." Mr. G. H. Blazrove.  
Dec. 18.—"English Homes of the Seventeenth Century." Mr. J. A. Gotoh.  
1886.  
Jan. 15.—"Stained Glass." Mr. Lewis F. Day.  
Jan. 29.—"Cathedral Facades." Mr. A. Beresford Peto.  
Feb. 12.—"Architectural Photographs by Mr. J. L. Robinson and other Amateurs." Mr. S. F. Clarkson.  
Feb. 26.—"Brickwork and Towns of Bologna." Mr. W. White, F.S.A.  
Mar. 12.—"The Practical Survey of Works in Progress." Mr. H. D. Appleton.  
Mar. 26.—"Members' Soirée."  
April 9.—"Indoor Architecture." Mr. G. R. Redgrave.  
May 28.—"Books." Mr. R. L. Cox.

#### THE CONSTRUCTION OF FACTORY CHIMNEYS.

THE *Chemiker Zeitung* has lately been devoting attention to this subject with special reference to the question whether decrease of height might not cause a saving in fuel without impairing general efficiency. Herr P. Huth records a case in which the erection of a new boiler in a relatively disused building necessitated (after an unsuccessful attempt to use it) the demolition of the old chimney, the dimensions of which were, height, 65 ft., lower diameter, 19-68 in., diameter of interior of chimney, 13-78 in. The entire length of the draught, including the flue, was about 98-42 ft. In the new chimney the entire length of draught, including the flue, was proposed to be about 95-14 ft., and the diameter at the narrowest square portion, 25-59 in.

Partially for experimental purposes, and partially with a view to economy, a trial was made of heating the boiler when the chimney was 39-37 ft. in height. Although the results were affected by the damp masonry, there was a distinct improvement perceptible as compared with the old chimney. At a height of 45-93 ft. the trials were still more satisfactory, and at 52-49 ft. all requirements were completely fulfilled, the smoke being absolutely white and sometimes scarcely noticeable, without any soot or flying ash. The heating of the boiler was excellent, and the consumption of coal 15 to 20 per cent. less than was the case with the old chimney. The top was then finished in the usual way without any further improvement or addition to the height.

From these facts Herr Huth deduces the argument that not only the height, but also the diameter, of a chimney in proportion to its height, deserves attention for economical and administrative reasons. High chimneys are, he considers, as a rule, too narrow in proportion to their height, and hence do not draw well, or else waste fuel and cover the neighbourhood with soot and flying ash. The effort to remedy those evils by still further increasing the height of the chimneys usually leads to their aggravation. Herr Huth suggests more detailed researches

as likely to elucidate the subject further. In a later number of the *Chemiker Zeitung*, Herr Ramdohr, of Gotha, confirms the assertion that there is a dearth of exact information as to this point. He alludes to the opposite extremes of making chimneys decrease or increase in their internal diameter at the top as compared with the base. He recommends uniform diameter, and thinks this should be estimated rather fully in order that the heated gases in the centre of the chimney may be, if possible, surrounded by a cooler stratum, which protects the brickwork to some extent from the heat.

This uniformity of diameter can be obtained by cutting the bricks or by dividing the chimney into sections and ascertaining that no portion of these has less than the specified minimum diameter. This diameter can be estimated in proportion to the extent of the grate-surface of all the fire-places which the chimney serves, being about equal to the free grate-surfaces. This varies with different combustibles (brown or mineral coal, wood, &c.), from one-eighth to one-fourth of the entire grate-surface. The lower a chimney, the larger may be its cross-section.

The height, even when the boilers are small, should not be less than about 50 ft. For large steam appliances, when they are near the chimney, a height of 100 ft. to 120 ft. will usually suffice, provided the cross-section is suitable. When the fire-places are some distance from the chimney, the height of the latter would be about 160 ft. to 200 ft., the cross-section being modified on account of the cooling of the smoke gases during their passage.

As to the form of the cross-section of such chimneys, it is considered that a circular shape is preferable on account of its resistance to wind-pressure. An octangular form is considered a very suitable alternative, as only one special shape of brick is indispensable; and finally it is stated that the top of the chimney should not be called on to bear any but a very slight projection; the whole being carefully surmounted with iron round the top of the brickwork.

#### ANCIENT ORDINANCES AND STATUTES AS TO MASTER MASONS.

THE following extracts from the Report of the Historical Manuscripts Commission\* (Eglington, Maxwell, Moray, Underwood, and Digby MSS.) will be found interesting:—

"82. The statutes and ordinances to be observed by all the master masons within this realm, set down by William Schaw, master of work to his Majesty, and general Warden of the said craft, with consent of the master masons. 28th December 1599" (p. 29).

This document is of considerable length, but may be summarised thus:—

"(1.) That they observe all former ordinances as to the privileges of their craft; that they be true, one to another and 'leve charitable togidder.' (2.) That they be obedient to their wardens, deacons and masters in all things concerning their craft. (3.) That they be honest, faithful and diligent in their calling, and deal uprightly with the masters or owners of the works they take in hand. (4.) That none take in hand any work, great or small, which he is not qualified to perform, under a penalty of 40*l*. (5*o*), or the fourth part of the value of the work, over and above due satisfaction to the owner of the work. (5.) That no master shall take another master's work over his head, after he has made an agreement, verbal or otherwise, under a penalty of 40*l*. (6.) That no master shall take the working of any work that other masters have wrought at, until the latter have been paid. (7.) That a warden be chosen yearly for each lodge, by the votes of the masters, and his election duly notified to the warden general. (8.) That no master shall take more than three prentices during his life time, without consent of the wardens, &c. of the sheriffdom where the prentice is to be received. (9.) That no master receive any prentice bound for fewer years than seven at the least, that it shall not be lawful to make the said prentice brother and fellow in craft, until he have served other seven years after the issue of his apprenticeship without special licence from the wardens, &c. that sufficient trial be taken of his qualifications. (10.) It shall not be lawful for any master to 'sell his prentice to any other master, nor to dispense with the years of his apprenticeship by selling them; the prentice himself. (11.) No master shall receive a prentice without notification to the warden of his lodge that the prentice's name may be 'ordurly buikit.' (12.) Prentices to be entered in the order of their booking. (13.) No fellow of craft nor master shall be received, save in the presence of six

masters (the warden of the lodge being one) and two entered prentices, &c.; no man being admitted without sufficient trial of his skill. (14.) That no master work any mason work. (15.) No master or fellow of craft shall receive any 'cowanis' to work in his company, nor send any of his servants to work with 'cowanis' under the penalty of 20*l*. for each offence. ['Cowanis' = persons who do the work of a mason, but who have not been regularly bred to the craft.] (16.) No entered prentice shall take on hand from any other, any task extending to more than 10*l*. [Scots]. (17.) Strife or variance among masters, servants and prentices, to be settled by the wardens or deacons of their lodge, obstinate parties being forbidden to work until they 'submit thame-selvis to reason.' (18.) That all masters, 'intorporaris of warakis, be veray cairfull to se their skeffalls and fete-gangis surelie set and placeit, to the effect that throw their negligence and slouch, na hurt or skaith cum vnto persons that workis at the said work; vnder the pain of discharging of thame thairafter to work as maisteris havand charge of ane work, bot sall euer be subiect all the rest of their dayes to work vnder or with ane other principall master having charge of the work.' (19.) No master shall receive any other master's runaway prentice or servant, nor entertain such. (20.) All masters in any assembly shall be sworn, that they shall conceal no faults nor wrongs done by one to the other, nor yet the faults or wrongs that any man has done to the owners of works that they have in hand, so far as they know, under a penalty of 10*l*. to be levied on concealers of such faults. (21.) Penalties to be levied by the wardens, &c., and to be given to pious uses. The masters present bind themselves to observe the foregoing ordinances, and have requested the warden general to subscribe them."

On the same day were drawn up and subscribed a series of ordinances for the Lodge of Kilwinning, and those within its bounds. Edinburgh is declared to be the principal lodge in Scotland; Kilwinning the second, and Stirling the third. Every fellow of craft at his entry shall pay 10*l*. to the lodge, with 10*l*. worth of gloves; sufficient trial being made of his skill. With other enactments as to the power and authority of the wardens, &c., of the lodge. Subscribed by "William Schaw, Maistir of Work, Wairden of the Maisons," at Holyrood, 28th December, 1599.

#### PLANNING FOR EVIL.

ST. GILES'S AND ST. LUKE'S.

SIR.—A paragraph has been quoted from the *City Press* in several quarters, referring to the Artisans' Dwellings, Chatham gardens, Nile-street, Hoxton, now in the course of erection by the "Joint Estate Trustees of the St. Giles's and St. Luke's Joint Parochial Charities," and intimating that when these buildings are inaugurated ceremoniously, the Royal Commissioners on the Housing of the Poor will, with others, "take an important part in the proceedings, to mark the occasion of the opening of the first block of artisans' dwellings erected out of parochial trust funds." As a member of that Commission, and one who has given consideration for many years to the sanitary requirements of the country, I am impelled to state the strong objections that exist to the general arrangements of these dwellings. They take the shape of one continuous street, or, rather, court, 509 ft. long, and 24 ft. wide from house to house, and, as it would seem, with only one entrance to it. I repeat, in words, these astounding dimensions (given to me on the spot), so as to prevent the supposition that the printers must have erred,—five hundred and nine feet long and twenty-four feet wide! The height of the houses is 35 ft. to the eaves of the roof. The published By-Laws of the Metropolitan Board of Works relative to the formation of new streets set forth that 40 ft., at the least, shall be the width of every new street intended for carriage traffic, and 20 ft. for every new street intended only for foot traffic. Further, that every new street shall, unless the Metropolitan Board of Works otherwise consent in writing, have at the least two entrances of the full width of such street, and open from the ground upwards.

We will suppose that the street in question is intended for foot traffic only, but then comes in the Act of 1856 to amend the Metropolitan Local Management Act, which says:—"No building, except a church or chapel, shall be erected on the side of any new street of a less width than 50 ft. which shall exceed in height the distance from the external wall or front of such building to the opposite side of such street without the consent, in writing, of the Metro-



opolitan Board of Works." The new street under consideration is 24 ft. wide; the height of the houses is, as I have said, 35 ft. and, as we understand, the Board of Works have not even consent to the deviation.

What the Local Government Board would sink of this 500 ft. of street 24 ft. wide is shown by the "Model By-Laws with respect to New Streets," issued by that Department for the use of Sanitary Authorities throughout the country, Clause 5 of which says:—"Every person who shall construct a new street which shall exceed one hundred feet in length shall construct such street for use as a carriage-road, and shall, as regards such street, comply with the requirements of every by-law relating to a new street intended for use as a carriage-road." In other words, in the case in question, if this clause weighed in the metropolis as it does in the provinces, the road must have been 40 ft. wide instead of 24 ft., with or without consent.

What is to be done? In a few years this pretty pile of dwellings, erected by two great architects, with enlarged views and the best of motives, will have to be included among the unlovely slums of London. An epidemic, should unfortunately break out there, will spread like wildfire. Whether or not the laws which are intended to obtain for every dwelling-house a certain open space at the back have been set on foot, as others have been, I cannot say; but, in any rate, the new buildings are surrounded by old, evil, and dilapidated dens, which seem to come close up to them, and serve still further to deprive them of light and air. On the occasion of laying the memorial stone of the new houses, I ventured, after a hasty glance at the plans, to point out privately to some of the parties concerned, the strong objections that existed to the arrangement proposed,—of course, without effect. Now that the carcasses of the houses are approaching completion, and thousands of pounds have already been spent, the requisite alterations are scarcely to be hoped for. The least that could be done to render the place healthfully habitable is the removal of a house on each side, about midway, so as to let in a little additional air and sunlight, and the formation of an entrance open from the ground upwards, as required by the law, at the further end. I write with extreme reluctance, and indeed, should not do so, but that a sense of duty outweighs personal feeling. "St. Giles's" and "St. Luke's" have long been the synonyms of Poverty and Madness. The Joint Trustees had here a fine opportunity to help forward the change which is taking place in the significance of these names, but they have, unhappily, disregarded it.

GEORGE GODWIN.

Cromwell-place.

#### ON CIRCULAR HOSPITAL WARDS.

SIR,—The paper on circular hospital wards in our issue of the 26th of September [p. 443] will attract very careful attention from the wide circle of readers to whom Mr. Saxon Snell is known as the architect of many infirmaries, and the author of the last, the largest, and most authoritative work on hospital construction.

The paper is written in a fascinating manner, and carries the casual reader swiftly and noisily to its author's conclusions. The subject, however, is one of great importance, and demands very close attention.

Mr. Snell's reasoning is based on a single and special example, that of a hospital for 576 cases, with eighteen parallelogram wards for thirty beds each, arranged in six pavilions. He compares the cost of constructing and working such an institution with one where he proposes to build circular wards of the same area as his parallelogram ones, but each containing twenty-two, in place of thirty patients, thus requiring twenty-four wards in eight pavilions. He shows that the additional cost of this proceeding would be 105,135l. per thousand patients.

The reasoning of the whole paper turns on the little clause, "If the buildings be three stories in height there would be six pavilions; if it, as I shall show, twenty-two patients only be placed in the large wards because they are of circular shape, then eight pavilions would be required."

Now, Mr. Snell does not show this. What he does show is, that, if in this ward of his own location we place twenty-two beds 6 in. from the wall, their heads will have a bed-space of ft. 8 in., and they will each have a floor-space of 112 plus 41, or 153 superficial feet.

After adding up part of the cost, Mr. Snell quotes a number of authorities as to floor-space, wall-space, cubic space, and ventilation, and, to illustrate their requirements, he takes a parallelogram ward 120 ft. long, 28 ft. wide, for thirty beds, giving 8 ft. of bed-space and 112 square feet of floor-space to each bed. He next takes a circular ward of equal area, and finds that this does not give him as much wall-space as the other. This follows from the well-known fact that of all plain figures, the circle is that which contains the largest area, bounded by the shortest line; this fact, in some respects, tells very much in favour of circular wards.

Taking off 13 ft. of the circumference for two lobbies in the ward, and taking some 6 ft. in all more at the sides of these lobbies and placing his bed-heads 6 in. from the wall, Mr. Snell finds that he can only get twenty-two bed-spaces of 8 ft. 8 in. wide. Though 8 ft. wall-space is necessary to give 112 square feet of floor-space in a ward 28 ft. wide, why should he apply this iron rule in the case of a circular ward 65 ft. wide? Had he taken as his illustrative ward the one he constructs in his parish infirmaries, 24 ft. wide, he would have needed 9 ft. 4 in. bed-space to give his 112 square feet of floor-space, and, had he applied this iron rule to his circular ward, more than two and a half times as broad, he would only have found room for nineteen beds.

In Mr. Snell's section of his great work on Hospital Construction an examination in some detail is made of the design and construction of the most noted hospitals of recent date. Some three dozen of the best types are most carefully described, but, curiously, of all these thirty-six one only has wards containing thirty beds,—the wonderfully successfully-transformed Hull General Infirmary, on which Mr. Snell must be congratulated by every one. In more than two-thirds of all the hospitals described the largest ward does not contain more than twenty-four beds.

The paper shows clearly that thirty beds form the outside limit for a parallelogram ward; beyond that number either the length or breadth must be increased more than is desirable. The same limitation holds in the case of circular wards. The area of a circle varies as the square of its diameter, while its circumference varies as the diameter. It thus follows, that below a certain limit in size, the wall-space of a circular ward is too great proportionally to the floor-space. Above a certain limit, again, the floor-space becomes rather too great compared to the wall-space; and, unfortunately, this region is the one beyond which Mr. Snell has selected his example.

Professor Marshall, in his excellent pamphlet on circular wards, points out these limits very exactly.

Turning from theoretical considerations to practical details, we find that in the Hull Infirmary Mr. Snell gives an average lineal wall-space of 7 ft. 6 in. in a ward 26 ft. wide. In St. George's and St. Marylebone Infirmaries he gives 6 ft. of wall-space in a ward 24 ft. wide. In the Moabitte Hospital, Berlin, 6 ft. 2 in. wall-space is given in a ward only 22 ft. 6 in. wide.

Now, if Mr. Snell put thirty beds in his circular ward, they would have an average wall space of 6 ft. 10 in., a considerably greater space than that given in the comparatively narrow wards mentioned above. With this greater bed-space, they would have the very much larger floor-space of 112 square feet; and this would be secured, with a bounding-wall 206 ft. long, as compared with one 280 ft. long in the case of the corresponding parallelogram ward.

In fact, if the 6 ft. of wall space allowed by Mr. Snell in the parish infirmaries, with a ward 24 ft. wide, was all that was granted by him in the circular ward, 65 ft. wide, thirty-four beds could be accommodated with considerably more floor-space than in the parish infirmaries, and thus a great saving of expense secured.

His very wild suggestion as to a ward 87 ft. 9 in. in diameter, in which he proposes the same wall-space as in the parallelogram ward less than one-third of the width, hardly invites serious discussion; and is on a par with the suggestion that cross ventilation through the windows alone would be the only plan applicable to a circular ward. His own book shows that in the circular wards of the Antwerp hospital an excellent system of ventilation has been designed, by which not only is fresh air pumped into the centre of the ward, but the foul air is

also extracted below the beds at the patients' heads.

One word with regard to heating. The loss of heat in a three-storied building is mainly by the walls, and is proportional to the length of wall. Now, his circular ward has a wall 206 ft. long; his parallelogram ward one 288 ft. long,—in about the ratio of three to four: the gain here in the case of the circular ward is plain.

His whole argument is directed, not against the system of circular wards as suggested by its advocates, but against this one single twenty-two windowed ward, the one principle of which is that nearly one-half more average wall-space must be given in the ward 65 ft. wide than he allows in the parish infirmary wards 24 ft. wide.

From consulting Mr. Snell's great work on Hospital Construction, we get the very curious result that in only two of the thirty-six hospitals so well described is a wall-space of 8 ft. given. In the other cases it varies from 5 ft. 8 in. at Riga in a ward 30 ft. wide to 9 ft. 9 in. at Blackburn in a ward 22 ft. 6 in. wide. It usually varies inversely as the width of the ward.

Turning thus from Mr. Snell's paper, with its one idea of a ward giving 8 ft. of wall-space and containing thirty beds, to his excellent book, we find that in practice the wall-space varies greatly with the width of the ward, and that the general size of hospital wards of recent construction allows a very large field where the circular form might with advantage be tried.

Captain Douglas Galton, the chief designer of the Herbert Hospital, which Dr. Parkes considered "The best military hospital in the country, or, perhaps, anywhere," the best authority we have on the question of parallelogram wards, has, in his paper at Liverpool three years ago, treated of the subject of circular wards in a justly critical spirit.\* He concludes his remarks by saying that, "in cases of hospital construction, practical experience is of more value than theoretical arguments."

Here, at Burnley, we are very slowly erecting two circular wards, 60 ft. in internal diameter, and it will be a matter of pride to us to have the opportunity of showing our experiment to any interested in this subject.

JOHN BROWN, F.R.C.S., Eng.,

San. Cert. Camb.

Burnley, Lancashire,  
September 29th, 1885.

#### NAWORTH CASTLE.

SIR,—May I be permitted to correct a slight error in the description of the illustrations of Naworth Castle in your issue of September 19th? The portions illustrated are not a restoration of anything that existed at any time, but are entirely new additions.

CHARLES J. FENCISON.

#### "RANDOM COURSES."

SIR,—Replying to the question asked by Mr. W. H. Pipe [p. 445, ante], the second sketch of the diagram would be (in my opinion) classed as "random-coursed rubble, squared," or "short-coursed rubble," or "squared rubble."

W. SHIPMAN.

**Chorley.**—On the 19th ult. the rearing dinner was given by Messrs. Gardner, Thompson, & Cardwell, at the Imperial Hotel, Cattle Market, to celebrate the erection of the new stock-rooms in connexion with their brewery at Whittle Springs. Eighty-seven of the workmen sat down to the repast, Mr. Cardwell, the managing partner, presiding. The new erection, which has replaced the last remnant of the old brewery buildings purchased by Messrs. Gardner, Thompson, & Cardwell some twelve years ago, completes the scheme of the new brewery, and is of a substantial character. It is in the "Scotch Baronial" style of architecture (an odd choice of style for a brewery, we may observe), and has been designed and supervised by Mr. James Radford, F.R.I.B.A., of Manchester. The general contractor is Mr. Robert Brownley, of Railway-street Works, Chorley, with the following sub-contractors:—For ironwork, Mr. John Heald, of the Phoenix Ironworks, Chorley; for slating, Mr. John Fairclough; for plumbing, glazing, and painting, Mr. George Yates, of Chorley.

\* Remarks on some Points of Hospital Construction. By Douglas Galton, C.B., &c. Wyman & Sons, Great Queen-street, Lincoln's Inn-fields, W.C.



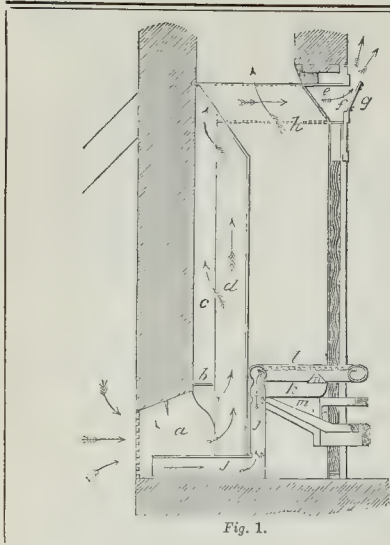


Fig. 1.

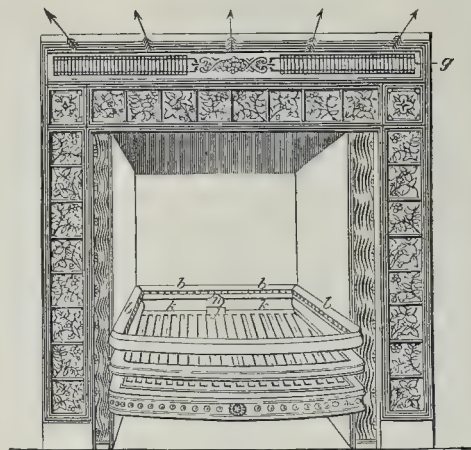


Fig. 2.

#### BOYLE'S PATENT VENTILATING AND SMOKE-CONSUMING GRATE.

This grate is invented by Mr. R. Boyle, and is claimed by its inventor to be a valuable fuel-economiser and smoke-consumer, and as a ventilating grate for admitting a supply of fresh, warmed, and purified air into an apartment. The fire-bars are raised at the back, and the top-rib is continued round the sides and back of the grate. This rib, or hollow bar, is perforated all round, and fitted with small nozzles, through which air heated to a high temperature is projected down on to the fuel in the form of a spray, when perfect combustion ensues, and smoke, as a natural result, is prevented from forming. The air-supply for ventilation and combustion is brought in at the back of the grate through a hole in the wall. In diagram fig. 1, *a* indicates the opening through the wall to admit fresh air; *b*, stop-plate, to force the air between the gills; *c*, hot-air chamber; *d*, gills for warming the fresh air; *e*, top of heating-chamber; *f*, fresh air; *g*, top of heating-chamber; *h*, baffle-plate, for directing warmed air upwards; *i*, directing valve; *j*, inlet for air-supply to hollow bar; *k*, tube for conveying air to the front of hollow bar; *l*, hollow-bar all round grate, fitted with conical perforations or nozzles for directing hot-air spray, on to top of fire; *m*, elevated fire bars; *n*, junctions between air-supply pipe and hollow-bar. Fig. 2 is an elevation of the grate.

#### PROVINCIAL NEWS.

**Brixham.**—The foundation-stone of the new market and public buildings for the well-known fishing town of Brixham was laid a few days ago. The site is in the most populous part of the town, with Bolton-street, Fore-street, New-road, and Church-street converging upon it. The contractor's price for the building is about 2,500*l.*, and the work is expected to be completed within twelve months. The market and public buildings attached are being built on the site of the old Naval Reservoir, made for the convenience of the Channel Fleet when anchored in Torbay. In consequence of the probable nature of the soil underneath the bed of the old reservoir, it has been deemed advisable not to interfere in any way with the original surface. Thus, instead of the usual excavations for trenches to receive the footings, layers of Tingey's Portland cement concrete, 4 ft. 6 in. wide at the bottom and 2 ft. deep, have been laid on the top of the original surface to receive the masonry foundations, which are about 3 ft. wide. The principal facings will be of bunched limestone, with horizontal beds, pilasters, and panels of terra-cotta brick from the Great Western Potteries; and the cornices, bands, mouldings, and other dressings of Monk's

Quarry Corsham stone. The Market Hall will be 100 ft. long by 39 ft. wide, the floor of which it is proposed to lay with good adamantine paving bricks. Immediately over the Market is the Assembly Hall, which will seat about 750 people. Adjoining the Market is another building, on the ground-floor of which is a large room for the use of the Justices and for School Board meetings, &c. On the floor above is a large room which may be used for Local Board meetings, and at the rear of this room offices are provided for the attendants and officers. The contractor is Mr. John H. Foaden, of Ashburton, who is represented in the works by his foreman, Mr. John Endacott. Mr. George Soudon Bridgman, of Torquay, is the architect.

**Exeter.**—At the meeting of the Exeter Town Council on the 16th ult., it was reported that Messrs. Warren Bros. had restored about 45 ft. of the oak panelling at the south-east end of the Guildhall, and a motion was made that the whole of the panelling should be restored and the hall re-arranged to some extent. In answer to a question it was stated that the restoration of the whole of the panelling would cost 400*l.* or 500*l.*. In the course of the not very edifying discussion which ensued, Mr. Courtney said that to spend 400*l.* on work of such a description was a thing he could not understand, and what had been restored was not, in his opinion, worthy to compare with the rest as it was at present. If they did anything they should knock the panelling down, sell it for matchwood, and put up new. Mr. Dunn asked if they could not remove the old panelling, and put up new for nearly the same money? Upon which Mr. Alderman Andrew observed that to remove the old woodwork from such a grand old hall would be a pure piece of vandalism. Eventually, after a wrangle as to whether the execution of the work should be put up to open competition by tender,—a course which was strongly opposed by Mr. Harry Hems and other members of the Council, on the ground that such a proceeding would be very unfair to Messrs. Warren after they had "shown their hand,"—it was agreed to commission Messrs. Warren to restore another section of the panelling.

**Lowestoft.**—The Grove Estate, situated in the heart of this town, has, through the death of the owner, been thrown into the market, and purchased with a view to its being developed into building sites. The estate contains upwards of six acres. It has a frontage towards the London-road of about 750 ft. The return frontage towards the Fish Market and the sea frontage will give sites well adapted for offices and shops for fish merchants, and others connected with the extensive fishing interests at Lowestoft. Mr. George J. Skipper, of Norwich, has been appointed surveyor to the estate, his plans for laying it out being selected from amongst several others submitted by different architects. The work of pulling down the old

mansion and felling the trees is rapidly proceeding, and the forming of the sewers and roads will shortly commence, under the surveyor's superintendence.

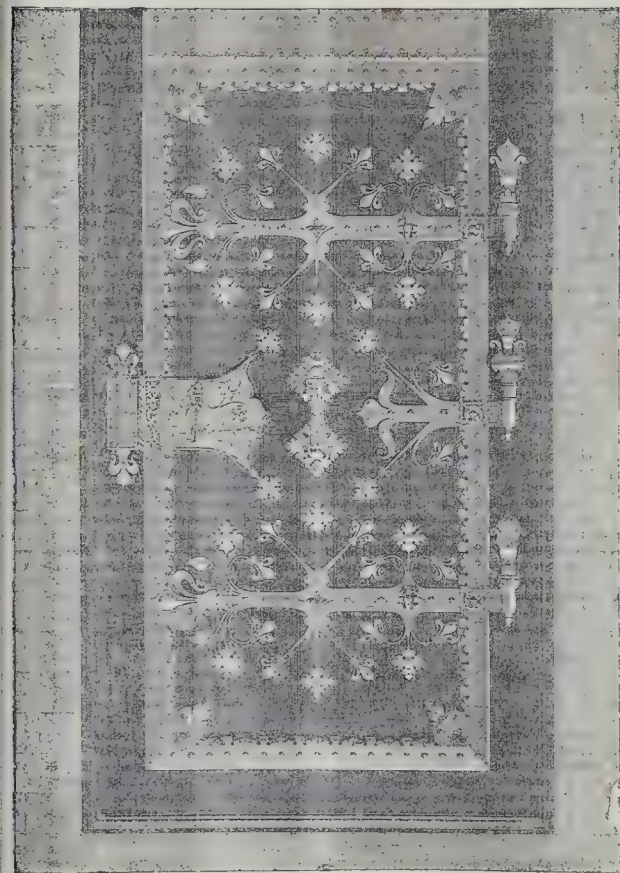
**Hereford.**—The new High School for Girls was opened on Friday, the 25th ult., by the bishop of the diocese, as chairman of the Council. The two principal school-rooms are respectively 48 ft. and 46 ft. in length. There are also several class-rooms, a council-room, library, and complete sitting-room and bedroom accommodation for the head-mistress and the whole of her staff of assistants. The desks and other fittings have been supplied by Messrs. Hammer & Co., of 172, Strand, and Messrs. Shanks & Co., of Glasgow, the general works having been executed by Messrs. Taylor & Hammonds, of Hereford, from the plans and under the superintendence of the architect, Mr. E. H. Lingen Barker.

#### CHURCH-BUILDING NEWS.

**Bridgwater.**—Northmoor-green Church, near Bridgwater, has been re-opened by the Bishop of Bath and Wells, after undergoing extensive alterations and repairs. The church, dedicated to St. Peter and St. John, at Northmoor-green, or Moorland, was built only about forty years since, but having suffered from the floods which so seriously injured that district, and from standing upon a bad foundation, a certain amount of work, chiefly in the shape of reparation, became absolutely necessary. The whole of the partially-decayed wooden flooring and joists have been entirely removed, and the area of the church within the walls covered with a bed of concrete laid above the level of the highest-known flood. The passages and porch have been paved with Maw's tiles, the chancel having been previously finished in a similar way. The old seats, which have been bent in a remarkable manner by the sinking of the walls to which they were attached, have been straightened and refixed on the new wooden platforms, which have been kept quite independent of the walls, and the spaces underneath, between the wooden floor and the concrete, well ventilated. The seats have been revarnished and the floors oiled. At the western end of the church, within the walls of the nave, two vestries have been formed of pitch-pine panelling, varnished. The Caen stone pulpit has been cleaned, and its position slightly altered. The position of the reading-desk has also been improved, and an organ provided in the place of the harmonium. The work has been executed by Mr. H. W. Pollard, builder, of Bridgwater, in accordance with plans and specifications prepared by Mr. J. Houghton-Spencer, of Taunton.

**Kensington.**—St. Barnabas Church, Addison-road, Kensington, has just been re-decorated by





Door with Decorative Metal-work (Modern Viennese).

Messrs. Dicksee & Dicksee, under the supervision of Mr. Arthur Baker, architect. The operation is in the Tudor Gothic style. Streatham.—St. Anselm's Church, Streatham, some years a temporary iron church, has had the permanent chancel, transepts, and vestries completed and opened. The work is executed in brickwork, with Douling stone dressings externally, and Cornham stone inside, and roofs covered with Broseley tiles. Messrs. Sawyer, of Norwood, executed the work, at a cost of 3,500*l.*, from the designs and under the personal superintendence of Mr. R. J. Withers, architect.

#### STAINED GLASS.

Distington.—Three stained-glass windows, from the studio of Messrs. Powell Bros., of Leeds, have been presented to Distington church, near Whitehaven. That at the east end of the north aisle is the gift of Mrs. Fisher, Distington Hall. It represents the "Miraculous Draught of Fishes" in the chief lights, and the tracery the "Agnus Dei." The other two windows, situated at the west end, contain illustrations of "Christ's Charge to St. Peter," and "Blessing Little Children," respectively. Tickhill (Yorks.).—It is proposed to fill the large west window of Tickhill Church, Yorks., with stained glass. The window is one well known to archaeologists, being a fine example of the fifteenth century, and containing amongst its tracery lights one of the shape of a heart. Messrs. Powell Brothers, of Leeds, have been entrusted with the commission. Acaster.—A two-light stained-glass window has just been erected by Messrs. Mayer & Co. at the parish church of Acaster, Selby, Yorks., representing the "Raising of Jairus's daughter."

#### DOOR WITH DECORATIVE METAL-WORK (MODERN VIENNESE).

The accompanying illustration shows a modern example of a door with decorative hinges and other metal work, designed by Messrs. König & Feldschwick, architects, of Vienna. It is executed in wrought iron.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

10,490, Plaster, &c. R. Stone.

Chalk, lime, gypsum, and similar materials are saturated with sulphuric acid, either in suitable tanks, or at the kilns, as the material is being loaded therein. The material is then burned, and after grinding to powder is ready for use. This plaster is suited to any climate.

3,741, Door-Lock. J. Parker.

The tumbler and lever by which the latch-bolt is operated from the follower on the knob-spindle are centred on a pin, which serves also as a guide for the main bolt.

9,091, Wall Paper, Paper-board, Slabs, Tiles, &c. H. W. Johns.

Employing asbestos pulp solely, or in conjunction with other materials, in the production of paper, paper-board, slabs, tiles, &c., having embossed surfaces.

10,622, Bricks for Paving Stables, &c. C. G. Tebbutt.

The bricks have knobs on one or both faces about 2 in. in diameter, and from 5-16ths in. to 5-8ths in. in height. The space between them is from one quarter to five-eighths of an inch. The knobs are flat on top so as to afford a good foothold, the spaces between being to allow liquid matter to run off. The top portion only of the brick is thus made, the eye may be bedded in concrete or asphalt.

10,664, Water-closets. J. Purdie, jun.

The hopper is socketed to the trap, and held in position by a projection which fits into a correspond-

ing recess in the trap. The trapping-tongue is made to slope backwards, both upwards and downwards, from a point just above the water-level in the trap. The trap is ventilated and provided with an inspection opening.

10,823, Asphalt. C. F. Stollmeyer.

Asphaltum, preferably Trinidad or a similar asphaltum, is melted and mixed with as much sawdust as it will take up, generally about 50 per cent. The substance thus produced can be employed for paving either in the usual way or in blocks, or moulded for railway sleepers, or filled in between thin sheet-iron plates for the protection of vessels against shot.

11,069, Portable Shelves. S. Harris.

Uprights are fitted into metal shoes secured to the floor. On the uprights slide grooved cross-bars, which support the shelves, which are supported, at proper distances apart, by short pillars at back and front. At the top is a cornice with metal shoes, in which the top of the uprights are bound together at the level of each shelf by bars, which are united to the cross-bars by bolts and nuts. Stops in the grooves of the cross-bars prevent the shelves sliding too far back. The cross-bars, instead of sliding in the uprights and being supported by the pillars, may be screwed to the uprights.

17,109, Ornamenting Venetian Blind Laths.

A. Mulford.

Ornamenting Venetian blind laths by making upon them any suitable design by painting, embossing, gilding, staining, or other process whatever.

#### NEW APPLICATIONS FOR PATENTS.

Sept. 17.—11,025, H. Smith, Preventing the Rattling of Window and other Sashes.—11,029, G. Grove, Construction of Open and Close Cooking Range.—11,046, H. Turner, Door, Gate, and other Fastenings.—11,058, W. Tyler, Closet Basin and other Joists.—11,060, J. Hix, Water Supply Regulators.

Sept. 18.—11,068, T. Robinson, Machinery for Cutting Thin Boards.—11,088, R. Stone, Manufacture of Cement.—11,101, W. Dupré, Cows to Prevent Down Draught.—11,107, W. Lea, Apparatus for Coupling together pipes or Tubes.—11,110, H. Lake, Pavements and Flags or Slabs.—11,112, W. Johnson and S. Phillips, Improved Construction of Walls for Buildings.—11,114, G. Greig, Diffusing Air for Ventilation.

Sept. 19.—11,128, C. Heywood, Construction of Water-closets.—11,133, H. Dawson, Ventilation of Street and other Drains.—11,141, J. Dickson, Chimney Tops for the Prevention and Cure of Smoky Chimneys.—11,145, H. Girdwood, Glazing Windows, Doors, Frames, &c.—11,146, C. Wharton, Automatic Window Sash Fastener.—11,149, W. Lea and J. Beech, Sash Fasteners.—11,160, W. Carr, Water-waste Preventing Cisterns.—11,174, J. Watson, Manufacture of Cement.—11,176, D. Nicoll, Foundations for Movable Cottages and other Structures.

Sept. 21.—11,186, W. Ratcliff, Nail-making Machinery.—11,206, F. Gouging and A. Burkart, Fireplaces or Grates of Stoves.—11,210, A. Clark, Improved Process for Making Metallic Paint from Lead.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

14,463, E. Stacey, After-Flush Apparatus for attachment to Water-waste Preventing and Flushing Cisterns.—9,561, A. Wilkinson, Improved Ventilating Brick.—9,780, W. Thompson, Manufacture of Artificial Stone.—9,832, P. Sorel, Improvements in Glazing.—10,000, H. Whitaker, Improved Method of Fitting Washstands and Lavatories.—12,803, E. Robbins, Improved Material for Building and other purposes.—8,837, G. Dorning, Joints for connecting Boards, and Apparatus for Cutting such Joints.—9,158, H. Hadden, Planing Machines.—9,417, J. Betts, Ventilation.—9,418, J. Carter, Window-sashes to fold horizontally inwards.—9,738, W. Gordon, Cows for Chimneys and Ventilating Shafts.—10,158, W. Duffy, Wood-block Flooring.—10,249, J. White, Water-waste Preventing Cistern.—10,263, G. Walker, Laying Wood Flooring or Pavement, Staircase-treads, and Landings.—10,349, J. Scholes and E. Hall, Ventilating Water-closets and Soil-pipes.—10,379, J. Peachey, Urinals.—10,411, W. Bruce, Fixing Rain-water, Waste, and Soil Pipes.—10,416, J. Shanks, Improvements in Water-closets.—10,625, J. Vaughan, Water-saving Flushing Cistern.—10,643, M. Syer, Flushing Cisterns.—10,668, H. Moody and J. Pope, Construction of Roofs or Coverings for Houses, &c.

#### COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

13,712, R. Medland, Syphon Water-waste Preventer.—16,023, F. Durrans, Traps for Sinks, Basins, and other Water or Waste-water Apparatus.—16,257 and 16,258, H. Wauwright, Apparatus for Supplying Water to Water-closets, &c.—12,803, E. Robbins, Improved Material for Building and other Purposes.—14,463, E. Stacey, After-Flush Apparatus for Attachment to Water-waste Preventing and Flushing Cisterns.—15,332, W. Allday, Apparatus for Planing and Shaping Machines.—117, J. Bonisson; Chimney-pots for Preventing Down-draught, &c.—1,257, J. Lee, Wrought Metal Shovels and Trowels.—8,763, W. Woods and H. Grimley, Making Terra-cotta Sepulchral Memorials.—9,843, J. Cooke and J. Bottomley, Construction of Portable Furniture.

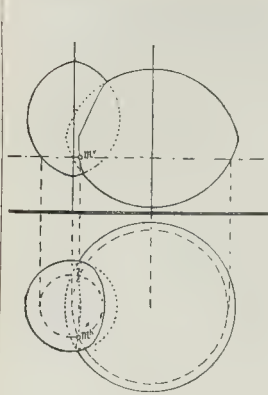


Fig. 171.

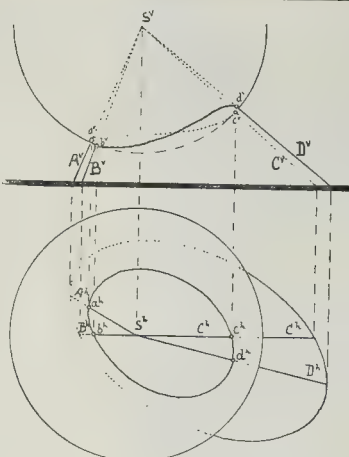


Fig. 174.

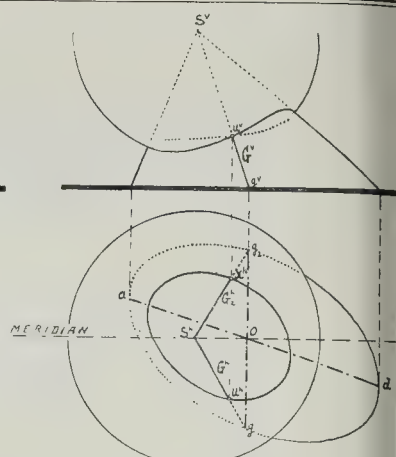


Fig. 175.

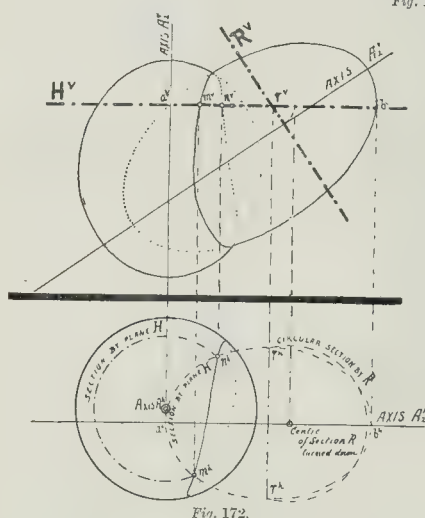


Fig. 172.

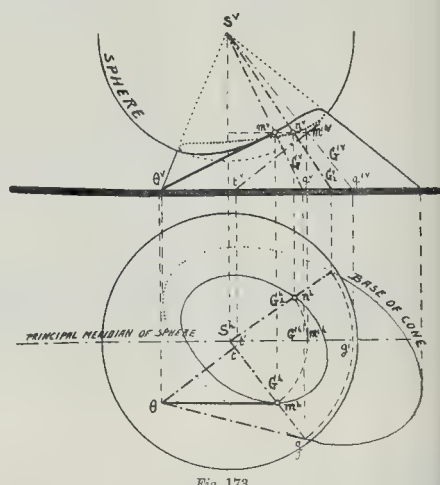


Fig. 173.

### The Student's Column.

#### DESCRIPTIVE GEOMETRY.—PART II.

XIX.

Find the intersection of two surfaces of revolution, the axes of which are parallel, say are both vertical.

**THE** sections of both surfaces of revolution by horizontal planes, such as H, will be circular, and, therefore, easily drawn (see fig. 171); the intersections of these circular sections will give us the plans  $m^a$  of points  $m$  of the intersection, their elevation is found in  $m^v$  on the line  $H^v$ . The tangents will be most readily found by making them perpendicular to the plane of the normals by the same method we used in the former case. Really there is no substantial difference between the facts that the axes of revolution meet or are parallel; for parallels are supposed to meet in a point infinitely distant, and the auxiliary sections by horizontal planes can also be considered as the sections by spheres the centres of which are infinitely distant. We call the reader's attention to this relationship, as such considerations often lead one to the discovery of methods of operation in new problems.

Find the intersection of two surfaces of revolution, the axes of which are not in the same plane.

This problem can only be solved by a series of plane sections. Let us assume the axis of the left-hand surface to be vertical, and let us

select the elevation plane parallel to the axis  $A_2$  of the right-hand surface. We shall only give on the plan the projection  $A^a$  of the axis, for the surface of revolution is then sufficiently determined, and we need not draw its plan. (See fig. 172.)

The section of the left-hand surface by the horizontal plane H, will be a circle which we can draw on the plan. To find the section the horizontal plane, H, makes in the second surface, we cut this surface by a series of planes, R, perpendicular to its axis. The sections of the right-hand surface by the planes, R, are of course circles; by turning them down round their lines of intersection,  $r r$ , with the horizontal plane H, we shall be able to draw these circles, and mark the points  $r$  where they meet the plane H. A series of points  $r$  will give us the outline of the section of the right-hand surface by the plane H. We shall have then the sections of both surfaces by the plane, H, and the points  $m$  and  $n$ , where they meet will be points of the intersection of the two surfaces of revolution.

As this operation necessitates making a number of sections delineated by series of points, this intersection of surfaces is necessarily a long one to draw. In some cases the sections may be more rapidly got at; for instance, the right-hand surface of our drawing being an ellipsoid, the sections are ellipses, of which the major axes are seen on the elevation as the one on the line  $a'' b''$ , and the minor axis can be found by taking the section of the surface by the plane R, which bisects  $a b$ . If the operator

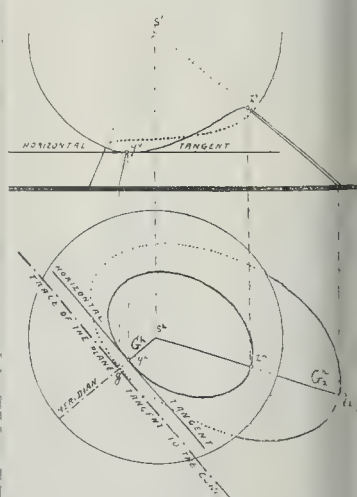


Fig. 176



elliptical compasses, he will be able to draw these elliptical sections nearly as rapidly as the circular ones, and the operation will be comparatively easy, as well as more accurate.

Let the intersection of any cone by a sphere with its centre on the apex of the cone.

In our drawing (fig. 173) the base of the cone is elliptical, and the apex of the cone is point S. We have supposed the upper part of the sphere left out, so as to be able to see on the plane its intersection with the cone, and mark the intersection with a full line. On the elevation the intersection is partly seen and partly hidden.

If we take any vertical plane through the apex S of the cone, it will cut the cone along a generator G, and the sphere, according to a meridian circle equal to the outline of the elevation. To find a point m of the intersection of the generator G, we have only to rotate the generator G till it be parallel to the elevation line in G'. In this position we can find the intersection m' of the generator G' with the meridian of the sphere, and then by rotating the m' comes by a circle to m, and m' comes along a horizontal line to m' on the elevation of the generator.

There is another generator, G<sub>2</sub>, of the cone of the same length as the generator G, and on it we shall find a point n of the intersection on the same level as the point m. It will save us, therefore, to operate simultaneously on the generators G and G<sub>2</sub>.

The tangent to the curve in the point m is the intersection of the plane tangent to the sphere with the plane tangent to the cone in the point m. The horizontal trace of the plane tangent to the cone is g<sub>2</sub>, tangent to the base of the cone in the point g foot of the generator.

The plane tangent to the sphere is perpendicular to the meridian on which the point m is situated. After rotating the point m to m' so as to bring it on the principal meridian, we can draw the m' m' tangent to the outline of the sphere, the foot of that line will come to the point t when rotating back the meridian to its original position. The point t is on the trace of the plane tangent to the sphere in the point m; the trace of that plane is, as we know, perpendicular to G<sup>2</sup>, which is the horizontal trace of the meridian plane; t θ is, therefore, the trace of the plane tangent to sphere, and θ is a point on the tangent to the curve; the line m θ is the tangent required, its plan is m' θ, its elevation m' θ.

There are points which are important for the lineation of the curve which we show apart to avoid confusion. They are:

Firstly, the points a, b, c, d (see fig. 174), of which a and d belong to the generators A and D of the cone, and the points b and c belong to the principal meridian of the sphere. The points b, c, d, are, therefore, the points where the cone of intersection is on elevation tangent to the outlines of the cone or of the sphere, and will give us the limits between the part of the curve which is hidden and that which is seen. The curve may be hidden either by the surface of the cone or by the surface of the sphere, and find which of the points a, b, c, d are seen we need only examine on the plan which of the generators A, B, C, D of the cone stand in front of the others; we may conclude in fig. 174 that to point b is seen, the point a is hidden, by the sphere, whereas, on the other side of the cone to point d is seen, and the point c is hidden by b cone.

Secondly, the points u and x projected on the elevation both in the same point w where the hidden part of the curve crosses the seen part thereof. Such a crossing of the curve on the elevation does not necessarily happen in every case, but only when, as in our drawing (see fig. 175), two generators G and G<sub>2</sub> of equal length have their feet g and g<sub>2</sub> on a line perpendicular to the elevation. As, in our drawing, the base of the cone is an ellipse, we have a means of determining before hand whether there are any points such as u and x. If the generators G and G<sub>2</sub> are equal, the cord g g<sub>2</sub>, which connects the feet of the generators, must be bisected by the trace of the principal meridian; for S<sup>2</sup>, o, g, g<sub>2</sub> are right-angled triangles, g, g<sub>2</sub> perpendicular to the meridian; they have side S<sup>2</sup> O in common and the sides G and G<sub>2</sub> are equal; therefore, they are identical triangles, and we can conclude that their sides g o and g<sub>2</sub> o are also equal. The question is now asked to find a line g g<sub>2</sub> perpendicular to the meridian and bisected thereby; a slight ac-

quaintance with conic sections will enable us to do this with ease. If the reader remembers what we said, fig. 149, on the conjugate diameters of the ellipse, he will see that the line which connects the points a and d is the conjugate diameter of the diameter of the ellipse perpendicular to the meridian. One of the properties of conjugate diameters is that a diameter will bisect all the cords of the ellipse which are parallel to its conjugate diameter; we know, therefore, that the centres of all the cords parallel to g g<sub>2</sub> are on the line a d, and can conclude that the point o, where the diameter a d cuts the meridian, is the centre of the line g g<sub>2</sub> required. The operation of finding the point w is, therefore, very simple. We draw the line a d; through the point o where it intersects the meridian we draw g g<sub>2</sub>; and find the points u and x of the curve in the ordinary way.

Thirdly, the points y and z, which are the highest and the lowest points of the curve of intersection. In these points the tangent to the curve is horizontal, this implies that the horizontal traces of the plane tangent to the cone and the plane tangent to the sphere will be parallel. This condition is only satisfied when the generator of the cone (see fig. 176) has its plan G<sup>2</sup> perpendicular to the base of the cone. In our drawing both the generators G and G<sub>2</sub> fulfil that condition; but we shall see further on that there might be even four such generators, and that, therefore, in some cases the curve offers four points where its tangent is horizontal. That for the point y on the generator G of fig. 176, the traces of the tangent planes will be parallel, is obvious; for the trace of the plane tangent to the cone will be in that case perpendicular to G<sup>2</sup>, and, on the other hand, the plane tangent to the sphere will be perpendicular to the plane of the meridian of which G<sup>2</sup> is the trace, and so the horizontal trace of the tangent plane will also be perpendicular to G<sup>2</sup>. The traces of the two tangent planes are therefore parallel.

# RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

SEPT. 22.

By W. H. MOORE.

|                                                                           |       |
|---------------------------------------------------------------------------|-------|
| Chelsea—Ground-rents of 322. 10s. a year, term 56 years.....              | £280  |
| Ground-rents of 374. 5s. a year, term 56 years.....                       | 1,650 |
| Peckham—Ground-rent of 102. 5s. a year, reversion in 74 years.....        | 230   |
| Ground-rent of 24. 5s. a year, reversion in 72 years.....                 | 475   |
| Camberwell—Ground-rent of 274. 5s. a year, reversion in 73 years.....     | 645   |
| Ground-rent of 182. 14s. a year, reversion in 68 years.....               | 470   |
| Ground-rent of 196. 3s. a year, reversion in 70 years.....                | 480   |
| Tottenham—Ground-rent of 251. 5s. a year, reversion in 83 years.....      | 580   |
| Upper Holloway—Ground-rent of 77. 10s. a year, reversion in 80 years..... | 175   |
| Kentish Town—Ground-rent of 761. 5s. a year, term 64 years.....           | 1,025 |
| Ground-rent of 261. 5s. a year, term 51 years.....                        | 476   |
| Ground-rent of 311. 5s. a year, reversion in 83 years.....                | 800   |
| Ground-rent of 304. 5s. a year, reversion in 80 years.....                | 730   |
| New Malden—Ground-rent of 394. 5s. a year, reversion in 84 years.....     | 800   |
| Norbiton—Ground-rent of 781. 5s. a year, reversion in 84 years.....       | 1,650 |
| Leicester-square, Little-street—Profit rental, 611. 2s. term 5 years..... | 200   |

SEPT. 23.

By LEMAN & CO.

|                                                                        |     |
|------------------------------------------------------------------------|-----|
| Euston-square—79, Drummond-street, 38 years, ground-rent 184. 18s..... | 400 |
|------------------------------------------------------------------------|-----|

By BAKER & WILKINSON.

|                                                                                                                                                                                                              |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Finchley—The Fallop Lodge Estate, with residence and 11s. 2r. 7p., freehold.....                                                                                                                             | 9,020 |
| Kennington—50, 51, and 51A, Walcut Tree-walk, and 18, 19, and 20, Richmond-street, and 1 and 2, Richmond-place, 32 years, ground-rent 501. 5s. Bethnal-green—1, Clarks-street, 51 years, ground-rent 34..... | 650   |
| Bromley—88, Bow Common-lane, and 1, Tidey-street, freehold.....                                                                                                                                              | 270   |
| St. George-in-East—27A, Commercial-street, 31 years, no ground-rent.....                                                                                                                                     | 650   |
| 65 and 67, Cornwall-street, 7 years, ground-rent 51. 3s.....                                                                                                                                                 | 550   |
| 16, Devonshire-street, 15 years, ground-rent 21. 10s.....                                                                                                                                                    | 45    |
| Bethnal-green—Improved ground-rent of 44. 14s. 6d., term 30 years.....                                                                                                                                       | 65    |

SEPT. 24.

By E. SIMMONS.

|                                                                       |       |
|-----------------------------------------------------------------------|-------|
| Brixton—13, Santley-street, 90 years, ground-rent 81. 8s.....         | 760   |
| King's-cross—34, Sydney-street, 57 years, ground-rent 44.....         | 310   |
| Kennington—34 to 40, Kennington Park-road, copyhold.....              | 5,220 |
| 1 to 4, Pleasant-row, copyhold.....                                   | 520   |
| Regent's Park—18, Little Edward-street, 51 years, ground-rent 54..... | 280   |
| Finchbury—2, Clifton-place, freehold.....                             | 430   |
| Stockwell—28 and 31, Aytoun-road, 90 years, ground-rent 181.....      | 600   |

By NEWBORN & HARDING.

|                                                                       |      |
|-----------------------------------------------------------------------|------|
| Kingland—21, Hayling-road, 87 years, ground-rent 51. 10s.....         | £250 |
| Conwall-road—1, Alfred-place, freehold.....                           | 635  |
| Leytonstone—A plot of freehold land.....                              | 765  |
| Hackney—77, King Edward's-road, 54 years, ground-rent 21. 2s. 8d..... | 455  |

By WALTON & LEE.

|                                                         |       |
|---------------------------------------------------------|-------|
| Bedford, near—Boston Leasow Farm, 191a. 1r. 33p., 2,600 |       |
| "The Guinea Inn" public-house, freehold.....            | 1,900 |
| Several cottages, and 4s. 2r. 2p.....                   | 550   |

SEPT. 25.

By DILLEY & SOX.

|                                                                                 |     |
|---------------------------------------------------------------------------------|-----|
| Norwood, Avenue-road—The residence "Sedge-mere," 89 years, ground-rent 121..... | 900 |
| By BLAIR, HADDOCK, & CARPENTER.                                                 |     |
| East Ham, Vicarage-lane—Freehold land, 3a. 3r. 15p.....                         | 480 |
| Hayes, Wood End-green—Freehold house and shop.....                              | 550 |
| Croydon—12, Lansdown-road, freehold.....                                        | 450 |

## MEETINGS.

SATURDAY, OCTOBER 3.

Architectural Association.—Excursion to Bisham Abbey and Great Marlow.

MONDAY, OCTOBER 5.

University College.—Professor Roger Smith on "Westminster Abbey." 3 p.m.  
Society of Engineers.—Mr. C. J. Light on "Opening Bridges on the Farnham Railway." 7.30 p.m.  
Clerks of Works' Association (31, Spring-gardens).—Mr. Grundy on "Electricity as Applicable to Domestic Purposes." 8 p.m.  
Royal Institute of the Architects of Ireland (Dublin).—Ordinary meeting.

FRIDAY, OCTOBER 9.

Architectural Association.—Opening Conversazione, at Galleries of the Institute of Painters in Water-Colours. 8 p.m.

## Miscellaneous.

**New South Wales at the Indian and Colonial Exhibition.**—One of the principal features of the New South Wales display will, says the Immigration Agent for New South Wales, be a large collection of photographs of the principal buildings, both public and private, of Sydney and the leading cities and towns of the colony. These will furnish a tolerably good idea of the social and industrial progress of the colony. "For instance, at Bourke, which but a few years ago was a place difficult of access from Sydney, with which place it is now connected by rail, there are to be found bank premises as spacious and substantially built as any in an English town. Photographic representations of New South Wales scenery will be abundant, and aid largely in dispelling many popular errors concerning the aspect of the antipodes, not a few of the localities possessing a beautiful rural appearance eminently suggestive of the English landscape. The frequency of broad verandahs and spacious balconies will tend to illustrate the sunny character of the climate, as will the wealth of floriculture displayed in the foregrounds of many of the villas and larger private residences. Not a few of the public school buildings in the colony are being photographed, and a collection of these will aid in indicating the manner in which the physical comfort of the school children is being attended to by the Department of Public Instruction."

**A New Portrait of Shakespeare.**—A paragraph has been "going the round of the papers" to the effect that a hitherto-unknown portrait of Shakespeare, taken when he was very ill, and probably very shortly before his death, has been discovered by Mr. E. Walford in a shop at the West End, and figures as a frontispiece to the current number of his *Antiquarian Magazine*. We mention it here chiefly to suggest that, if it be really genuine, and doubtless, its genuineness will be strictly questioned and canvassed,—its publication will set at rest the question raised last year as to the great poet's features and appearance, and render it less than ever necessary to carry out the suggestion of Dr. Ingleyby, that we should dig up the grave in the church of Stratford-on-Avon, in order to see what Shakespeare was like when he was in the flesh.

**Technical Carpentry.**—We hear that a Diploma of Honour has been awarded to an English mechanic, Mr. H. Staynes, a carpenter and joiner by trade, for his exhibit at the World's Exposition, at New Orleans, of diagram and models illustrating the principles of carpentry and joinery. Mr. Staynes was formerly a student in the Technical Carpentry and Joinery Classes at the Artisans' Institute in St. Martin's-lane, and is now the teacher of these classes in the Finsbury Technical College, and also of the Technical Carpentry and Joinery Classes in Croydon, supported by the Drapers' Company.



**Ecclesiastical Art Exhibition at Portsmouth.**—In connexion with the Church Congress, to be held at Portsmouth next week, there will be an exhibition of ecclesiastical art, including an interesting loan collection of 330 exhibits, embracing specimens of ancient and modern embroidery, wood carving, metal work, carved ivories, and other objects of interest to the lovers of Ecclesiastical Art. The Rev. J. C. Jackson's collection of ivories and hardwood carvings includes about fifty examples, ranging in date from the seventh to the seventeenth century. Silvermith's work is well represented, both by ancient and modern examples, and includes some specimens of church plate, lent by the clergy and churchwardens of several places in the diocese of Winchester. The Vicar of Sopley contributes a chalice of Tudor period, supposed to have been given to the parish by Queen Mary. A communion cup and cover, dated 1569, comes from Gresham, and the authorities of Portsmouth Parish Church lend a valuable collection of plate, one of the flagons having been presented "to the Church of Tangier" in 1672. The Chaplain of the Forces contributes a set of communion plate, given by Queen Anne to the Garrison Church.

**Useful Plant for Contractors.**—On Wednesday last we had an opportunity of inspecting, at the works of Messrs. Houghton Brown Bros., Kingsbury-road, Ball's Pond, a combined engine and mortar-mill, of a new and improved type, for contractors' use. The engine is horizontal, with 8½ in. cylinder and 12 in. stroke, steam jacketed, bolted down on a cast-iron bed-plate alongside of the boiler. It is fitted with a double wrought-iron crank shaft, of sufficient length to receive a driving-pulley on each end, so as to be capable of driving wood-working or other machinery when necessary. The engine is of 6-h.p. On the crank shaft is a bevel wheel, which gears direct on to the lagshaft of the mill, and can be readily thrown in or out of gear. The boiler is vertical, with three cross tubes, with all mountings and fittings covered with felt and mahogany lagging. The mill is of the manufacturers' well-known "A1" type, with 7 ft. pan, and the whole is mounted on a stout timber frame stiffened with wrought-iron flat plates up the sides and across the centre, carried on heavy cast-iron wheels, with axles, fore-carriage, and shafts complete. The whole arrangement is very convenient, and is likely to find much favour.

**The Metropolitan Board of Works.**—At the meeting of this Board, to be held this Friday, the 2nd of October, the Works and General Purposes Committee will present a report stating that the committee have fully considered the article in the *Times*, referred by the Board on the motion of the member for Fulham, and regret to find that some irregularities have occurred in the Dangerous Structures Department; that they find, however, no account has yet been delivered against either owner of the party-wall between Nos. 33 and 35, Lisson-street, and that, therefore, the charge of fraud is without foundation; that the committee have not entered upon an inquiry as to the alleged insanitary condition of the premises in question, the Vestry of St. Marylebone being the Sanitary Authority for the district.

**Geological Congress.**—According to the Berlin correspondent of the *Times*, the third International Congress of Geologists was opened, on the 29th ult., in the hall of the Reichstag by Professor Capellini, its last president at Bologna. The first Congress of the kind, which was held at Paris in 1878, had for its object the attainment of uniformity in the nomenclature of fossils and the colouring of maps; while the second meeting, which took place in 1881, approved a German proposal for the preparation of a geological map of Europe, and this is the subject which will mainly occupy the attention of the Congress during its present session.

**Repton School.**—The chapel attached to this well-known school has been lighted with gas, the whole of the fittings for which have been executed by Messrs. Jones & Willis, of Birmingham and London. They have been designed so as to be in character with the existing work, and, with the exception of the wall brackets, are of polished brass. The brackets are of iron, relieved with brass.

**Hospital Saturday Fund.**—The Council of this Fund have issued a circular reminding employers, foremen, and others, that the workshop collections are now due.

**The River Lea.**—The river is not in so bad a state now as it was, partly from the hot weather having passed away, and some rain fallen, but chiefly because the water companies have allowed one day's supply to pass into the Lea and the Navigation Cut. The effect of the polluted water being drawn off and fresh water being let in was very marked, a stream of clear water being first noticed in the centre, gradually extending to the banks, so that no unpleasant smell was given off, and boats again appeared on the river after the flushing was completed. This result clearly shows that, if the Legislature had not authorised the water companies to take nearly all the water of the river for supplying the East of London with drinking water, the river would not have been in an injurious state, despite the large quantity of very imperfectly treated sewage which the Tottenham Board have discharged into it. As, however, the water is absolutely necessary for the wants of the East and North-east of London, and no other source of supply is available, whilst the storage of the companies has been largely drawn upon, it is quite evident that water for repeated flushing cannot be obtained; and as the Tottenham drainage cannot be stopped, the nuisance must speedily occur again unless a large rainfall and cold weather occur.

#### —Sanitary Record.

**The Whitening of Walls.**—The *Deutsche Bauzeitung* has lately commented upon the dangers resulting from the use of certain substances in whitening walls, as well as from the size and other compositions used in paper-hanging, &c. From the fact that painters' brushes are injured by lime freshly slaked, they often mix with it organic substances, which are liable, it is considered, to cause infection. The same remarks are applied in a general way to paperhangers. These disadvantages can, it is said, be obviated by adding one-tenth of a pound of boric acid to each gallon of ordinary milk of lime. This addition has the advantage of preventing the appearance of stains when paper or size-colours are applied to walls not sufficiently dry. In cases of disinfection it is necessary for special care to be exercised as to the purity of the lime used.

**Brighton.**—A new memorial window has been placed in St. Mary's Church, designed and executed by Messrs. Alfred O. Hemming & Co. It is a large one, situated on the east side of the nave, and contains the subjects of the Sermon on the Mount surmounted by canopies of the fourteenth-century period, under which are standing figures of St. Philip, St. Bartholomew, St. Thomas, and St. Matthew. Above, in the large piece of tracery, is the subject of the Salutation of St. Mary and St. Elizabeth. The inscription is as follows:—"To the glory of God, and in loving memory of Susannah Burman, late of Arlington House, Brighton, who died 21 Oct., 1884. This window has been erected by many of her former pupils as a tribute of their affection, 1885."

**Putney Bridge.**—This fine granite bridge, of which we published a description and facsimiles of several of the working drawings on the 3rd of January last, is now fast approaching completion. The whole of the masonry of the arches is in place, and the upper surfaces of the arches and of the piers at a little above springing level have been covered with Claridge's asphalt prior to the formation of the roadway. The asphaltic work, of which there are about 53,000 square feet on the job, has been very creditably done.

**Working Lads' Institute, Whitechapel.** The Princess of Wales has promised to visit and open the new Working Lads' Institute, Whitechapel-road, E., and has appointed Saturday, the 31st of October, for the ceremony. It will provide accommodation for 1,000 working lads. The total cost, including freehold land, fittings, furniture, &c., is 12,000*l*.

**Breweries.**—The publication of a work on "Malt and Malting," by Mr. H. Stopes, is announced, which includes chapters on construction of buildings, capacity and cost, tools and materials, &c., which may be of use to architects who may have to deal with this class of structure. It is published at the *Brewers' Journal Office*.

**Death of Mr. F. W. Ordish, F.R.I.B.A.** We regret to record the death of Mr. Frederick Webster Ordish, F.R.I.B.A., of Quenborough Old Hall, near Leicester. He was killed through alighting from a train in motion at Syston Station one right last week. He was in his sixty-fourth year.

**New Buildings for the "Salvation Army."**—The foundation-stones of a "Head-quarters" and public hall for the "Salvation Army" in Toronto, Canada, were laid a few days ago. The building is designed in the Tudor Gothic style. Seating accommodation has been provided in the hall for 4,000 persons. The estimated cost is 5,500*l*. Mr. E. J. Sherwood, of 101, Queen Victoria-street, London, E.C., is the architect. "Barracks" for the use of the "Army" in this country are about to be erected at Batley, Great Horton (near Bradford), Beverley, Hendon, and New Barnet. The total cost of these will be 5,260*l*. Seating accommodation will be provided for 5,700 persons. Mr. E. J. Sherwood is also the architect of these buildings.

**The Builders' Accident Insurance (Limited).**—The registered offices of this company have been removed to 31 and 32, Bedford-street, Strand, W.C.

#### PRICES CURRENT OF MATERIALS.

| TIMBER.                                  |          | L. s. d. | L. s. d. |
|------------------------------------------|----------|----------|----------|
| Greenheart, B.G.                         | ton      | 6 10 0   | 7 10 0   |
| Test, E.I.                               | load     | 13 10 0  | 15 10 0  |
| Sequoia, U.S.                            | ft. cube | 0 2 6    | 0 2 9    |
| Ash, Canada                              | load     | 3 0 0    | 5 0 0    |
| Birch                                    | load     | 3 0 0    | 4 10 0   |
| Elm                                      | load     | 3 10 0   | 5 0 0    |
| Fir, Dantia, &c.                         | load     | 1 10 0   | 4 10 0   |
| Canada                                   | load     | 3 0 0    | 5 0 0    |
| Pine                                     | load     | 3 0 0    | 4 0 0    |
| " yellow                                 | load     | 3 15 0   | 5 5 0    |
| Lath, Dantia                             | fathom   | 5 0 0    | 6 0 0    |
| St. Petersburg                           | load     | 7 0 0    | 8 10 0   |
| Waincoat, Riga                           | log      | 3 0 0    | 4 10 0   |
| Deals, Finland, 2nd and 1st              | std. 100 | 8 0 0    | 9 0 0    |
| " 4th and 3rd                            | std.     | 6 10 0   | 7 10 0   |
| Riga                                     | std.     | 7 0 0    | 8 10 0   |
| St. Petersburg, 1st yal.                 | std.     | 10 0 0   | 17 0 0   |
| " 2nd                                    | std.     | 8 0 0    | 9 15 0   |
| " white                                  | std.     | 6 10 0   | 11 0 0   |
| Sweden                                   | std.     | 12 0 0   | 17 0 0   |
| White Sea                                | std.     | 8 10 0   | 19 0 0   |
| Canada, Pine 1st                         | std.     | 18 0 0   | 32 10 0  |
| " 2nd                                    | std.     | 13 0 0   | 18 10 0  |
| " 3rd                                    | std.     | 7 0 0    | 10 10 0  |
| " Spruce 1st                             | std.     | 9 0 0    | 12 0 0   |
| " 3rd and 2nd                            | std.     | 6 10 0   | 8 0 0    |
| New Brunswick, &c.                       | std.     | 7 0 0    | 12 0 0   |
| Battens, all kinds                       | std.     | 4 0 0    | 13 0 0   |
| Flooring Boards, sq. 1 in.—Parsed, first | std.     | 0 9 0    | 0 13 0   |
| Second                                   | std.     | 0 7 6    | 0 10 0   |
| Other qualities                          | std.     | 0 5 0    | 0 7 0    |
| Cedar, Cuba                              | foot     | 0 0 9    | 0 0 4    |
| Honduras, &c.                            | std.     | 0 0 3    | 0 0 4    |
| Antialia                                 | std.     | 0 0 3    | 0 0 4    |
| Mahogany, Cuba                           | std.     | 0 0 5    | 0 0 8    |
| St. Domingo cargo                        | std.     | 0 0 6    | 0 0 7    |
| Mexican                                  | std.     | 0 0 4    | 0 0 5    |
| Tobacco                                  | std.     | 0 0 4    | 0 0 5    |
| Honduras                                 | std.     | 0 0 4    | 0 0 5    |
| Rose, Rio                                | ton      | 7 0 0    | 17 0 0   |
| Bahia                                    | std.     | 6 0 0    | 15 0 0   |
| Satin, St. Domingo                       | ft.      | 0 0 8    | 0 1 0    |
| Porto Rico                               | std.     | 0 0 8    | 0 1 5    |
| Walnut, Italian                          | std.     | 0 0 4    | 0 0 5    |
| METALS.                                  |          | L. s. d. | L. s. d. |
| Iron—Pig in Scotland                     | ton      | 2 1 6    | 0 0 0    |
| Bar, Welsh, in London                    | std.     | 4 15 0   | 5 2 6    |
| " " in Wales                             | std.     | 4 7 6    | 4 12 6   |
| Sheets, strong, London                   | std.     | 7 0 0    | 7 2 6    |
| Sheets, single, in London                | std.     | 7 10 0   | 9 0 0    |
| Hoops                                    | std.     | 6 10 0   | 7 10 0   |
| Nail-roads                               | std.     | 6 0 0    | 7 0 0    |
| COPIES.                                  |          | L. s. d. | L. s. d. |
| British, cke, and ingt.                  | ton      | 44 0 0   | 48 0 0   |
| Best selected                            | ton      | 46 0 0   | 47 0 0   |
| Sheets, strong                           | ton      | 54 0 0   | 0 0 0    |
| " India                                  | ton      | 51 0 0   | 53 0 0   |
| Australian, fine cast.                   | ton      | 0 0 0    | 0 0 0    |
| Chili, bars                              | ton      | 40 12 6  | 41 15 0  |
| YELLOW METAL                             | lb.      | 0 0 4    | 0 0 4    |
| Lead—Pig, Spanish                        | std.     | 11 5 0   | 0 0 0    |
| English, com. brands                     | std.     | 11 12 6  | 0 0 0    |
| SPRINGS.                                 |          | L. s. d. | L. s. d. |
| Silicon, special                         | ton      | 14 10 0  | 14 12 6  |
| Ordinary brands                          | ton      | 14 7 6   | 14 10 0  |
| TIN.                                     |          | L. s. d. | L. s. d. |
| Straits                                  | std.     | 91 15 0  | 92 5 0   |
| Australian                               | std.     | 91 17 6  | 92 17 6  |
| English ingots                           | std.     | 93 0 0   | 0 0 0    |
| TINPLATES.                               |          | L. s. d. | L. s. d. |
| IC coke                                  | box      | 14 8 0   | 16 8 0   |
| IX ditto                                 | std.     | 21 0 0   | 25 0 0   |
| IC charcoal                              | std.     | 17 0 0   | 20 0 0   |
| IX ditto                                 | std.     | 26 0 0   | 27 0 0   |
| OILS.                                    |          | L. s. d. | L. s. d. |
| Linseed                                  | ton      | 23 5 0   | 23 15 0  |
| Cocanut, Ceylon                          | std.     | 31 0 0   | 32 0 0   |
| Ceylon                                   | std.     | 27 0 0   | 28 0 0   |
| Copra                                    | std.     | 26 0 0   | 26 10 0  |
| Palm, Lagos                              | std.     | 30 0 0   | 0 0 0    |
| Palm-kernel                              | std.     | 26 5 0   | 0 0 0    |
| Rapeseed, English pale                   | std.     | 25 15 0  | 0 0 0    |
| " brown                                  | std.     | 23 15 0  | 0 0 0    |
| Cottonseed, refined                      | std.     | 21 5 0   | 23 0 0   |
| Tallow and Oleine                        | std.     | 25 0 0   | 45 0 0   |
| Lubricating, U.S.                        | std.     | 7 0 0    | 10 0 0   |
| " Refined                                | std.     | 8 0 0    | 15 0 0   |
| TURBINES.                                |          | L. s. d. | L. s. d. |
| American, in chs.                        | std.     | 1 5 0    | 1 5 6    |
| Tur—Stockholm                            | std.     | 0 19 6   | 1 0 0    |
| Archangel                                | std.     | 0 11 6   | 0 12 0   |



CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

| Nature of Work, or Materials.          | By whom required.          | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|----------------------------------------|----------------------------|-----------------------------------|--------------------------|-------|
| ite and Stone.....                     | Aldershot Local Board      | W. I. Coulson.....                | October 5th              | xiv.  |
| ng Bricks.....                         | Worthing Local Board       | Official.....                     | do.                      | ii.   |
| ing, Tar-Paving, Metalling, &c.        | Lewisham Bnd. of Wks.      | do.                               | October 6th              | ii.   |
| ile Carriageway Paving.....            | Par. St. John, Hampstead   | C. H. Lowe.....                   | October 7th              | xiv.  |
| nel and Schools, Norbiton              | Rev. A. Ward.....          | do.                               | October 5th              | ii.   |
| & Sower.....                           | Vestry of St. James's,     | Official.....                     | do.                      | ii.   |
| ght-Iron Pier & Landing Stage, Fulham  | Westminster.....           | J. W. Pegg.....                   | October 12th             | ii.   |
| ring, Kerbing, &c., of Streets.....    | Met. Asylums Board         | C. G. Lawson.....                 | do.                      | ii.   |
| irs to Footbridges, &c.                | Southgate Local Board      | do.                               | October 13th             | ii.   |
| ng Footways and Making-up Roadways...  | Vestry St. Mary Abbots,    | W. Weaver.....                    | October 14th             | ii.   |
| rgement, Southampton Post-Office.....  | Greenwich Bd. of Wks.      | Official.....                     | do.                      | ii.   |
| chwork, &c.....                        | Com. of H.M. Works         | do.                               | October 16th             | ii.   |
| enware Pipe-Sewer.....                 | Bristol Waterworks Co.     | J. Taylor & Sons.....             | October 17th             | ii.   |
| on Guernsey Granite.....               | Nilton Improv. Com.        | F. J. Rumble.....                 | October 17th             | ii.   |
| nge Works.....                         | Ramsgate Town Council      | H. W. Clarke.....                 | October 20th             | ii.   |
| h Sewer, &c.....                       | Leicester Corporation..... | W. C. Barley.....                 | do.                      | xiv.  |
| rote Sea-Wall and Promenade.....       | Com. of H.M. Works         | J. Gordon.....                    | October 22nd             | ii.   |
| age Reservoir.....                     | Hartlepool Corporation     | Official.....                     | October 24th             | ii.   |
| & Woodwork for Pier, Le-on-the-Solent  | Cardiff Corporation.....   | J. A. B. Williams.....            | October 29th             | ii.   |
| don to Benhall Lodge, Bournemouth..... | do.                        | E. A. Robinson.....               | Dec. 5th                 | ii.   |
|                                        |                            | H. Hall.....                      | Not stated               | ii.   |

PUBLIC APPOINTMENTS.

| Nature of Appointment.        | By whom Advertised.       | Salary.    | Applications to be in. | Page.  |
|-------------------------------|---------------------------|------------|------------------------|--------|
| eyor.....                     | Plumstead Bd. of Wks.     | 250l.      | October 5th            | xviii. |
| rch Surveyor.....             | Booth-le-mun-Linacre Cor. | 300l.      | October 13th           | xviii. |
| ty Surveyorship, Ireland..... | Civil Service Com.        | Not stated | October 23rd           | xviii. |

TENDERS.

|                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ARNET (Herts).—For the erection of "Salvation Army Barracks," Albert-road, Barnet, Herts, for "General" th. Mr. E. J. Sherwood, architect and surveyor, on Victoria-street. Quantities by the architect:—<br>E. Hunter, New Barnet.....£1,250 0 0<br>F. Butcher, New Barnet.....1,287 14 0<br>J. Ellwood, New Barnet.....1,145 0 0<br>J. F. Coxhead, Leytonstone.....1,023 0 0<br>G. Daniels, New Barnet (accepted).....788 4 3 | CLAPHAM.—For new schools, Hackford-road, Clapham, for the London School Board. Mr. T. J. Bailey, architect:—<br>F. Sargeant.....£11,795 0 0<br>C. W. Reading.....11,494 0 0<br>S. J. Jerrard.....11,401 0 0<br>Turtle & Appleton.....11,189 0 0<br>A. Oliver.....11,177 0 0<br>W. Shepherd.....11,171 0 0<br>Atherton & Latta.....11,093 0 0<br>W. Tongue.....11,050 0 0<br>F. & F. J. Wood.....10,980 0 0<br>Lasky Bros.....10,897 0 0<br>J. Marland.....10,891 0 0<br>J. Grover & Son.....10,954 0 0<br>Wall Bros.....10,928 0 0<br>W. Wall.....10,899 0 0<br>C. Cox.....10,884 0 0<br>Holloway Bros.....10,863 0 0<br>H. L. Holloway.....10,787 0 0<br>W. Sherrin.....10,780 0 0<br>W. & F. Croaker.....10,727 0 0<br>W. Downs.....10,630 0 0<br>Stimpson & Co.....10,570 0 0<br>J. Holloway.....10,550 0 0<br>Kirk & Randall.....10,615 0 0<br>W. Johnson.....10,470 0 0<br>S. J. Jerrard.....10,370 0 0<br>E. C. Howell & Son.....10,275 0 0<br>H. Hart.....10,219 0 0 | ATLEY (Yorks).—For the erection of "Salvation Army Barracks," Branch-road, Bailey, Yorkshire, for "General" Booth. Mr. E. J. Sherwood, architect and surveyor. Quantities by the architect:—<br>Broscup & Son, Cross-lane, Great Horton.....£1,690 0 0<br>Garthwaite & Blackburn, Dewsbury.....1,549 5 0<br>I. F. Coxhead, Leytonstone, Essex.....1,438 0 0<br>Chadwick & Sons, Staincliffe.....1,430 0 0<br>* Accepted. | HASTINGS.—For the second part of additions to Laurel Lodge, for Mr. William Stubbs. Mr. A. Hessel Tiltman, architect, John-street, Bedford-row:—<br>H. Ditch.....£1,623 10 0<br>Howell & Son.....1,570 0 0<br>C. Hughes.....1,390 10 0<br>W. Rodda.....1,375 0 0<br>J. & P. Phillips (accepted).....1,285 0 0 | VERLEY (Yorks).—For the erection of "Salvation Army Barracks," Wilbert-lane, Beverley, Yorkshire, for "General" Booth. Mr. E. J. Sherwood, architect and surveyor. Quantities by the architect:—<br>W. Barnes, Hull.....£1,162 0 0<br>G. West, Beverley.....1,141 19 3<br>F. J. Coxhead, Leytonstone.....1,128 0 0<br>G. & H. Pape, Beverley.....1,125 0 0<br>J. Barnes, Beverley.....1,089 0 0<br>Bastiman Bros., Kilham, Driffield.....1,069 0 0<br>J. Constable, Beverley.....1,069 0 0<br>F. Blackburn, Hull.....1,031 0 0<br>H. Greenlaw, Beverley.....693 0 0<br>* Accepted with additional gallery included. | HENDON (Middlesex).—For the erection of "Salvation Army Barracks," Brent-street, Hendon, for "General" Booth. Mr. E. J. Sherwood, architect and surveyor. Quantities by the architect:—<br>J. Eliscott, Hendon.....£756 0 0 for Allowed<br>J. E. Coxhead, Leytonstone.....731 0 0 for 263 0 0<br>W. Toul, Hendon.....693 0 0 for 70 0 0 | ISLINGTON.—For new schools, Buckingham-street, Calcutt-road, for the London School Board. Mr. T. J. Bailey, architect:—<br>J. Goodman.....£13,699 0 0<br>Perry & Co.....13,320 0 0<br>J. Grover & Son.....13,185 0 0<br>C. Cox.....12,940 0 0<br>W. Brass & Son.....12,828 0 0<br>Atherton & Latta.....12,663 0 0<br>W. Sherrin.....12,663 0 0<br>C. Wall.....12,620 0 0<br>Wall Bros.....12,613 0 0<br>Stimpson & Co.....12,468 0 0<br>W. Oldrey.....12,432 0 0<br>W. Shurmutt.....12,393 0 0<br>S. J. Jerrard.....12,279 0 0<br>E. C. Howell & Son.....12,210 0 0 | RENFLEY (Surrey).—For the erection of stables to "Kilnura," for Mr. W. H. Mortimer. Mr. Herbert D. Appleton, architect, Wool Exchange:—<br>Williams.....£549 0 0<br>Taylor.....468 0 0 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

KINGSLAND.—For the erection of warehouse and stabling and two houses and shops, at Kingland-green, for Mr. George Carter. Mr. Chas. R. Winter, architect:—  
J. K. Hunt.....£2,820 0 0  
Steel Bros.....2,790 0 0  
Castle & Son.....2,780 0 0  
Jackson & Todd.....2,608 0 0  
Hayworth & Sons.....2,624 0 0  
J. Anley.....2,588 0 0  
Stevens Bros.....2,440 0 0  
M. Manley.....2,437 0 0  
Garrud (accepted).....2,131 0 0

LAMBETH.—For rebuilding factory for Messrs. Doulton & Co., Lambeth:—  
Chas. Dickinson.....£8,300 0 0  
J. T. Chappell.....5,946 0 0  
Stevens & Bastow.....5,499 0 0  
J. Clemence.....5,195 0 0  
J. Mortar.....4,840 0 0  
Wm. Smith.....4,913 0 0  
Higgs & Hill.....4,750 0 0  
J. & J. Greenwood.....4,553 0 0

LEIGH (Essex).—For the erection of cottage at Leigh, Essex, for Mr. S. S. Tomlin. Mr. Edmund J. Bennett, architect, Gravesend:—  
Woodhams, Southend (accepted).....£215 0 0

LIMEHOUSE.—For new schools, Gill-street, Limehouse, for the London School Board. Mr. T. J. Bailey, architect:—  
F. Sargeant.....£11,530 0 0  
J. Holloway.....11,086 0 0  
F. & F. J. Wood.....10,837 0 0  
Holloway Bros.....10,829 0 0  
J. Grover & Son.....10,797 0 0  
W. Oldrey.....10,796 0 0  
H. L. Holloway.....10,673 0 0  
Perry & Co., London.....10,469 0 0  
Harris & Wardrop.....10,467 0 0  
Howell & Son.....10,477 0 0  
Wall Bros.....10,387 0 0  
C. Cox.....10,366 0 0  
Kirk & Randall.....10,312 0 0  
Atherton & Latta.....10,300 0 0  
S. J. Jerrard.....10,289 0 0  
C. Wall.....10,246 0 0  
Stimpson & Co.....10,290 0 0  
W. Shurmutt.....9,882 0 0

LONDON.—For the erection of new warehouse and offices, Leman-street, London. Mr. James F. Goodey, architect, Colchester. Quantities by Mr. W. Strudwick, 14, Parliament-street, London:—  
A. Kimberley, Banbury.....£33,437 0 0  
Grimwood & Sons, Sudbury.....32,217 0 0  
H. Lovatt, Wolverhampton.....32,027 0 0  
B. Nightingale, Lambeth.....31,653 0 0  
Colls & Sons, London.....31,400 0 0  
G. Shaw, Westminster.....30,900 0 0  
Perry & Co., London.....30,829 0 0  
Brown, Son, & Blomfield, London.....30,190 0 0  
J. T. Chappell, London.....29,883 0 0  
Stimpson & Co., London.....29,860 0 0  
Higgs & Hill, London.....29,740 0 0  
Mowlem & Co., London.....29,585 0 0  
Kirk & Randall, Woolwich.....29,433 0 0  
Morton, London.....28,800 0 0  
J. Greenwood, London.....28,692 0 0  
Clark & Bracey, London.....28,581 0 0  
Brass & Co., London.....27,777 0 0  
Martin, Wells, & Co., Aldershot.....26,771 0 0  
\* Accepted.

LONDON.—For workshops at rear of "Derby Houses," Great Eastern-street. Mr. E. Evans Cronk, architect:—  
Lidstone & Son.....£2,320 0 0  
Thomas & Tremaine.....820 0 0  
Lancelotti & Co.....289 10 0  
W. Shurmutt.....288 0 0  
W. Coleman.....270 0 0

LONDON.—For alterations, &c., to the "Horn of Plenty," Globe-road:—  
R. Marr.....£1,510 0 0  
F. & F. J. Wood.....1,500 0 0  
J. Walker.....1,493 0 0  
J. Anley.....1,368 0 0  
W. Shurmutt.....1,368 0 0  
J. R. Hunt.....1,280 0 0  
S. W. Hawkins.....1,196 0 0

LONDON.—For the erection of new offices, with additional stables, &c., for the London Parcel Delivery Company (Limited), at Rolls-buildings, Fetter-lane. Mr. W. Seckham Witherington, architect, Mark-lane. Quantities by Mr. Edw. J. Thomas:—  
Rider.....£5,899 0 0  
Boyes.....5,930 0 0  
Kearley.....5,695 0 0  
Ekinston.....5,559 0 0  
Colls & Son.....5,445 0 0  
Lacke.....5,369 0 0  
Shepherd.....5,250 0 0  
Patman & Fotheringham (accepted).....5,193 0 0  
[Architect's estimate, 5,340l.]

LONDON.—For work at 62, New Broad-street, for Messrs. Hanbury & Co. Messrs. W. E. Williams & Sons, architects:—  
Little.....£125 0 0  
Marr.....115 0 0  
Jackson & Todd (accepted).....114 10 0

LONDON.—For new wing to St. Helen's Vicarage, St. Quintin Park, Notting-hill, for the Rev. A. Dalgarano Robinson, M.A. Mr. A. Hessel Tiltman, architect:—  
Stevens Bros.....£460 0 0  
McCormick & Son.....629 10 0  
Mattock Bros.....615 0 0  
P. Tincham.....613 0 0  
E. Kerry & Son.....600 0 0  
S. E. Lambie (accepted).....579 0 0

LONDON.—For the erection of Scavengers' Depot at Stoney-lane and New-street, Petticoat-square, for the Honourable the Commissioners of Sewers of the City of London. Mr. William Haywood, engineer:—

|                                 |            |
|---------------------------------|------------|
| Dover                           | 25,000 0 0 |
| Cook                            | 1,990 0 0  |
| Robson                          | 1,916 0 0  |
| Wright                          | 1,930 0 0  |
| Wood                            | 1,738 0 0  |
| Buller                          | 1,675 0 0  |
| H. B. Little                    | 1,813 0 0  |
| Wilkinson                       | 1,637 0 0  |
| Cotterell                       | 1,632 0 0  |
| Neave                           | 1,600 0 0  |
| Braid                           | 1,505 0 0  |
| Gentry                          | 1,550 0 0  |
| Mowlem & Co.                    | 1,138 0 0  |
| Leslie                          | 1,473 0 0  |
| H. R. Hunt                      | 1,370 0 0  |
| Martin (accepted conditionally) | 1,395 0 0  |

LONDON.—For sanitary works at 45, York-terrace, Regent's Park. Mr. Thos. Durran, surveyor:—

|                            |          |
|----------------------------|----------|
| North British Plumbing Co. | £445 0 0 |
| Andrews                    | 332 0 0  |
| The House Sanitation Co.   | 289 10 0 |
| E. K. Wilson (accepted)    | 285 10 0 |

LONDON.—For alterations at the "Bird-in-Hand" public house, Box-road, for Mr. Hyams. Mr. Edward Brown, architect, Hanbury-street, Spitalfields:—

|                          |         |
|--------------------------|---------|
| S. Salt                  | 449 0 0 |
| Jackson & Todd           | 492 0 0 |
| C. Marr                  | 483 0 0 |
| M. A. Palmer & Co.       | 480 0 0 |
| S. W. Hawkins (accepted) | 464 0 0 |

*Painter's Work.*

|                      |         |
|----------------------|---------|
| E. Pringle           | £82 0 0 |
| J. Thompson          | 88 16 0 |
| W. Padden (accepted) | 71 17 0 |

LONDON.—For the erection of additional stables at Tottenham Dale, for the London General Omnibus Company (Limited), under the superintendence of Mr. Lanham. Quantities by Mr. A. J. Bolton:—

|                    |            |
|--------------------|------------|
| Norris & Luke      | £1,642 0 0 |
| Roberts            | 1,141 0 0  |
| Scarbrough         | 1,127 0 0  |
| Evans              | 1,738 0 0  |
| Deering & Son      | 1,083 0 0  |
| Richards & Mount   | 962 0 0    |
| North Bros.        | 960 0 0    |
| Alldridge & Jenney | 977 0 0    |
| Haynes             | 975 0 0    |
| Parker             | 958 0 0    |
| Garrud             | 937 16 0   |
| Hunt               | 877 0 0    |
| Knight             | 875 0 0    |

LONDON.—For works in connexion with the formation of kitchen offices at Lancaster House, Savoy, for the Savoy Club. Mr. Walter J. Ebbetts, architect, Savoy House, Strand:—

|           |          |
|-----------|----------|
| H. Baylis | £135 0 0 |
|-----------|----------|

LONDON.—For painting and other works at Malden Factory, Malden-crescent, Kentish Town, for Mr. F. W. Rowney. Mr. Walter J. Ebbetts, architect:—

|               |          |
|---------------|----------|
| Robt. Perkins | £185 0 0 |
|---------------|----------|

LONDON.—For alterations and repairs to houses 43 and 44, Camden-square, for Mr. Matthews. Mr. Edmund J. Bennett, architect:—

|                          |          |
|--------------------------|----------|
| Gould & Brand (accepted) | £475 0 0 |
|--------------------------|----------|

MARYLEBONE.—For enlargement of schools, Henry-street, Marylebone, for the London School Board. Mr. T. J. Bailey, architect:—

|                    |             |
|--------------------|-------------|
| F. S. Grant        | £12,569 0 0 |
| Turtle & Appleton  | 12,245 0 0  |
| J. Holloway        | 11,950 0 0  |
| Servener & Co.     | 11,921 0 0  |
| Kirk & Randall     | 11,446 0 0  |
| W. Shurmer         | 11,259 0 0  |
| E. C. Howell & Son | 11,163 0 0  |
| J. Grover & Son    | 11,149 0 0  |
| S. J. Jerrard      | 10,992 0 0  |
| W. Oldrey          | 10,876 0 0  |
| Simpson & Co.      | 10,830 0 0  |
| W. Johnson         | 10,776 0 0  |
| Wall Bros.         | 10,711 0 0  |

PORTSMOUTH.—For new sewerage works and pumping station at Stanshaw, near Portsmouth. Mr. H. Percy Boulton, M. Inst. C.E., engineer. Quantities supplied by Mr. H. H. Foster:—

|               |             |
|---------------|-------------|
| Gilless & Co. | £7,381 5 7  |
| J. Jackson    | 7,255 0 0   |
| W. Ward       | 6,777 0 0   |
| J. Mackay     | 6,299 16 10 |
| T. B. Hayter  | 5,681 0 0   |
| T. B. Hall    | 5,427 19 6  |

SPITALFIELDS.—For alterations to "Bull's Head," Hanbury-street, Spitalfields, for Messrs. Truman, Hanbury, & Buxton. Messrs. W. E. Williams & Sons, architects:—

|                |          |
|----------------|----------|
| Jackson & Todd | £285 0 0 |
| Staines & Son  | £276 0 0 |
| Marr           | 885 0 0  |

WALLINGTON (Surrey).—For the erection of oak fence, for Mr. J. Gibbs. Mr. Herbert D. Appiston, architect:—

|         |                 |
|---------|-----------------|
| Tribo   | £2 8 0 per rod. |
| Rowland | 2 4 0 "         |
| Cartis  | 2 1 0 "         |

Additional Works at Royal Surrey County Hospital, Guildford.—Messrs. Johnstone, Norman, & Co., of 67, New Bond-street, write to say that in the list of tenders for these works published on p. 445 of the 29th inst. the name of their firm was erroneously given as "Johnstone & Co." We printed the list in the form in which it was received.

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our Office, 45, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

TO CORRESPONDENTS.

J. R. E. M. B. (photograph received).—L. M. R. E. S. R.—"Curious" they are just as of law on which we cannot take the responsibility of advising. Consult a lawyer.—C. G. J. B.—J. G. H.—B. G. W. R. L.

All statements of fact, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessary for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications. Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

PUBLISHER'S NOTICES.

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPOINTMENTS, TRADE, AND GENERAL ADVERTISEMENTS. Six lines (about fifty words) or under..... 4s. 6d. Each additional line (about ten words)..... 6d. Terms for Series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sale by Auction, &c., may be obtained on application to the Publisher.

FOUR LINES (about thirty words) or under..... 2s. 6d. Each additional line (about ten words)..... 6d. PERMANENT IS ABSOLUTELY NECESSARY.

\* \* \* \* \* Blanks must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. 4.

DOUGLAS FOURDRINER, Publisher. Addressed to No. 45, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c., left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE must reach the Office before TEN o'clock on WEDNESDAY morning.

PERSONS Advertising in "The Builder," may have Replies addressed to the Office, 45, Catherine-street, W.C., free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is a limited number from the Office to residents in any part of the United Kingdom at the rate of 12s. per annum PREPAID. To all parts of Europe and America, 20s. per annum. To India, China, Ceylon, &c., 25s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 45, Catherine-street, W.C.

Best Bath Stone.  
WESTWOOD GROUND,  
Box Ground, Combe Down,  
Coram Down, And Farleigh Down.  
BANDELL, SAUNDERS & CO., Limited,  
Coram, Wilts. [Advt.]

Bath Stone.  
ALL DESCRIPTIONS OF BEST QUALITY  
PICTOR & SONS,  
BOX, WILTS. [Advt.]

Doubling Freestone and Ham Hill Stone of best quality, in blocks, or prepared ready for fixing. An inspection of the Doubling Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stones. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [Advt.]

Doubling Free Stone For prices, &c., address S. & J. STAPLE, HAM HILL STONE, Quarry Owners, Stone and Lime Merchants, BLUE LIAS LIME Stoke - under - Ham, Ilminster. [Advt.] (Ground or Lamp).

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tin-rooms, and terraces. [Advt.]

Asphalte. Seyssel, Patent Metallic Lava, and White Asphaltes. M. STODART & CO. Office: No. 90, Cannon-street, E.C. [Advt.]

EVERY DESCRIPTION OF SEASONED WOODS AND VENEERS IN EXTENSIVE QUANTITIES.

B. J. HUDSON & SONS, Whitfield-street, W. Store-street, W.C., and Great Peter-street, S.W., London. Telephone No. 3,654, and Private Wire connecting Business Premises.

Chas. J. Wade & Co. TIMBER MERCHANTS (Late of the Firm of Messrs. HUDSON & CO.) No. 153, LEADENHALL-STREET, E.C. [Advt.]

MICHELMORE & REAP. Manufacturers of

CHARLES COLLINGS' PATENT.

COLLINGS' PATENT HINGES, LEVER, SCREW, & BARREL BOLTS. Self-Acting "FALL DOWN" GATE STOPS, and IMPROVED GATE FITTINGS of every Description.

36A, BOROUGH ROAD, LONDON, S.E. [Advt.]

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DRAWINGS AND PRICES ON APPLICATION.

— MODELS AND SECTIONS ON VIEW. —

LONDON: 356 to 362, EUSTON ROAD. LIVERPOOL: 6 and 8, HATTON GARDEN. GLASGOW: 335, ARGYLE STREET.



# The Builder.

Vol. XLIX. No. 227.

SATURDAY, OCTOBER 10, 1886.

## ILLUSTRATIONS.

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### The Roman Villa at Bignor.

THE republication of the work on the remains of the Roman villa at Bignor, in Sussex,\* written by the late Samuel Lysons, would have been opportunely timed, even if no attempt at the reproduction of the illustrations which were then published on a large scale had been made; for, in the opinion of several archaeologists who attended the recent Congress of the British Archaeological Association held at Brighton, the villa at Bignor was one of the principal features of that meeting. But the publishers of the re-issue of Mr. Lysons's atlas have had a plan prepared, and several of the most important of the mosaic pavements drawn afresh from the pavements and noted in chromolithography: hence these features lend additional interest to the work and make it doubly valuable as a contribution to the works already extant relating to Roman antiquities in Britain. Some of our readers will recall to memory an account of the ancient Mosaic Pavements in the British Museum, printed in the *Builder*, June 24, 1882, vol. xlii., No. 2,055, p. 757, and it will be interesting at the present moment to give an account of the pavements at Bignor by way of further illustrating the subjects then under consideration.

The first discovery of the Bignor villa was made in July, 1811, when in a field, known as "Berry," about a quarter of a mile to the west of the old church, a mosaic pavement was discovered during the process of ploughing. This was then in the occupation of Mr. George Tupper, and it still remains in the possession of Mr. Tupper's family, to whose care the present condition of the ancient remains are entrusted. The name Berry is probably a corruption of Bury, signifying a place where some kind of local government was transacted, and this instance it may, in all probability, be an Anglo-Saxon equivalent of a British word of similar signification, derived, in its turn, from the Romano-British uses to which the villa itself had been at the first applied. But this we shall say more presently. On the discovery being made, the superincumbent earth was removed, and at a depth, varying from 1 ft. to 2 ft., a tessellated pavement of

considerable dimensions was revealed (see a plan). The general design, as Mr. Lysons records, was in good taste, and the various figures better executed than any before discovered in similar remains in this island. The pavement itself consists of two circular vignettes inscribed in squares, the first having a diameter of 7 ft. 6 in. and the second the large dimensions of 16 ft. The first of these has been very faithfully reproduced in chromolithography by the publishers of the present work, and is apparently a very successful example of the application of the chromolithographic art to the illustration of multicoloured pavements. In the centre is a representation of Ganymede, wearing a Phrygian cap on his head, and partially covered with an ample robe which is blowing open as he mounts the skies, borne aloft in a graceful floating attitude by an immense eagle with expanded wings of varicoloured hues, beautifully shaded in harmoniously arranged *tesserae* or cubes of stone representing the plumage of the bird of Jove. In his left hand the favourite youth carries a shepherd's crook, by way of emblem symbolical of his employment while on earth; his right hand and arm are extended, as if waving "a mute farewell" to his companions and his flocks, who may well be imagined to be gazing aloft in wonder, if not in admiration, at his fate. The background is of a creamy yellow colour, and is bordered with a circular band ornamented with a kind of embattled or chequered pattern alternately disposed in compartments. Outside this is a plain narrow circular band of yellow cubes, which are enclosed in turn by a broad band of three cords interlaced in a triple plaitwork charmingly shaded with various delicate colours. The outermost circle, which is separated from the touch of this intermediate one by a narrow ribbon of light colour, is decorated with an indented pattern of two alternate colours. The corners or triangular spandrels which have been cut off the square by the inscribed circle contain, each of them, a capacious vase of semicircular body, standing on a small foot, having two sprigs drooping from the lip, each sprig consisting of a twig with single pair of bay or laurel leaves upon it. To the right and left are two parallelograms of coloured mosaic work, consisting of a double link set in a square between four pairs of ornamental lozenges.

The larger pavement is subdivided into six hexagonal compartments, somewhat irregular in measurements, within which are depicted by the *tesserae* a similar number of figures of dancing nymphs, in the ancient Italian style, one of them being at the time of uncovering totally destroyed, but enough remains of the other five to indicate the dress and attitudes

of these indispensable adjuncts of the peculiar culture affected in Roman life. Mr. Lysons points out that, although well designed and as well executed as the nature of the work and the capabilities of the materials would allow, the lower limbs of these figures are incorrectly drawn; and in this respect, as well as in the general style of the figures and the arrangement of the ornaments, this pavement much resembles one (of which further mention will presently be made) found in the beginning of the eighteenth century at Avenches, in Switzerland, and which there is good reason to suppose was executed in the reign of Vespasian or Titus, that is, A.D. 69-79. In the middle of this large pavement is a hexagonal piscina, or sunken cistern, of stone slabs, measuring 4 ft. in diameter, 1 ft. 7½ in. deep, with a step at about half its depth. At the bottom of this fountain, now dry, but no doubt originally a spring, is a circular hole, 3 in. in diameter, intended to carry away the water before it should overflow the pavement, by connexion with a leaden pipe, part of which, in very good preservation, was found on the outside of the wall to the southward. It is a curious coincidence that there was also an octagonal cistern in the Avenches pavement mentioned above, and these two are supposed to be the only examples of the kind which have yet occurred in connexion with Roman villas. We may, therefore, infer, if this be so, that the two pavements of Bignor and Avenches owe their community of design to the same individual or to the same ancient school of art. The room to which this larger pavement belonged had evidently been heated by means of a hypocaust, or underground system of hot air circulation, and some of the details of the flues or supports had given way, and thus the surface had become uneven.

Shortly afterwards, part of another pavement, about 30 ft. to the west, was found (b in plan). This originally measured 44 ft. long by 17 ft. wide, and consisted of two large square compartments. One was mapped out, as it were, with subdivisions of various geometric figures containing part of the figure of a boy, a dolphin, a pheasant, and a cornucopia; and in one of the triangular spandrels between two hexagons the letters T R or monogram T E R occurs. The other large compartments contained at each corner an octagon with its outline marked by a guilloche or cable twist, and included within its area two interlaced squares with frames similarly decorated. In the small octagon or star-shaped panel thus formed within the squares, was an ideal portrait head of one of the four seasons of the year. Those representing the first three seasons are destroyed, but our readers may turn to the volume of the *Builder* mentioned at the beginning

\* On the Remains of a Roman Villa discovered at Bignor, in the county of Sussex, in the year 1811 and following years. By the late Samuel Lysons. London: Long and Co., Sardinia-street, 1835.



of this notice for some account of the emblematic representations of Spring and Summer found in the Halicarnassus pavements now in the British Museum. The figure at Bignor (see lithographic plate in this week's *Builder*) is that of Winter season, and thus helps towards the completion of the four. It is an artistic picture in coloured stones, of characteristic Roman feeling. The serious aspect of the mature face, the head closely enwrapped in thick folds of cloth, the drapery drawn tightly over the bust and shoulders, and the leafless branch held obliquely over the left shoulder, leave us no room for mistaking the symbolism intended to be conveyed to the eye. In the sides of the pavement, between the seasons, were depicted elegant vases with fluted bowls, and sprigs carrying heart-shaped leaves and stars of various colours, sets of circles composed of cabled twists enclosing plaques adorned with quatrefoils, and pairs of links interlaced at right angles; and the meander or key-fret, with lengths of guilloche in narrow rectangular bands, fills up the outer border of the pavement. Outside all, as in the former example, so also in this, the remaining floor space of the room was filled up with larger squares of red brick or stone, of about 1 in. or 1½ in. diameter.

More precise investigation was stimulated by the discovery of these pavements, and in the following years, 1812 to 1815, the foundations of the walls were laid open, and the plan of the building traced; and it was soon apparent that a Roman villa, if not, indeed, a palace, of considerable extent had been discovered. The room *a* (see plan) appeared to be rectangular, 19 ft. by 30 ft., with a recess on the north 20 ft. 10 in. wide, making total length, north to south, nearly 40 ft. The walls were very thick, 2 ft. 6 in. on the north, east, and west; 3 ft. on the south. But the walls on the east and west were not quite parallel, a not unusual circumstance in buildings of the Roman ages. The same irregularity is noticed in the room *b*. This room *a* was probably a banqueting-hall, and Mr. Lysons conjectures that the recess was well calculated to answer the purpose of the high table in our public halls. The walls had been adorned with paintings on the stucco, that of the room *b* had plain red coloured walls. In the room *c* a fine and perfect pavement, of great beauty of colour and elegant geometric design, relieved by introduction of curvilinear accessories, such as interlaced links, lanceolate and cordiform leaves, and guilloches, was found. In one side of the wall of this room was a doorway 3 ft. 3½ in. wide. On the south of the great room *a* were discovered the foundation walls of a long *cryptoporticus*, *d*, 150 ft. long by 10 ft. wide. This was an enclosed gallery or cloister, so to speak, in which the Romans took walking exercise under shelter. It had a red and blue pavement, with ornamental meander design.

In a line with the great room *a* the foundations of other rooms, *f*, *g*, *h*, *g*, *r*, *s*, *t*, *u*, *x*, *y*, were found in the positions indicated on the plan, and some of these had tessellated pavements on their floors. The fire-place of the hypocaust by which the system of hot-air circulation was carried on, was discovered on the north side of the north wall of the room *c*. It was composed of two walls, 18 in. thick, and 18 in. apart, projecting 16 in. from the wall; between these walls an arch was met with, formed by bricks projecting beyond each other, and communicating with various flues under the floors. The room *k* had a very fine pavement, 22 ft. by 19 ft. 10 in., with an apse at the north end, 10 ft. diam., and an ante-room *l*, with doorway 4 ft. wide. This large room was enriched with a very fine pavement, unfortunately seriously injured in parts, but with its north end nearly perfect. The rectangular part contained panels holding figures of Cupids or genii dancing in the manner of Bacchantes, figures of urns with fruit and foliage, and cornucopias. It was divided from the apsidal part by a long and narrow frieze containing twelve Cupids or genii, winged, attired as gladiators, in four groups, each consisting of a master or instructor and a pair of combatants in the various stages of the mimic contest. The apse, or semicircular part, is

surrounded by an elegant scroll of foliage, enriched with heart-shaped and bell-shaped flowers and roses, springing from a late amphora, or two-handled vase, set on a narrow foot and having a ball in the stem. This border encloses an area of semicircular form, paved with creamy yellow *tesse*, holding a circular panel, within which is represented the bust, perhaps, of a female, full-face, the head adorned with a chaplet of flowers, and with tresses of dark hair on the shoulders, which are not draped. The head is surrounded with a nimbus like that found on early representations of Christian saints, of a light blue colour, few examples of which appear in any of the remains of ancient art; and, according to Mr. Lysons, only one other is recorded as having been discovered in a work of this nature. The nimbus, in this instance, appears to indicate that the head is that of a deity, and if it be not a relic of pre-Augustine Christianity in Britain, and commemorative of Our Lord or the Virgin Mary, it may possibly be referred to Juno or Venus. On each side of this circular plaque are a cornucopia on a branch, and a festoon of foliage tied at each end with a coloured ribbon, with a pheasant holding a branch, perched on the middle of the loop. The pheasant is not particularly emblematic of Juno, to whom the peacock would be more appropriate, nor to Venus, whose emblem of a dove, or a goose, is frequently met with in ancient art, but the bird may be the proper, although forgotten, emblem of a local divinity, whose bust is here portrayed, unless the first-mentioned theory of its Christian origin is accepted.

On the west of this important apartment—(may it have been a church?),—were found the remains of a sort of enclosed portico, *m*, which appears to have had a terras floor, and a range of small columns of the Doric order, but evincing, in truly Roman keeping, a good deal of irregularity in the mouldings. The small room or lobby, *h*, had two doorways. On the south of the room, *h*, was a room, *n*, 14 ft. 6 in. by 17 ft., and after an interval of 44 ft. further south, in a line, another room, *o*, 16 ft. 5 in. by 15 ft. 6 in., with part of its floor covered with a tessellated pavement, of coarse style, formed of light brown stone cubes. This room was of interest, because of its fireplace against the west, or outer, wall, with a hearth formed of four square bricks; the fireplace being similar to, but smaller than, that already described, for the opening in front was 19½ in.

The next discovery in connexion with this extensive building was made in the adjoining field, known as "Town Field," where at the east end of the *cryptoporticus* a second gallery, *p*, was found, 10 ft. wide and 68 ft. long, thus making the entire extent of this ambulatory or cloister 227 ft. in one line. Part of a tessellation was also found here. The room *s* was paved with bricks 10½ in. square; the room *t* with large flagstones. The walls in this part of the building were constructed of the stone of the country, unhewn and plastered, and varied in thickness from 2 ft. to 3 ft. The semicircle *f* indicates the foundation of a building 8 ft. 10 in. diameter. The wall on the east ran down from the gallery in a sloping direction, and there were no apartments on this side. After following the direction for 133 ft. the remains of a corresponding ambulatory, *z*, communicating with a series of no less than twelve rooms, were met with. Few of these rooms were paved; room *l* is nearly a square, of 25 ft., with a mosaic pavement of stars, interlaced squares, guilloches, and in the centre a circular plaque containing the full-faced head of Gorgon or Medusa, girt with fourteen snakes issuing in a kind of wavy radiance from her hair, and enclosed in two embattled borders of black and cream-coloured *tesse*, holding an intervening cable-twist of four lines, black, red, yellow, and white. Portion of a small stone column of irregular Doric style was found lying on this pavement, measuring 2 ft. 2 in. in the shaft, 14½ in. diameter of base, and from the indentations on the pavement produced by the fall it has been reasonably conjectured that two pillars stood at some height above the floor-line, at the sides of a doorway leading to room 2,

which was paved with tessellations and furnished with a cold bath of the shape shown in the plan, 7, measuring 18 ft. by 12 ft., and fitted with three steps, in all 3 ft. 2 in. deep below the floor level. Many fragments of a neat cornice of stone 2 in. wide, with an ogee moulding, were found in the bath itself. Room 3 revealed remains of an extensive hypocaust, with its fireplace on the outer south wall. Room 5 had a pavement of coarse mosaics, and a hypocaust which communicated with the previous one by a brick arch, 3 ft. 9 in. wide) 3 ft. 2 in. wide. The remainder of the plan does not need special explanation.

The great extent of the foundations, the large number and goodly size of the apartments, the richly-worked pavements, the numerous hypocausts, and other circumstances clearly point to the fact that as far as the hitherto imperfect investigations go, the building was the habitation of some personage of great political importance; quite possibly it was the palace of a legate or governor of a province. The district around Bignor was known as the province of the Regni, with a capital believed to be at Regnum, the site of modern Chichester, ten miles distant. This, according to Mr. Lysons, but not undisputed by some archaeologists, was in all probability reduced to subjection by the Romans under Vespasian, in the reign of the Emperor Claudius, about A.D. 49-50, as recorded by the historian Suetonius. Cogidubnus, or Cogidunus, a British prince, who had submitted to the invaders, was appointed legate in England by Claudius, and he governed in this province of the Regni. Fortunately, an undoubted relic of the period of Cogidubnus is still extant. It is an inscribed stone slab about 3 ft. by 1 ft. 6 in. when perfect, and was found in 1723 at Chichester. It is now in the possession of the Duke of Richmond, who has set it up in the wall of a temple in the garden at Goodwood. Enough remains of this stone, which is cracked and imperfect in some places, to show that by order of Cogidubnus the "Collegium Fabrorum" erected at Regnum a temple dedicated to Neptune and Minerva. Neptune would naturally exercise a potent influence in a place so near the sea as Chichester, and in a district so well furnished with a sea-board as Sussex; and, as if in corroboration of this fact, a colossal marble head of a deity, presumably that of the principal statue which graced the Temple of Neptune, still lies in a sadly mutilated condition at the garden door of the Bishop's palace at Chichester. In the absence of better suggestions, may not this be the head of the Neptune set up in obedience to the command of Cogidubnus, and may not the palace at Bignor have been the dwelling actually inhabited by that prince? We may even go further, and, without overstepping the bounds of probability, see in the plan of this villa at Bignor the handiwork of an architect specially sent from Avenches to carry out for his princely British patron a work intended to imitate, and even to emulate, Roman fashions in building and decoration. It is well known that considerable buildings were erected in Britain during the reign of Titus, and Tacitus, who is the authority for this statement, also declares that the Britons erected temples, houses, porticos, and baths by the advice and with the assistance of Agricola. Mr. Lysons saw in some of the tessellations at Bignor grounds for referring them to the age of Titus, and from the account of the Avenches mosaic found in 1708, and described by the Seigneux de Rossan in his "Recueil d'Antiquités de la Suisse," the two principal pavements are almost identical as to the occurrence of a central cistern or foundation; as to the figures of dancers in octagonal compartments and with their lower limbs incorrectly outlined; and as to the nimbus which at Avenches adorns the head of Bacchus and at Bignor a corresponding head of the so-called Venus. There is also a general agreement between the style of ornamentation in both of these relics. Mr. Lysons also saw in some of these pavements a striking resemblance to some tessellations found at Pompeii which could not have been of later date than the reign of Titus. The ball in the stem of some of the vases is a detail which



also occurs under similar conditions at Pompeii.

In conclusion, a few words may be added by way of a lesson to be learned from the inspection of the Bignor pavements. The practical value of the details of the classical ornamentation cannot be over-estimated. Our early illuminated manuscripts and sculptured crosses indicate to how great an extent the illuminator and the stonecarver drew upon Roman tessellated patterns,—far more abundant a thousand years ago than they are now,—for their elegant borders and panels; and now that mosaic pavements have become important factors in the decoration not only of public buildings but even of private dwellings, the designers of the new patterns will do well to study the graceful curves and symmetrical arrangements seen at Bignor and elsewhere. Many of these ornamental designs will be found reproduced in a work by Mr. T. Morgan, F.S.A., on "Romano-British Mosaic Pavements," which is on the eve of publication. What we said in 1882 (in the article already referred to) as to the precarious condition of many Romano-British pavements *in situ*, is forcibly true of those at Bignor. We do not desire to depreciate in the slightest degree the intelligent care which Mr. Tupper has bestowed upon his precious antiquities. Had he not exercised great forethought, and incurred great expense in building houses over them, they would probably have long ere this, have crumbled away under the plough; but the fact is, that the sinking of foundations, never very stable, and the slow but sure growth of roots and rising of damp has displaced numbers of the cubes, destroyed the cohesive nature of their bed, and, in some instances, seriously impaired the beauty of the work. These conditions, which must always go on with greater or less destructive agency, coupled with the treading of visitors over the borders of the pavements, must eventually result in finally reducing what are now, in spite of many flaws, fine and fairly well preserved relics of Roman Britain, to mere fragments of inferior value. Happily Sussex has its Museums at Brighton and Chichester, than which no better or securer resting-places could be found, and if the owners of these important remains were properly compensated by the Museum or the State for the removal of this property, in which, in so far as tradition, and history and art go, the whole nation has an inalienable interest, the pavements could be rebeked and moved, without the least danger of injury or the slightest reproach of restoration, from a perilous position to one of lasting security.

#### MELROSE, DRYBURGH, AND ABBOTSFORD.

Those who have not seen the far grander scenery of the Highlands, or even of Argyllshire and the Isle of Arran, Teviotdale and the valley of the Tweed will be one of the most attractive districts for a pilgrimage. In the spring and autumn the colours of the larches, firs, and beeches which fringe its sides are as rich and as varied as they were when Sir Walter Scott chose this said valley as his future home; and the fact that he spent here the best part of his life, on the banks of the Tweed which he loved so well, and that he lies in the sleep of death within the sound of its rippling waters, will render the whole neighbourhood sacred ground for many a generation come.

Both Dryburgh Abbey and Melrose can easily be visited in the same day with Sir Walter Scott's old home at Abbotsford. This is rather nearer to Galashiels than to Melrose; but is more accessible from the latter place, where the North British Railway will deposit the traveller close to the ruins of its famous abbey. Unless, however, he makes up his mind to spend a couple of days at least in this pleasant pilgrimage, it goes without saying that the tourist will not be able to follow out the oft-quoted advice of Sir Walter, and "visit it by pale moon-light." But the ruined abbey seems very fair indeed under the changing

colours of a bright summer day, when the cloud and the sunshine alternately prevails. It is a pity, perhaps, that the abbey is so closely hemmed in, on three sides at least, by modern houses; for if it had stood apart and lonely in the meadows, like Tintern or Netley, or Dryburgh, the scene would have been surpassingly beautiful. There is truth in the remark of honest Tom Purdie, who had been educated in taste by Sir Walter, "See ye now then the sun glinting on Melrose Abbey? It's no aw bright, nor it's no aw shadows neither, but just a bit screed o' light here and a bit daud o' dark yonder like; and that's what they call picturesque; and, indeed, it maun be confessed it is unco bonnie to look at!"

The general view of Melrose is familiar to every reader of Sir Walter Scott, as it forms one at least of the illustrations of almost every edition of his works, to say nothing of the more recent art of photography. Billing, in his "Baronial and Ecclesiastical Antiquities," remarks: "The student of architecture will find that the building, both in the great features of its design and in its decorations, has a lightness and delicate symmetry quite peculiar. The stone, skilfully chosen for the artist's purpose, is capable of remarkable delicacy of cutting, and preserves its sharpness against even the mouldering winds of Scotland. In this it much resembles the stone of which Strasburg Cathedral is built, and there is a similarity of style in the two, and especially in the masses of masonry being disguised by light open decorations, which seems to hang over them like lace. There are some features in which it is not unlike Antwerp, as in the turrets or machicolations at the corner of the tower, which Scott adapted to his mansion at Abbotsford."

The building, which is now standing in such picturesque ruin, has had three predecessors. The first abbey, which, by the way, was at Old Melrose, somewhat nearer to St. Boswell's, had its origin as far back as the seventh century, when it was founded by the saintly Aidan; the second was built in 1136, by King David I., who placed therein a community of Cistercian monks from Rievaulx. During the wars of the succession this building suffered grievously, and it was finally demolished by Edward II. It was soon afterwards rebuilt by Robert the Bruce, whose heart, it is said, reposes in front of the great east window of the present fabric, where it was placed after Douglas had failed in his attempt to carry it to the Holy Land. Bruce's building was destroyed at the invasion of Scotland by Richard II., but was soon rebuilt; and this is the work now standing, though much altered by subsequent restorations and repairs, but not much of the monastic buildings except the church remains. The church is cruciform in plan, and the flowing tracery of many of the windows is very elegant and partakes of the Flamboyant character. The principal feature of the chancel is the great east window, of five lights, of which Scott has given such a poetical description.

By a little poetical licence, or poetical inaccuracy, Scott terms the great east window an "oriel" which it, of course, is not. Entering the ruins by the west door-way, the visitor has before him a piece of barbarism, in the shape of heavy piers and circular arches, which were erected early in the seventeenth century, when the nave was converted into a Presbyterian church, and which completely hides from view the elegant Early Pointed arches of the original building. It is possible, however, that they may have been intended to serve, as they still serve, for props, and so have helped to secure the fabric from falling at a time when no architect could have repaired the loss. The south aisle is divided into a series of chapels, each of which serves as a family burial-place. The tracery of the windows in the aisle is somewhat of the Flamboyant character, and that of each window is different in design; but these are surpassed in beauty by that of the south transept, which is 24 ft. in height, and is divided into five lights. An aisle of two bays, separated from the transept by pointed arches with clustered

columns, runs along the east side of it. The north transept has an aisle on the west side, with an arcade and fragments of early ornamentation. The whole interior, in fact, is one of simple grandeur, looked at from whatever point of view the visitor chooses.

The exterior of the abbey still retains many specimens of the carved work, both sacred and grotesque, with which the building was originally enriched. Along one wall of what remains of the cloisters, on the north side of the nave, is a series of trefoil-headed arches, with mouldings of great delicacy.

Billing, in the work above quoted, writes:—"Some architectural critics treat Melrose as a mixture of Early English and Perpendicular, while some features from the intermediate neighbourhood, and even from the Earlier Norman, somewhat disturb the amalgamation. But this is treating by rules derived from English analysis a building which was free of all English principles. After the War of Independence the ecclesiastical architecture of Scotland rather followed Continental than English models. The style which Rickman classes as Perpendicular was peculiarly of English growth. It was never adopted in Scotland, though certainly the style of Melrose makes a nearer approach to it than any other modern building." What remains of the sacred edifice is sufficient to stamp it as an architectural gem which will bear the minutest examination. This, of course, must be done in the light of day, in spite of Scott.

In 1822 Melrose was secured against further decay by the Duke of Buccleuch at the urgent entreaty of Sir Walter Scott. One would have thought that the idea of a railroad near Melrose would have grieved Sir Walter's heart, but we learn from Lockhart's "Life" that he joined his neighbours in welcoming the idea many years before it was carried out.

Scott loved to "lionise" his visitors over Melrose, and to act as their guide, being so familiar with its every detail. Moore, for instance, tells us that with the assistance of the sexton, a shrewd sturdy-mannered original, he (Scott) explained to him all the parts of the ruin, and jokingly offered to give the worthy sexton a statue of the Virgin and Child to fill one empty niche, among casts taken from the abbey ornaments, if he was not afraid of having his house pulled down about his ears by his Puritan neighbours.

Melrose is undeniably the finest Gothic ruin to the north of the Tweed, and its sacredness and importance may be inferred from the fact that the shrine of St. David here was one of the four chief places of pilgrimage in Scotland during "The Ages of Faith." The story goes that Cuthbert was once buried here, and that his body floated in a stone coffin down the Tweed to Tilmouth. Legends and traditions, it may be remarked, cluster thickly around the grey and lichen-covered walls, not only of the Abbey of Melrose, but also those of Dryburgh and the other sacred fanes of Teviotdale,—legends which have been handed down from generation to generation for ages past.

From Melrose it is but a walk to Dryburgh, and the pilgrim can choose his path on the right or the left side of the Tweed. Whatever route he takes he will be rewarded by lovely scenery, on which Sir Walter's eye so often rested, and almost all the way he will be within earshot of the Tweed's rippling waters. If he goes through St. Boswell's he will have to turn down a shady lane, and cross a foot-bridge, and then to walk another half-mile before he reaches the gates of Dryburgh. So thick and close are the trees that, at all events in summer-time, he will find himself almost face to face with the ruins before he is aware of it. Here, at all events, the modern builder and improver has not been able to effect an encroachment. The most peaceful seclusion reigns around, the shade is perfect, and the grass, even in the hottest summer, is deliciously green and soft to the tread. The old Austin Canons may have preferred to be near a town and the hum of voices, but the Premonstratensians, like the Cistercians, loved a secluded spot, such as Dryburgh, which is beautifully situated amid grand old trees and verdant fields.

Of the Abbey Church, little or nothing is



left but the north transept, with its east aisle, and a small portion of the main aisle, the western entrance, and a small chapel dedicated to St. Moden. This chapel is a small apartment in one corner of the cloister-court, and belongs to the "transition Norman" period, as its pointed oval-shaped window testifies. All the other windows in the original work have semicircular arches, like the doorways. In St. Moden's Chapel there appears to have been an altar, as the remains of a piscina are to be seen in one of the side walls, and on the floor immediately below is an ornamented stone basin, having a drain passing into the ground. In the transept aisle, called St. Mary's, is the burial-place of the Erskines, and hard by is that of the Scotts and Halyburtons. Two pointed arches separate this chapel from the nave. An Early English window alone remains to mark the portion of the south transept. The Chapter-house is on a lower level than the rest of the church, and is fairly preserved. It is a long plain building, with a cylindrical or barrel-vaulted roof, and an arched on the east side formed of Norman arches interlaced. Part of the walls of the refectory are left; and in its gable end is a handsome rose-window. Close by are the bare walls of the library and of the chamber known as the abbot's parlour. All these places were closely associated with the domestic life of the monks; and, although they are all roofless, it is gratifying to know that they have been thus far preserved from the ravages of time and the spoiling hand of man. Several vaulted passages run through the buildings; and under the refectory, which occupied the whole south side of the cloister-court, are the almonry and wine-cellar. In one corner of the cloisters are three dungeons, in which, it is said, the "refractory" brethren were kept and punished. In one of them a hole, large enough to admit a man's hand, has been cut in the wall, into which the prisoners' hands were thrust and fastened with a wedge. The whole place is so low as only to admit of its occupant kneeling upright, and the only light admitted into this gloomy recess was by an opening 2 in. wide.

The arms of the last abbot, James Stewart, are still visible above the staircase leading to the dungeon.

The visitor is naturally very sorry to see how little of the church remains here,—far less than at Melrose,—but that feeling of regret is lessened by finding that the other conventual buildings are far more perfect. Indeed, the cloister-court, the abbot's parlour, the chapter-house, the library, and St. Moden's Chapel, are all more or less entire, with the exception of their roofs. Time, on the whole, has dealt gently with these ruins, and the grey stone harmonises most pleasantly with the bright turf and dark evergreens around it. Tread softly and gently, for in the corner of one roofless aisle, sleeps the poet whose writings have consecrated not merely Dryburgh, but Scotland. Here his remains were placed, amidst the tears of his tenantry, and friends, and neighbours, on one of the last lingering summer days of 1832, in the presence of a crowd of mourners from all parts. The spot is one which he chose during life, and he rests among his kindred of the Halyburtons, as he would have wished.

Dryburgh Abbey was never an establishment of great size or wealth. It was founded about the middle of the twelfth century by Hugh de Morville, Lord of Lauderdale, and endowed with the patronage and revenues of the churches of Dryburgh, Lanark, and Pedyne, besides lands in other parts. In 1322, the abbey was burned by Edward II., on his retreat from Scotland, but was soon after rebuilt, only to be again destroyed by fire in 1544, by the English, under Sir Brian Latoun. It does not seem to have been again rebuilt, as traces of the effects of fire are visible on one or two of the fragments of columns and arches yet remaining.

Returning to Melrose, we take an upland road to Abbotsford. There can be no wonder why Sir Walter should have chosen Abbotsford as the site of his future home. A farm, or "holding," of a few acres was for sale; it overlooked his beloved Tweed; it was not far from Archiestel, where he had spent the first years

of his married life; it was near to the domains of the Kerrs of Cessford, whom he admired, and also to those of the bold Buccleuch to whom he looked up with that loyal regard which marked all the members of a class in the old feudal times. The acquisition of such a property would give him a local habitation and a name to match it; he would be Scott of Abbotsford. At Abbotsford, Scott writes:—"We dwell among our own people," and "we were not out of reach of our Edinburgh friends." And a proud day it was for him, as we learn from his son-in-law, Lockhart, when the deed was signed, which made him the "superior" of that demesne. He would plant the hillside; he would see his own woods spring up; he would design a small baronial mansion, which should serve as his castle and enable him to realise in stone some at least of the scenes which he had described in poetry and prose; he would here exercise the hospitality of a Lowland laird. He lived to do all this, and we now see before us a baronial hall, whose battlements and gables, and mullioned windows, would have delighted the eye of Horace Walpole; but scarcely had he completed the building and laid out the grounds, much as we now see them, when death snatched him away from his beloved home; but he left a worthy and loving son to succeed him and to keep up his name.

The mansion of Abbotsford is shut in from the main road by a high wall, and but little can be seen of the house on this side. Entrance is obtained by visitors through a small postern gate, which leads to a side door and small hall, in which is a statue of "Maida," Sir Walter's favourite deerhound. Having duly paid his or her shilling (the sum charged for admission),—which, by the way, we believe, is put to charitable purposes,—and entered their names, the visitors are conducted to the library, a handsome apartment, fitted up in the Gothic style, and containing a collection of some 20,000 volumes, which have become heirlooms in the family. The adjoining study and small octagon dressing-room remain in much the same condition as when occupied by the poet. Here are preserved his chair, desk, and writing-case, the stick which he used when out walking, and even the identical clothes which he wore. The dining and drawing rooms contain numerous relics and memorials, and a few portraits of distinguished personages whom he reckoned among his friends and guests. There is also, in the latter room, a bust of the poet by Chantrey. A room, called the "Armoury," is a veritable museum and storehouse of curiosities.

The house was built, as it were, piecemeal; it was very costly, and its growth very gradual. Though twice it has been carried, in the female line, into other houses, the name of "Scott of Abbotsford" survives in Sir Walter's descendants. The house still stands, an object of pilgrimage to all the world. The gardens still flourish and delight the eye with their variegated hues as they did in Scott's time; the shrubbery and lawn, on which he was wheeled during his last illness after his return from Italy, still remain as of old, preserved with almost filial care; but the plantations have grown into groves and noble woods. The Vale of Gala still smiles below, and the fair Tweed still ripples and shines in the hollow, as it did on that September day when the poet breathed his last in his drawing-room at Abbotsford, and it still reflects the purple gleam of the autumn woods, whilst the little "linn" near the garden still trickles in summer and brawls and foams in winter,—

"For men may come, and men may go,  
But I flow on for ever."

**Great Fire in Clerkenwell.**—What appears to have been probably the largest fire that has occurred in London since the great fire in Tooley-street, more than twenty years ago (not excepting the large fire in Wood-street three or four years since), broke out early on Thursday morning in a block of warehouses at the junction of Goswell-road and Clerkenwell-road. No fewer than fifteen large warehouses (all of them comparatively new buildings) are reported to have been destroyed.

## NOTES.

**THE Metropolitan Board of Works** have wisely made public the Report of the Works and General Purposes Committee in regard to the houses in Lisson-grove, about which the attacks of the correspondent "Sanitary" in the *Times* have been directed against them. They admit that irregularity has occurred in the "Dangerous Structure Department," or, as they finally put it, that the Superintendent of that Department "gave an extension of time," in regard to the condemned structure, "without the sanction of the Board." At the same time they urge, not without reason, that the extension of time was made on grounds which would probably have been accepted as reasonable by the Bench, if the matter had come into a Police-court. The charge that an account had been rendered to the outside owner of property (house No. 33) for the repairs ordered, and none to the owner of No. 35, who was a Member of the Board, is shown to be entirely untrue, the accounts in question not having been made up at all at the time "Sanitary's" charges were made. There appears to have been too much facility given to the owner who was a member of the Board, for getting extension of time in an informal manner, and the investigation will probably check any such irregularities in future. But in the main the Board appear justified in regarding the attacks made on them as characterised by much exaggeration, and the latest aspect of the affair confirms us in the feeling we form from the first entertained, that there was personal animus of some kind behind the letters of "Sanitary." A public-spirited sanitary reformer does not generally direct elaborate and repeated attacks against one small piece of unimportant property.

**WE** observe that a motion is to be brought forward in the Salford Town Council recommending that an application should be made to Parliament for power to subscribe to the capital of the Manchester Ship Canal Company. If the motion is carried, and the question comes before Parliament, it is to be hoped that the Legislature will show plainly that it will not sanction town councils becoming shareholders in joint-stock companies. There is no difference in principle between the Ship Canal and any other commercial undertaking favourable to the trade of a particular locality. If municipal bodies are once allowed to have an interest in commercial undertakings an enormous field is opened to all sorts of jobbery, and the ratepayers' money will never be safe. It is the function of municipal bodies to govern the locality to which they belong, not to embark in speculative undertakings, however much they may be likely to improve the trade of the place. It is greatly to be regretted that the idea of such a gross departure from the principles of civic government as this should ever have been contemplated.

**"ABOVE** the intakes of the water companies," report the Conservators of the Thames, "whence the chief part of the London water-supply is derived, the state of the river is satisfactory." "This portion," said the *Lancet*, on the 18th of September, "having received much sewage pollution in the upper reaches can never be regarded as entirely satisfactory. . . . At the mouth of the Wey we found, on a recent inspection, that the water coming through the lock was black and dirty, and had a bad smell." Which of these two conflicting statements is correct? This much is certain that the Wey receives much raw and untreated sewage, besides the discharges from paper-mills and tanneries. As to the former, "The rage," says Mr. Higgins, in "The Pollution an Obstruction of Water-courses" "after the dusting process, and esparto grass, from which paper is manufactured, are treated for several hours with a strong solution of caustic soda during which the silica contained in the raw material is dissolved, together with any greas present. The dark brown liquid obtained from this process is soapy and highly polluting, and is also the water subsequently used in washing the boiled material. The pulp is bleached with



solution of chloride of lime. The preparation of this solution, as well as the caustic soda when made on the works, gave rise to a refuse consisting of lime and calcium carbonate." As to tanneries, the same authority says, "The waste liquor from tanneries may, for all practical purposes, be regarded as concentrated sewage, possessing from five to ten times the manurial value of the latter." Esparto liquor from paper-mills, according to the reports of the River Pollution Commissioners, contains 2,826 grains of solid matter per gallon in solution, and spent tan liquor contains 5,921 grains per gallon. The primer contains 53 grains and the latter 5 grains of organic nitrogen in the gallon. It is thus not surprising to be told that the water of the Wey as it flows through Guildford contains a quantity of chlorine equal to that in 2.42 grains of common salt per gallon, which is very nearly one-fourth of the proportion of 9.90 grains per gallon contained in London sewage. We fear that these facts tend to tip the scale in favour of the *Lancet* rather than in that of the Report of the Conservators of the Thames.

THE insanitary condition of the dwellings of many of the Windsor poor is unfortunately no new complaint. In 1871, we personally inspected the poorest quarters of the Royal Borough, which almost touch the Castle walls, and we reported in the *Builder* on the lamentable state of things then existing, as both dangerous and demoralising. In 1873, as Rev. Arthur Robins became Rector of Holy Trinity, and from that hour to this he has never ceased to expose and denounce that which is so full of material and moral evil. Two months ago the *Lancet* sent its Special Commissioner to Windsor, who found that the sums there were, — as we had described, and as Mr. Robins had reported, — a local peril and a national disgrace. The Rev. Arthur Robins now proposes that in the Royal Borough the jubilee of Queen Victoria's reign should be truly honoured and commemorated by giving to poor people of Windsor sanitary dwellings and human homes. This is, indeed, what the late Prince Consort would probably have done long since, had he lived; and if Windsor is really ready to fulfil its duties and obligations as a Royal Borough, it will not miss this opportunity of recognising its responsibilities, and of thus most appropriately offering its highest homage to the Queen.

THE Manchester Canal scheme is to be followed, it appears, by one for improving the navigable channel of the Dee up to Chester, so as to receive 15 ft. of water up to Chester. Inland navigation seems to be the order of the day. Three centuries ago the Chester authorities referred to Liverpool in one Parliamentary document as "a creek of the port of Chester." Those times, however, will hardly be revived by any dredging of the Dee channel now.

THE Governor of the Isle of Man merits the gratitude of all interested in archaeological research for the valuable "memorandum," which at his request Prof. Boyd Dawkins has recently prepared with a view to assisting the passage through the local legislature of a Bill to preserve from destruction the many antiquities of the island. The prehistoric remains alone, as Prof. Dawkins points out, are more numerous in the Isle of Man than in any other equal area of the British Isles, and, had to say, remain as yet entirely unprotected from the wanton destruction which has to so great an extent been arrested in England, Scotland, and Ireland by the "Ancient Monuments Act" of 1882. The interest of the antiquities of the ancient kingdom of Man is not a purely local one; as Prof. Dawkins urges, they merit preservation on the score of the light they throw not only on early Christian art, but on the complicated and little-known relations of the Northmen and the Celtic population of the British Isles. The principal objects to be attained are, first, the protection of the existing remains; secondly, a notice, where possible, of all those

which have disappeared; and, lastly, the record of the old Manx place-names. The Runic crosses, of which many well-known specimens exist in the island, are, it appears, rapidly disappearing, and, it is urged, should be immediately placed under shelter. The island is also especially rich in prehistoric remains, camps and ramparts, stone circles, tombs, tumuli, cairns, and cists; these are, for the most part, unrecorded, or very incorrectly marked, on the Ordnance maps. Long protected by local superstition, they are at present being ruthlessly destroyed; among them the interesting Braddan alignments should certainly be protected from further injury. It is equally desirable that all local traditions respecting these antiquities should, as soon as possible, be recorded before being for ever lost; the work, in fact, systematically carried out which has been so ably commenced by the Isle of Man Antiquarian Society. It is sincerely to be hoped that the Manx Legislature, — itself an interesting archaeological, though, none the less, a very practical, survival of a distant past, — will not neglect to support their Governor in his laudable effort.

A MEETING of the Associates of the Institute of Architects will be held on Monday evening next, at 9, Conduit-street, at half-past seven, to discuss the provisions of the proposed new Charter as affecting the Associate class of members. The discussion is expected to turn chiefly on the question of the right of the Associates to vote in respect of the passing of by-laws affecting their interests. Mr. Mark H. Judge, A.R.I.B.A., intends to move the following resolution: —

"That, in the opinion of the Associates of the Royal Institute of British Architects, it is most desirable that the new Charter should give them a voice in the making of by-laws, and it is therefore resolved, — That the Council be asked (1) to amend the 23rd clause of the proposed new Charter by adding the words, 'Every Fellow shall be entitled to two votes in respect of the making, altering, revising, suspending, or rescinding of any by-law'; (2) to amend the 24th clause by leaving out all the words after the words 'Election of Fellows,' and thus provide for the voting power in respect of by-laws being in proportion to the subscription of members."

THERE seems to have been a question raised at Nottingham in regard to the quality of stone in use in the new Law Courts, which are being erected from the designs of Messrs. Verity & Hunt. There was a discussion on the subject in the Town Council last Monday, when it was stated that a memorial had been received on the matter from the Federated Organised and Building Trades' United Councils, who, as representing 7,000 ratepayers, urged that the quality of the stone in the new buildings was inferior to what it ought to be, best Darley Dale stone having been specified. The Operative Stonemasons' Society and the Nottingham Ratepayers' Association presented similar memorials, and a motion was carried referring the matter to the Buildings Committee for consideration. The architects state that they have specially selected the stone, which they had every confidence in; and the Borough Engineer, Mr. Tarbotton, a thoroughly competent witness, stated that he had examined the stone that was being used, and that it was Darley Dale stone of excellent quality and all that could be desired. Our impression, judging from the reports of the matter by the local press, would be that some trade interest was probably at the bottom of the objections raised.

WE have brought under our notice a new method of stone-working by machinery which has been developed and brought into its completed form by Mr. M. Powis Bale, who has already contributed so much to the development of stone-working machinery. The new method differs in principle from that of Mr. Bale's mechanical system of stone-cutting and dressing already described in these pages, as the stone is not really cut at all, but shaped by the erosion of sand and water under the action of iron scrapers or

rubbers of the required section. The advantage of this system is that it does not shake or jar the stone, and leaves a perfectly smooth and very weather-resisting and compact surface. Work like the fluting of a pilaster can be accomplished with this machine at 2s. per square foot. Of course, we are not in favour of ornamental work by machinery, but such mechanically-repeated features as the flutes of a column or pilaster, and other surface treatment of the same class, loses nothing by machine treatment, and for this class of work the process may prove very useful.

WE have received the following letter from the Manager of the Patent Grano-Metallic Stone Company: —

"Sir, — With regard to the paragraph published by you in last week's *Builder*, respecting the Patent Grano-Metallic Stone Company, I beg to inform you that no agent or traveller has any authority to offer commissions to engineers, architects, or others. I must ask you to give the same prominence to this letter as you gave to the notice of last week.

I am, Sir,

Your obedient servant,

J. H. BRYANT,  
Manager Patent Grano-Metallic Stone Co.  
To the Editor of the *Builder*."

Of course we comply with the request to publish this disclaimer; but it still rests with the Company to explain how it came about that a person professing to be acting for them, and enclosing their printed card, has been writing to architects offering 5 per cent. commission in their name.

THE exhibition of the work of the Photographic Society, now open at the rooms of the Society of Painters in Water-Colours, compares curiously with the class of exhibition we are accustomed to see in the same rooms. We feel how great a part of the interest of art lies in the idiosyncrasy of the artist and his method, when we compare the intellectual charm of a good water-colour exhibition with the cold and uninteresting effect of this collection of chemical transcripts from the forms of nature. On the other hand, the realistic fidelity of photography constantly reminds us of little facts that are missed by the painter. In one of the series of yachting scenes, for instance, the mainsail of a yacht, evidently in a light breeze, is rippled over by a multitude of little crinkles and folds. We never saw a yacht's sail painted in that way. The realistic power of modern photography is well exhibited in Lieut. Hawker's six successive views of the effect of a gun-cotton explosion under water, taken at intervals of three-fourths of a second with his automatically-charging camera. The proportion of attempts at picture-making in photography, by means of carefully-studied lighting and grouping, is not large, nor are any of them remarkable as compared with what Mrs. Cameron used to produce in that way. Architecture, to the representation of which photography lends itself so admirably, is very little represented, probably because there is so little demand for such subjects on the part of the general public. The "School of Military Engineering" shows some good photographs of Tintern Abbey and other Medieval buildings, and Mr. W. J. Stillman has a medal for a view of the Erechtheum. The portraits by Mr. Mendelssohn and Messrs. Marius & Vivash are very good; the former especially aims at artistic effect, but he can do better than anything that we see here, when he has a thoroughly good subject. Among the minute revelations of photography is a remarkable example in the extraordinary and complicated object which turns out to be the microscopic representation of the tongue of a blow-fly.

THE exhibition of sketches and studies at the Dudley Gallery comes more strictly under that denomination than is usually the case in such exhibitions. In proportion to the number of works it contains a good many interesting and pleasant studies, varied by occasional not uninteresting eccentricities of medium or method. Thus Mr. Walter Severn exhibits, in a white frame, a beach study at Freshwater "sketched with sea-water"; so it is noted in the cata-



logue, though we do not recognise any special effect resulting from the saline medium. Mr. Coudry has been working in pastel, in which method his cats are as felix as in oil or water colour. Among the water-colour drawings may be picked out "Broken Weather, Bourne End" (142), by Mr. de Breanski, a fine broad sketch full of wind and wet; "The Golden Temple of Amritsar" (110), by Mr. Goff, a rather unusual architectural scene; "Vignettes" and "Studies" (30 and 38), by Mr. C. Robertson, executed in body colour with very minute finish; "The Roman Forum" (79), by Mr. Mildmay; "On the Roman Campagna" (170), a portion of an ancient aqueduct, by Mr. J. M. Donne; "The Humber at Hull" and "Oldbury-on-Severn" (32 and 39), by Mr. Medlicott; besides others.

WE understand that Dr. Rowand Anderson has revised and adjusted his design for the Buccleuch Memorial in Edinburgh, and different portions of the sculpture have been allocated to several artists. The monument, which is Tudor-Gothic in style, after the manner of Henry VII.'s Chapel, is hexagonal in form, and divided into four stages. The first stage or base is richly moulded, and has buttresses at the angles, above which are bucks bearing heraldic shields. The next stage contains a series of six oblong bas-reliefs in bronze, having moulded frames on three sides, and projecting canopied work on the upper side. The execution of these reliefs has been entrusted to Mr. Clark Stanton, R.S.A. At the angles of the next stage are short twisted columns supporting statuettes under canopies. The statuettes are to be executed by Mr. Rynd, sculptor; and to Mr. Burnet has been allocated six upright bas-reliefs, which occupy the surface of this stage. The canopies over these uprights are more elaborate than those on the first stage. The upper stage is elaborately decorated with foliated enrichments, and a small representation of a hunting scene will be introduced. This portion of the work is to be modelled by the Messrs. Stevenson. The monument, exclusive of the statue of the Duke (which has been executed by Mr. Boehm, R.A.), will reach a height of about 20 ft. The site fixed upon is the small square to the west of St. Giles's Cathedral.

THE Town Council of Edinburgh have directed Mr. Moreham, City Architect, to prepare plans and procure estimates for public baths to be erected on part of the ground which was occupied by the old Infirmary. The value of the site is estimated at 2,380l., and the probable expenditure upon the building 8,700l. The Town Council have also under consideration suggestions for the erection of a monument in St. Giles's Cathedral to the late Dr. Chambers, who restored that edifice. Amongst other contemplated improvements in the city are additions of a porch, &c., to the Catholic pro-cathedral in Broughton-street; the completion of the Waverley Hotel, Princes-street; and a new branch police station for the Causewayside district.

THE photographs which Mr. John L. Robinson, of Dublin, took on the recent excursion of the Architectural Association, and which are now on view at the Architectural Museum, Tufton-street, Westminster, will be of interest to more than the thirty individuals who went on that pleasant expedition. Mr. Robinson, being himself an architect, chooses his points of view with more judgment than the ordinary photographer could be expected to display; while the facilities afforded by the excursion enable him to obtain subjects which the professional photographer would neither know of nor care for, but which are of value to the architectural student. It must not be supposed that the whole series of something like twelve dozen plates are picked examples of the photographer's skill: the conditions under which they were taken would prevent that. But many of them are excellent specimens, and present such a charming play of

light and shade, such indications of intelligent seizing of opportunities, as to give them a very distinctive character. Of course, colour cannot be even hinted at by photography, but form, tone, and texture can, and as examples of these the charming series of views from Compton Winayates should be specially noticed. No more piquant specimen of Tudor brickwork exists in England than this home of the Comptons. Some of the interior views, owing to the want of light, are less successful as pictures, although interesting as examples of architecture. But the whole collection must be judged, not as photographs, but as reminiscences of architectural features, selected by an architect of keen perception and catholic taste.

LORD BRABAZON, in asking, through the *Times*, for further assistance for the Metropolitan Public Gardens Association, states that the Association has, during the past year, added to the open space already at the disposal of the public three playgrounds and eleven gardens, comprising a total of about fourteen acres, at a cost of about 3,000l. They have fitted up 300 seats as resting-places for the aged and weary, assisted in the formation of many gardens and playgrounds, and fitted up a public gymnasium and obtained grants for others. Among the schemes on hand are the laying out of the churchyards of St. Dunstan, Stepney (six acres), St. Anne's, Limehouse (four acres), and that of St. Paul's, Shadwell, a much smaller space, and of a public playground at Whitechapel. The Association is untiring in its work, but wants funds; and we hope those who are able will support an association which is doing such a real benefit to the people.

THE subject of the influence of religion and art on each other occupied a good deal of attention at the Tuesday sitting of the Church Congress at Portsmouth. Mr. Sedding read a paper, very eloquent in parts, the main point of which was the plea for the introduction of good modern art into churches, not mock Medievalism. In this we are entirely with him, though we can hardly admit that Hunt's "Light of the World" is of more interest to the modern Christian than the *Ansdei Madonna*. If he had said "to the uneducated modern Christian" we could have concurred. Mr. Horsley, R.A., read a strong paper against the use of naked models in art, a subject on which he is somewhat *l'été monté*. There is certainly something to be said on both sides. There appears to have been a greater freedom arising lately in regard to the drawing from nude models by female students, and probably Mr. Horsley is right in intimating that some female students are going into this quite unnecessarily, for any artistic use they will ever be able to make of it. We heard of one case where a self-constituted class of female art-students endeavoured to engage a well-known male model, and the man, with apparently more sense of decorum than the women, refused the engagement. A great deal depends on the question of the spirit and reality of the work that is to be done. Speaking to an audience of clergymen, mostly quite ignorant of the conditions of artistic work, Mr. Horsley, of course, had it all his own way. Probably none of these reverend gentlemen are aware what is the mental strain of painting from the nude model, with artists who really mean business; it is hard work, in which none succeed but those who are in earnest. Nor, probably, was the clergyman who proposed to "boycott" all works of art produced with this kind of assistance (all nude works, he apparently meant) in the least aware that every sculptor, in setting about even a completely clothed figure, models the naked figure first, and could make nothing good of it otherwise. We believe there is some reform and restriction desirable in regard to the indiscriminate use of naked models, but the system does not necessarily imply degradation,—that is only the view of small-minded people who cannot see through conventionalities; and Mr. Horsley's theory that the best art can be produced without it is not happily illustrated by his own paintings.

#### A FAREWELL TO GREY FRIARS.

Here Lyes  
A BENEFACTRESS.  
Let no one  
Move his BONES.

So runs the inscription of a mural tablet in the sole existing cloister of Grey Friars, Newgate-street. When read in conjunction with lately-published scheme of the Charity Commissioners, this admonition has a more than ordinary significance. For after one or two previous movements to the like end, that body have decided upon a measure which but few citizens will regard with indifference,—the removal of the time-honoured Bluecoat School to "within a convenient distance from the City of London." From one point of view, so radical a change may be appositely compared with certain events which happened on this very ground just 350 years ago. At that crisis in the ecclesiastical fortunes of England, the Defender of the Faith found nowhere so rich a spoil as in his own capital. One Cistercian abbey, viz., Edward III.'s East Minster of St. Mary de Grace, West Minster itself, the St. Clare nunnery of Blanche, Queen of Navarre,\* the Dominicans Mendicant at Blackfriars, Child's Cliniacs of Bermondsey, Queen Matilda's Holy Trinity at Aldgate, the nuns Minchin of St. Helen's, Humphrey Bohun's Augustinians, the Carmelites at Whitefriars, Do Manny's Carthusians at West Smithfield, together with other large and wealthy priories,—the outgrowth of centuries of covetousness and liberality,—all fell at once, and undefended, before that new sacrifice of Suppression.

Foremost among these religious houses ranked the monastery of Grey Friars, whose inmates followed the ascetic rule of St. Francis d'Assisi. This had long enjoyed a signal share of public as well as of royal favour. The citizens at first strove in emulation to befriend a certain body of monks who had settled in their district. King Henry III. had not long ascended the throne when a party of nine Franciscans reached our shores at Dover. Five of them stayed at Cantorbury: four, coming to London, found hospitable entertainment with the Black or Preaching Friars in High Holborn. After a brief sojourn in the house of John Travers, then sheriff (1224), on Cornhill, where their community and adherents greatly increased in numbers and importance, they obtained a permanent abode in St. Nicholas Shambles, Farringdon Within, through the munificence of John Iwyn, or Erwin, citizen and mercer. The deed bears the date 9 Henry III. William Joyner (mayor in 1239) builds for them a chapel, latterly the church choir; a nave is added by Henry le Wallis,—six times mayor during the period 1273-1298. These were supplemented with the chapter-house of Walter le Pote, sheriff in 1269 and 1272; the dormitory of Gregory de Rokele, mayor (1274-1280); the refectory of Bartholomew de Castro; Peter de Helyland's infirmary; and so on. William, King Henry III.'s tailor, provided a watercourse, which, springing from near to Bagnigge Wells, ran beneath Leather-lane, Holborn, and Newgate. In 1301, however, these yield place to a more magnificent structure, which was begun at the charges of Margaret of France, second wife to Edward I., who gave 2,000 marks for the choir; Gilbert de Clare, earl of Gloucester; and John de Bretagne, earl of Richmond, who, together with his niece, Mary, countess of Pembroke, contributed the new nave. The consorts of the two sovereigns next in succession resumed the pious work: other less exalted benefactors followed, including Sir Richard Whittington, who built the library, furnishing it with costly books.† Scarcely any trustworthy particulars come down to us as to the outward aspect of the new church, which was dedicated to St. Francis in 1327. The actual site we shall presently describe, and will merely state that the church was 300 ft. long by 89 ft. wide, with a height of 63 ft. from its marble floor to the roof. Particular sanctity was deemed to rest in interment within the precincts of Friars Mendicant. This accounts for the fact, insisted upon by Weaver, of the unusual number of illustrious personages

\* Introduced into England at the end of the thirteenth century. Their foundress, St. Clair, was a Franciscan nun, and a contemporary fellow-townswoman of St. Francis at Assisi. He was born there in 1182.

† It is on record that for the transcript of one set alone, De Lira's works in two volumes, 100 marks were paid.



uried here. They comprise four queens, two duchesses, two of them being Beatrice de Bretagne, daughter to Henry III., and Eleanor, duchess of Buckingham; one duke, John of Labour, who, taken prisoner at Agincourt, died captive in the Grey Friars; four countesses; two earls; eight barons, &c.,—in all 663 persons of quality. All the monuments were destroyed and sold in 1545 to the Lord Mayor, Sir Martin Bowes, for 50*l*.

It is conceivable that, in course of time, the citizens did not, in a general way, much concern themselves at the downfall of the monks and nuns. But they felt a pecuniary interest in the sudden conveyance of many eleemosynary endowments from the sick and the poor. We thus find them after the Dissolution petitioning the sovereign for the restitution of the St. Mary's, St. Bartholomew's, and St. Thomas's hospitals, together with the new Abbey [St. Mary de Grace] at Tower-hill . . . only for the relief, comfort, and aid of the poor and indigent people not being able to help themselves."† They recovered St. Bartholomew's in 1544; the next year they secured Simon Fitz-Mary's Hospital,—site of Liverpool-street railway station,—for lunatics, the modern Bethlehem. On the 3rd of January, 1546, Bishop Ridley announced from St. Paul's Cross that, by indenture dated December 27th, 1545, the king had made gift to the mayor, commonalty, and citizens of all the priory buildings, to be known as "Christ Church within Newgate, founded by Henry VIII." together with the adjoining Bartholomew's Hospital, and the parish churches of St. Owen, Newgate Market, and St. Nicholas. These two parishes and such part of St. Sepulchre's as lay within Newgate, were to form the new parish of Christ Church. "A very odd foundation," observes Stevens, "to let two churches of four acres, subverting the other two, and a good hospital, and to call himself a founder." The poor do not seem, however, to have derived much benefit from the change. It was King Edward VI., moved, we are told, by Ridley's exhortation upon the exercise of charity (1552), who shortly before his death established the three royal hospitals of Christ, St. Thomas, and Bridewell respectively, for the young, the sick, and the necessitous or thriftless poor. Of Christ Church, the library excepted, was consumed by the Great Fire. The existing structure was built by Wren, 1703-4, at a cost of nearly 12,000*l*. Like to the parallel instance of St. Bartholomew's the Great, West Smithfield, a modern grave-yard, to the west of Christ Church, distinguishes the site of the old Greyfriars. Sir Robert Clayton's Wing (1682), along the southern cloister, and in John Moore's writing-school, beyond the northern cloister (1694), are Wren's work also. Between "the ditch" playground and St. Bartholomew's Hospital is the Grammar School, built in 1795, mainly by Sir John Smith's bequest. An open cloister, the northern, occupies the position of Whittington's Library; a dormitory replaces the old Hall, which was supported by the western cloister (1836). On Restoration, 1829, was opened John Shaw's new Hall; the Tudor dormitories and wards were designed by his son.

A faithful copy-plan lies before us dated 1540. Grey Friars Churchyard is marked thereon, between the City Wall and Ditch, being situated westwards of "The Walke" leading through a gateway in the London Wall to St. Bartholomew's. Beyond is another burial-ground for the poor of that hospital.† The gateway in the Wall,—and its representative still exists,—stands by the north-western angle of Great Cloister, westwards of which latter (and within the Wall) is Little Cloister. It is over Little Cloister that we see the boys at play as we pass the railings in Newgate-street. Great Cloister is the modern court-yard between the dormitories. Southwards is Greyfriars Church, its eastern end abutting against Fowle or Chicken Lane.‡ The plan gives a bird's-eye view of the church. It is of the type customary with Friaries; no chapels break the simplicity of

the nave and choir, whilst the plain outline shows in striking contrast with the more varied configuration of abbatial and cathedral churches. Between the end of Fowle-lane in Newgate-street and Warwick-lane are indicated the Shambles with the meat and flesh markets. The slaughter-houses used to be in Warwick-lane. Did we continue the Wall westwards from its existing remains in St. Botolph's-without Churchyard, along the southern side of the detached Christ Church burial-ground in King Edward-street, and then on to the bastion which stood at the return towards Newgate, we should pass between the School Infirmary (1822) and the rear of the Hall. The Hall, in fact, stands over the former refectory and against London Wall. The ditch beyond is commemorated by the name of the playground we have already mentioned as facing the Mathematical and Grammar Schools. The opening here, facing Christ Church burial-ground, was made on the removal of the Rose and Crown Tavern with other tenements within the gates. Mr. Legg, Architect to the Governors, informs the writer that the southern wall of his offices beneath the Latin School in the Clayton wing is built over a thick wall of chalk, flint, and rag; this, doubtless, is a relic of the former nave. What was left of the western Great Cloister was removed (1827), together with the earlier hall erected after the Fire, by Sir John Frederick, who was mayor in the year 1661. No remains of Grey Friars are now visible other than the pointed arches, shamefully disfigured by later modern filling-in of brick, and the buttresses of the southern Great Cloister. Here should be noticed the lower level of the pavement, now resonant during play-hours with whipping-tops and thongs of the genuine eel-skin.

With no income from original endowment, the property has increased to a princely amount by the gifts of subsequent benefactors and the contributions of governors' donations. The present net value of the educational endowment,—there are other charities besides,—exceeds 56,000*l*. The Metropolitan property comprises about 1,000 houses and holdings in various parts of the City, in Westminster, Southwark, St. James's Park (western side), Old Ford, Holloway, and Deptford. The country estates lie in the counties of Middlesex, Essex, Kent, Buckingham, Oxford, Surrey, Sussex, Hereford, Bedford, Cambridge, Hertford, Lincoln, Norfolk, Northampton, and Berkshire. There are, besides, certain urban possessions at Reading, Ware, Romford, Brockley, Epsom, Hornsey, Rochester, and Erith. The Hertford schools for girls and the little boys stand on seven acres, in all, of land. The London premises cover 1a. 2r. 20p. out of 4a. 3r. 20p.; this latter site being estimated at a value of, say, 700,000*l*.

The primary object of King Edward VI.'s foundation was to provide orphans and otherwise destitute children with a home. Let it not be urged to the boys' reproach that in each corner of Great Cloister once stood a statue of a Blue Coat scholar thus inscribed:—"This is Christ's Hospital where poor Blue Coat boys are harboured and educated." They have relinquished their "yellows" or sleeveless under-tonsics, and their muffs, caps, but in other respects retain the dress, being that both in colour and fashion peculiar to the inferior classes, which they exchanged for their "russet cotton."\* in Queen Mary's reign. Stow described their appearance, thus clad for the first time, in Easter-tide, 1553, at the Spital sermon, Spital-fields. On their buttons is the effigy of their founder. Though they have long ceased to make periodical excursions to bathe in Peckers-pool, we shall miss their familiar appearance in our streets, sometimes in groups under charge of a Royal Artillery sergeant. We shall miss too the Lenten "Suppings," the processions to the Mansion House, and the Spital sermons in Christ Church at Easter-tide; and, it may be, the annual presentation of the forty "Royal Mathematical Boys," with their drawings, to the sovereign. They cannot boast of the more aristocratic associations which cluster around the past *alumni* of Charterhouse or St. Paul's, which have already set the example of migration from Town. But that school has little to be ashamed of whose inner life is portrayed by the facile pens of Leigh Hunt, Coleridge, and Charles Lamb, which has given to the world such scholars as Joshua Barnes, a

Grecian of Grecians, Markland, Campian, and Mitchell; to the Church men like to Stillingfleet and Middleton; which can claim as its own Thomas Barnes, prince of editors, Scholefield, Hartwell Horne, and Thomas Dale; the authors of "Britannia" and "Clarissa"; and a hero like Louis Cavagnari, beneath whose bust at Christ's is fittingly written the *Dulce et decorum* he won at Cabul.

#### COMPETITIONS.

*New Church, Grove Park, Lee.*—In the recent competition for this building, the design of Mr. Charles Bell, of Dashwood House, E.C., was selected, and the work will be proceeded with at once. There were twenty competitors.

*Undercliffe Drive, Bournemouth.*—At the meeting of the Bournemouth Improvement Commissioners on Tuesday last, the Report of Sir Joseph Bazalgette on the twenty-nine sets of plans sent in in this competition was read. The following is an extract from Sir Joseph's report:—

"Out of the twenty-nine schemes submitted, sixteen propose the formation of roadways not exceeding 10 ft. above mean sea level, and of these nine propose the formation of roadways and footways, the united widths of which do not exceed 40 ft., and seven of them not exceeding 50 ft. It is from the plans whose general outlines come within these limits that the approved designs should be selected, having reference also to their provisions and appliances as being best suited to the locality.

But the selection must not be assumed to embrace the approval of all the details of any plan.

The design under the title of 'Utile Dulci' provides a carriage-way 30 ft. wide with a 10 ft. footway raised 10 ft. above mean sea level. Flights of steps, extending along an aggregate sea frontage of from 8,000 ft. to 9,000 ft., give access from the footway to the sands. These are broken by twelve inclines for boats and bathing machines, each 20 ft. wide, viz. seven on the east side of the pier and five on the west side, in addition to one opposite Durley Chine, 120 ft. long; also by seventeen projections for sheltered seats, each 30 ft. in length. The steps would be largely used as seats by nurses and children in fine weather. This design, taken as a whole, deserves first prize, although it would not be well to carry the roadways under the pier as suggested.

Next to it should be classed the design 'Ad Rem,' which proposes also a 30 ft. road and a 10 ft. esplanade raised 9 ft. 6 in. above mean sea level. It provides four lengths of inclines, in convenient places, for boats and bathing machines, giving an aggregate length of frontage to the sands of 2,310 ft., and twenty-eight flights of steps, each about 80 ft. length of frontage, or a total of 2,620 ft.; and the line of wall is broken by thirteen projections with sheltered seats and steps to the sands.

The third place should be awarded to 'Fidelitas Vincit,' which provides a roadway 31 ft. wide and a footway of 12 ft.; but raised only 8 ft. above mean sea level. The line of sea-wall has twenty-seven flights of steps, each giving 160 ft. of frontage to the sands, or a total length of 4,000 ft., but each 300 ft. of wall is broken by circular projections for seats. The approaches to the pier are well arranged."

Sir Joseph Bazalgette mentions that the estimates for the drive and cliff works in the three selected designs range from 28,525*l*. to 35,142*l*., "but as the authors have variously estimated the value of the work to be done, they do not bear comparison." The committee of the whole Board appointed to consider the matter recommended that Sir Joseph's advice in the above Report be followed, and that the three premiums of 200, 100, and 50 guineas for the three most suitable plans be awarded to the authors of the designs respectively marked "Utile Dulci," "Ad Rem," and "Fidelitas Vincit." The recommendation of the committee was unanimously agreed to. It was decided that an exhibition of the whole of the plans take place at Messrs. Robb's, 5, Mart, on Wednesday, Thursday, and Friday next week. The three successful plans were opened, and it was found that the authors were—(1) Mr. John Stewart, (of Hackney), Little-down-road, Bournemouth, a visitor; (2) Mr. T. J. Soconce, Unity-street, College-green, Bristol, who has designed a similar work at Weston-super-Mare; and (3) Messrs. Rowell & Harding, Wimbeldon.

*New Church, Borrowstoness.*—Messrs. Shiels & Thomson, of Edinburgh are the successful competitors for the new parish church at Borrowstoness, which is to be erected at a cost of between 4,000*l*. and 5,000*l*.

**New Residential Flats in Westminster.** An extensive block of residential flats is about to be erected immediately in Carlisle-place, Victoria-street, Westminster. The frontage will be 388 ft., and the elevation six stories in height, faced with red bricks with stone dressings. The block will be divided into nine tenements on each floor, each pair of tenements being approached by a stone staircase, with a hydraulic passenger-lift in the well of stairs, communicating with the landing on each floor. The suite of rooms will be self-contained, and varying in accommodation from eight rooms up to fourteen. All the floors will be fireproof.

\* Margaret of France, Isabella, wife to Edward II., and his daughter Joan of the Tower, Queen of Scots; and Isabella *auo jure* Queen of Man. Here, too, were deposited the hearts of Queen Eleanor, wife to Henry III., and of King Edward II.; with the body of Isabella, daughter of Edward III., and wife of Ingelmar de Courcy, earl of Bedford.

† Vide certain memoranda relative to the Royal Hospital, a Court of Common Council, 1836.

‡ The thoroughfare from Newgate-street to St. Bartholomew's, along "The Walke," was closed seventy years ago. § Since Butcher Hall-lane, now King Edward-street.

\* On St. George's Day, 1563, the Grey Friars abandoned their London russet for their original dress, in undyed white-grey.



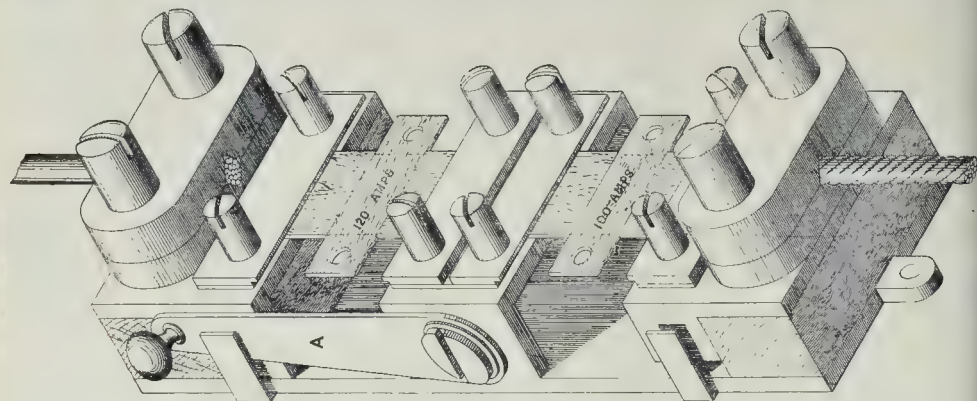


Fig. 1.

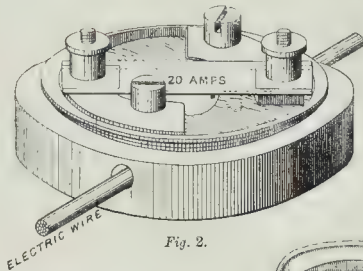


Fig. 2.



Fig. 3.



Fig. 5.

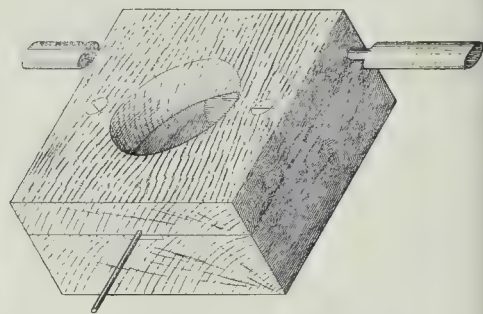


Fig. 4.

## INVENTIONS EXHIBITION.

THE Globe Electrical and Engineering Company have an almost complete display of Mr. Killingworth Hedges's patents in electrical appliances. It comprises, amongst other fittings, Mr. Hedges's switches and contact-breakers, which, in electrical parlance, take the place of gas-taps and unions. These instruments made their first appearance at the Exhibition in Paris of 1881. The movable rubbing surface is of bent copper, which gives a very large bearing, and is easily replaced when worn. Switches of all sizes, on this principle, are constructed at the Globe Company's Works, and are exhibited to carry currents suitable for 300 lights.

A new ornamental type of small contact-breaker for group or single glow lamps has lately been introduced for use in houses, the case being made to harmonise with the decoration. In this pattern, when the current is passing, the contact arm is well kept up to its work by means of a wiping spring engaging on the short end of the arm, which plan prevents any chance of the switch being left turned partly on and dangerously heating.

The above company also exhibit a most complete collection of Hedges's cut-outs, referred to specially in the discussion which followed Mr. Hedges's paper on "Precautions to adopt on introducing the Electric Light into Houses," read before the members of the Royal Institute of British Architects on February 18th, 1884. Some of these instruments are shown with an arrangement which enables resistance to be put into the circuit automatically on the melting of the fuse. At first sight this may seem a blundering policy, as the primary object of a cut-out is to act as a safety-valve and protect against any excess current. In practice, however, the sensitive fuses, such as are indispensable for complete safety, are often melted by the wrong circuit being switched on by a careless attendant. In the event of such an accident with the new

automatic duplex cut-outs, the lights would not go out as under the old system, as the excess current would be broken by the resistance, and nothing but a dangerous short-circuit would melt the remaining fuse and extinguish the lights. The cut-outs remain of the same design as were shown at the Philadelphia Exhibition, where they were employed in protecting the electric light wires. Fig. 1 is a duplex form, which enables a spare fuse to be instantly substituted for that melted, by turning the handle marked A. For instance, as shown, the working fuse is set to carry the current for 100 lights and melt with any excess current, and the spare one marked 120 would be thrown into action by causing A to bridge the gap. Fig. 2 is a cut-out designed for smaller currents, and is the kind generally used in private houses; the mica foil is shown by Fig. 3, the fusible portion being shaded. Fig. 4 is a connector form of cut-out, and is constructed of an alloy which adheres to the mica when melted, and does not run into globules which may cause fire. It is so arranged that the branch main can be united to the small lamp wire without cutting the former, and, at the same time, produce a very simple form of fusible connexion. Fig. 5 can be inserted, and easily replaced if melted, by any person, without special electrical knowledge. This pattern is used throughout the Law Courts, and for the protection of the electric light wires in the South Kensington Museum and Buckingham Palace. Considerable alteration has taken place in the fuses, which have been somewhat improved and strengthened at the ends where the contact takes place, making them much easier to fix than the dangerous lead wire fuses.

A novel arrangement in automatic cut-outs may also be seen at the Globe Company's stand. It consists of a lever, to which a weight is attached, the lever being held up in place by a small notch in a steel bar, which, when the current exceeds a given amount, is attracted by the action of an electro-magnet placed in a shunt circuit, releasing at the same time the

weighted lever, thus opening the circuit immediately the current exceeds the amount the instrument is regulated to carry.

The Globe Company show a variety of electrical accessories and fittings, such as would be required for house lighting, also a novel speed indicator for insuring the steady running of the dynamo, which can also be applied for registering the speeds of all fast-running machinery.

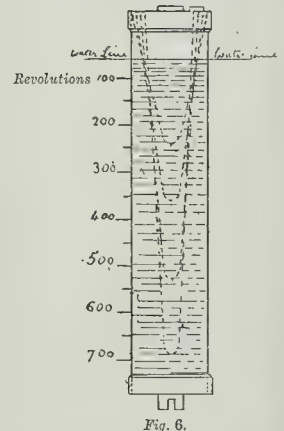


Fig. 6.

It is known as the vortex speed gauge, and is merely a movable glass tube which is rotated in a metallic case, on the outside of which is fitted a sliding ring. The glass tube being partially filled with fluid, when revolved the liquid has a tendency to force its way up the sides of the glass and carry the air down the middle in a parabolic form, which lengthens or elongates



ing to the speed. The action is shown in the accompanying diagram (fig. 6). The form of the bubble registers the speed, which may be determined by getting the wires of the ring in a line, the revolutions being ended on the side of the case. The angular velocity of the fluid which causes the depression in any given speed can be calculated; and as depression is always in proportion to the velocity, so the calibration of this instrument is no simpler than other designs of speed indicators, in which the ordinates vary with the square of speed.

Several of these gauges are working in the engine-room at the Exhibition.

## THE CHURCH CONGRESS AT PORTSMOUTH.

The Ecclesiastical Art Exhibition in connection with the Church Congress is well worth a visit. The Assembly-rooms at Cawley's Hotel, on Southsea Pier, have been arranged for reception, and afford a fairly satisfactory display of "galleries." The exhibits are divided into two classes: modern church architecture, decoration, &c.; and an excellent collection of miscellaneous items of ancient ecclesiastical art. We shall first briefly notice some of the most striking objects shown in the latter class.

Messrs. Bemrose & Sons, of Derby, occupy a stall at the entrance. Besides a quantity of ecclesiastical literature, they show, among their productions, Mr. St. John Hope's "History of Saints, Derby," and Ussher's "History of the Church," not to mention Cox's well-known "Bible Churches." These works are carefully illustrated, and should be in every ecclesiastical reference library. This may be a hint to the Library Committee of the Institute.

Mr. W. Baker, of Wigmore-street, shows many other objects some excellent, especially designed Buckinghamshire lace; and various examples of embroidery. Of the latter may be named a dark-red chasuble with a flower-work, the figure of our Lord at the back being represented as nailed to the flowers. The treatment of the foliage is, however, rather too naturalistic. We noted also some altar-frontals, one of the best being a white cloth one, with conventionalised flowers and leaves between dark velvet orphreys. The Wimbledon Art College for Ladies would appear to undertake all kinds of decorative work—painting, embroidery, stained glass, &c. The best example of the College work shown was an altar-frontal of white silk figured with a floral design, and a powdering of conventional flowers in well-harmonised and bright colours.

The Zeolus Waterspray Ventilating Company exhibit a complete series of their various apparatus for ventilating and warming churches, schools, &c., illustrated by good working models. The East Grinstead Sisters are as usual to be depended upon for their excellent work in embroidery. At the same time we would suggest that the human figure subjects are too archaic in character, and poor in drawing and conception. The fact is, also, that the very nature of needlework makes it unsuitable for this kind of representation. The Sisters exhibit some excellently executed stoles, altar-frontals, &c.; and we also noticed a wall-hanging of some coarse green material, covered with an effective embroidery of brown stems, silvery leaves, and golden fruit.

Mr. E. Frampton, of Buckingham Palace, shows a stained-glass window intended for Stepney Church. We preferred, however, to small lights, by the same artist, representing St. Cecilia and St. Gregory. Messrs. Turner & Co. have a large show of their well-known school fittings, and also exhibit some of the elaborate items of church furniture, including an oak altar and lectern.

Messrs. Jones & Willis have a well-arranged display, containing examples of all kinds of church architecture and decoration—oak and brass work, embroidery, and silver communion vessels. Among the examples of embroidery may be noted a dark red silk frontal, with flowers embroidered in dull golds, greens, and purples, as being quiet and satisfactory in effect.

Messrs. A. L. Moore & Co., of Southampton, furnish numerous cartoons, and also examples of their stained glass. We remarked

a panel of Renaissance character, with arabesque ornament around the figure of a girl playing a lyre. A Mediaeval panel, with armorial detail, was also noticeable, the heraldic drawing being, however, rather too forced and extravagant.

The Royal School of Art Needlework has a well-arranged display of some of the most noteworthy embroidery in the Exhibition. Against the wall hangs a very rich-looking quilt of white satin worked over with elaborate gold-foliated ornament, outlined with red. Below, a very original altar frontal attracts attention. The ground is white cloth, and figures of angels, including Raphael, Michael, and Gabriel upon it, are outlined only in dark browns, greens, and golds. The embroidery is partly in silk and partly in crewels. Along the super-frontal runs the inscription:—"Tibi Omnes Angeli incessabili Voce Clamant." The whole work is certainly striking, but savours rather too much of a cartoon in its effect. It was designed by Mr. Selwyn Image, Messrs. Wake & Dean, of London-road, exhibit useful improvements in seats and desks for schools, mission-halls, &c. The seats can be raised to a vertical position when required, and the desks are convertible to flat tables. There is an extensive collection of all kinds of church fittings manufactured by Messrs. Wippell & Co., of Exeter. Their display of hanging-lamps, coronets, &c., for the lighting of country churches, is particularly noticeable.

The last exhibit we can find space to refer to, is the collection of chairs made by Messrs. West & Collier, of Hambleton. A large number of specimens are shown, suitable for domestic as well as ecclesiastical purposes. With the exception of the "Gothic" ones, the firm may be congratulated upon the character of their designs. Those known as numbers "92," "98," and "102," are really very good, and far preferable to the more elaborate "regulation" patterns of the "complete house furnishers."

Next week, we hope to give some description of the Ancient Art Section, accompanied by sketches made at the Exhibition.

## CARRIAGEWAYS AND PAVING.

We extract the following from the annual report of Mr. James Lovegrove, Surveyor to the Board of Works for the Hackney District:—"Macadamised roads are really very costly as compared with paving. Granite sets form the most economical paving, and next comes wood. In many frequented roads, if the cost of paving were spread over a period of twenty years, it would probably be 40 to 60 per cent. less than the cost of maintenance of a broken granite road."

In my report of 1867 it is stated that when the cost of maintaining granite roads reaches 10d. per yard super, paving should at once be laid down, but it must be also borne in mind that the above estimated cost per yard is the average of considerable lengths, some portion of the lengths being wide and some portions narrow; therefore the cost per yard in some parts of Kingsland-road surface would be 3s. per yard super, and other portions 1s., and so with the other roads. The maximum saving would, therefore, be obtained by paving the full widths of the narrowest portions of the roads herein named, rather than by selecting one or two complete lengths.

The roads, or parts of the roads referred to, have since been paved, but there are other roads in the district, as costly, and, indeed, some more costly than Kingsland-road to maintain with broken granite, and which are, nevertheless, very rarely in good order for a longer period than nine months:—

The following are a few examples:—

Lea Bridge-road.  
Church-street, Stoke Newington.  
Albion-road, Stoke Newington, south end.  
West-street and Pritchard's-road.  
Well-street and Water-lane.  
Part of Morning-lane.  
Margins of Stoke Newington-road.  
Margins of Stamford Hill.  
Margins of Upper and Lower Clapton.  
Homerton High-street.  
South portion of Clarence-road.  
Dalston-lane (part).  
Shacklewell-lane (part).  
Ambrose-road (eastern portion).  
Victoria Park-road (western portion).

## On Broken Granite Tests.

On p. 5 of my last annual report are given the positions and lengths of four different kinds of granite, laid down under the same lines of

traffic, with the view of making a comparative test as to quality.

It is difficult, however, to fix upon any considerable length which can be divided and each division subjected to exactly the same conditions.

1. There should be one common incline and cross section.
2. The line should be straight.
3. There should be no lateral or cross streets, nor any depot, or wharf, or anything likely to interfere with the continuity of the traffic.
4. All parts should be equally exposed to the same atmospheric conditions, and be treated the same in respect of cleansing and watering.

The best and most durable road materials are not discoverable by watching the surface condition only of the road. The condition of the underside and the size of the materials should also be well examined. Thus I find in the case of Guernsey granite the under parts of the stone remain intact, presenting the sharp angles as when first laid down, and not much crushed under the steam roller, consequently less new material is required when it becomes necessary to pick up and regulate the road. In other granites, though differing but slightly in surface appearance, the stones are found to be crushed and cracked under the roller, and should, therefore, if used, be rolled in with a roller of say not exceeding 10 tons weight.

It is also observable that with the 15-ton roller the other granites do not so readily become fixed as Guernsey, which has a character of toughness peculiarly its own, so that the wavelike form into which it is forced in front of the steam roller is of less height, and the process of abrasion under the roller is conducive to a fixed position. Further, this special quality of the Guernsey stone results in a saving of time in rolling,—and requires much less grit to help to bind it together, consequently a more compact road crust is formed, with less grit to work up as mud under the traffic.

These observations are based on careful examinations which have been made of the respective materials after they have been subjected to heavy vehicular traffic for several years. The trials of Rowley and Cleve Hill stones, referred to on page 5 of my last Annual Report, are the first which have been made of these stones within the district.

Trials have been made in past years with blue Guernsey, Markfield, Belgian, and Quenast stones. Generally the machine-broken granite has been found not so reliable as the hand-broken. In the former there is a considerable admixture of stones of thin wedge-like form, which in the process of spreading will form small patches, less capable of resisting the traffic than the neighbouring stones. Taking all these considerations into account the cost price of the other granites ought to be much less than that of Guernsey in order to obtain equality in value."

## OBITUARY.

Mr. William Dickinson.—On the 26th ultimo, after a few hours' illness of heart disease, died Mr. William Dickinson, of 176, Brookspring-lane, Sheffield, aged 59 years. Mr. Dickinson was up to the moment of his death the clerk of works of the new Montegomery Hall, now erecting in Surrey-street, Sheffield, from the designs of Mr. C. J. Innocent, F.R.I.B.A., architect, of George's-street, Sheffield. He was widely known and much respected, and as a clerk of works he had had a very large experience. For the last twenty years or so he had been almost entirely employed as clerk of works in Sheffield and its immediate neighbourhood. He was the head clerk of works to the Sheffield School Board for a number of years, and nearly a score of the Board Schools, erected by that body from the designs of Messrs. Innocent & Brown, architects, of Sheffield, were carried out under his direct supervision. He was born at Whitehaven, in Cumberland, and was by trade a joiner, but was a thoroughly practical man in the various branches of the building trade.

Mr. Robert Brindley.—With much regret we have to announce, after a short illness, the death on Oct. 1 of Mr. Robert Brindley, a name well known to stone-carvers. The deceased was brother of Mr. William Brindley, of the firm of Farmer & Brindley, in whose employ he had been over twenty-five years, having been foreman of many of their most important works. He was highly esteemed and respected by his fellow-workmen.



# EXCURSION OF THE ARCHITECTURAL ASSOCIATION TO BISHAM ABBEY.

The last summer excursion of the Architectural Association was made last Saturday, the 3rd inst., to Bisham. The members, passing through Great Marlow paid a short visit to the old Deanery, which is now being restored by Mr. Carter, of Great Marlow. There are a few interesting features about the old house, the principal being the old hall, with an open-timbered roof, and two tracery windows of very coarse detail. On reaching Bisham, the first place visited was the Church of All Saints. Here the party was met by the Rev. T. E. Powell, vicar of Bisham, who gave a brief

English doorway which leads into the large hall, which has an open oak roof. This hall has been so surrounded by the later buildings, that all the original windows, which were five in number, have been blocked up, and the hall is lighted from two windows in the apex of the gables. The old windows, which, up to a recent date, were covered with plaster, have been uncovered and the stone tracery exposed. In this hall is a fine carved wood and stone mantel-piece, which was brought from Worcester in 1843. This chimney-piece was originally given to the then Earl of Plymouth, by James I., the house from which it was taken now being used as part of the pottery works at Worcester. In one of the recesses, which was formerly a window, a fresco of the death of the fourth Earl of Salisbury, at

of the dining-room was repaired, some time ago a large quantity of broken glass was found.

The walls of the house were originally built of brick and plastered, and the general tone of the building is a warm grey; the workmanship was originally very bad, and the wonder is how much of the work holds together, probably more from old association than anything else.

The old abbey must at one time have been a splendid building, as it is recorded the knights in armour rode into the church, and hung their shields on the columns, but all traces of the church have disappeared, though during the last dry summer traces of old foundations have been seen in the lawns round the building.

## Illustrations.

### DESIGN FOR STAINED GLASS BY MR. E. BURNE JONES, A.R.A.

THIS is one of the series of stained glass designs made by Mr. E. Burne Jones, A.R.A., of which we have published several, and shall have the pleasure of publishing several more. The window, executed by Messrs. W. Morris & Co., is at Biarritz. It may be noticed how the design, although approaching perhaps a little too much the character of pictorial treatment in the general composition, preserves a simplicity of line in the figures, the drapery, and the trees, eminently suitable for stained glass. The lithograph is reproduced from one of Mr. Hollies' photographs from Mr. Burne Jones's cartoons.

### HOUSE AND STUDIO FOR MR. J. MACWHIRTER, A.R.A.

THE remodelling of this house, 1, Abbey-road, St. John's Wood, was carried out under rather peculiar circumstances, the architect's assistant being called in not to build a new house, but to unite and blend into one two separate already existing houses; such features as the projecting bay-windows, projecting porch, tower, &c., being added to improve the plan in the first place, and to give character to the exterior. The surface of the brickwork over all the exterior was covered with Portland cement pebble casting, which, while preserving the brickwork, gives the outside surface a more agreeable texture than the ordinary smooth treatment. The studio window commands one of the finest lights in St. John's Wood. The work was carried out by Mr. E. Cox, builder, St. John's Wood, from the designs and under the superintendence of the architects, Messrs. Wallace & Flockhart.

### SKETCHES AT ROTHENBURG.

THESE bold little sketches of two old gateways of Rothenburg, by Mr. A. B. Fite, speak for themselves. They have an interest both as representations of picturesque old buildings, and as examples of sketching, for the effective massing of light and shadow which they display.

### MOSAIC PAVEMENTS AT BIGNOR.

FOR a description of these fine specimens of mosaic pavement, see the article on "The Roman Villa at Bignor," on p. 487 of the number of the *Builder*.

### SHOPS, HIGH-ROAD, STREATHAM, S.

Our illustration shows part of a block of business premises, in the Flemish style, recently erected on the Bedford Park Estate, Streatham, S.W., from the designs of Messrs. Wheeler, Hollands, architects, of 27, Chancery-lane, E.C., and under whose superintendence the work have been carried out jointly by Mr. Mearns and Messrs. Hayward & Morgan, builders, Streatham.

**Walthamstow.**—The new Sunday School of St. Michael's and All Angels' Church, Walthamstow, were opened on Tuesday last by the Hon. Mrs. Courtenay Warner. The school have been erected from the designs of Mr. M. Bignell, of Clapham. The contract was carried out by Mr. S. J. Scott, of 3, Blomfield-street, E.C., and Walthamstow.



Part of Deanery, Great Marlow.

description of the church. In the year 1818, when he first saw the church, the only remains of the original building were the tower and the north wall as far east as the chancel. There were no traces of either buttresses or windows in the wall. The church was restored in 1819, under the direction of Mr. Benjamin Ferrey.

The original tower, built of chalk, and plastered, contains little detail of architectural interest. The belfry windows show traces of zigzag ornament, and the plaster falling away at the angle shows the original angle-shaft. Internally, the tower arch is in a good state of preservation, and the chalk ashlar in the ringing-chamber is very good. The principal interest in the church centres in the Hoby Chapel, which contains an imposing monument, of alabaster,

the siege of Orleans, has been painted by Roddam Spencer, but it is decaying very fast.

The dining-room is entered from the hall, and is a fine panelled room, 54 ft. long. In this room are several historical pictures. "Van Tromp," by Sir Peter Lely; "General Monk," by Peter Bursler, &c. The most remarkable picture is that of Lady Elizabeth Hoby, painted after the death of her husband in 1566. She is represented dressed in coif weeds and wimple exactly as she is sculptured in the monument in the Hoby Chapel. This is called the ghost picture, because her ghost, dressed in the negative of this picture—that is, all the white, black, and black-white,—is said to haunt the bedroom (now used as a smoking-room), in consequence of a slight accident which happened to



Bisham Abbey.

to the memory of Lady Elizabeth Hoby, 1566. This has a canopy, supported by columns, and seven large figures. The general feeling of the detail is Italian. In the same chapel is another monument, also to a member of the Hoby family, consisting of an obelisk, with four swans at the base. At the end of the chapel is a large armorial window, the colours being enamelled on the glass.

The members then proceeded to Bisham Abbey. There is very little of the old abbey left, the principal features being the entrance porch, which has a richly-moulded arch and groined ceiling; a good geometrical tracery window, of very similar design to the clearstory windows at Westminster Abbey; and the large hall in the centre of the house. The present house dates from about 1590, and was built by Sir Edward Hoby.

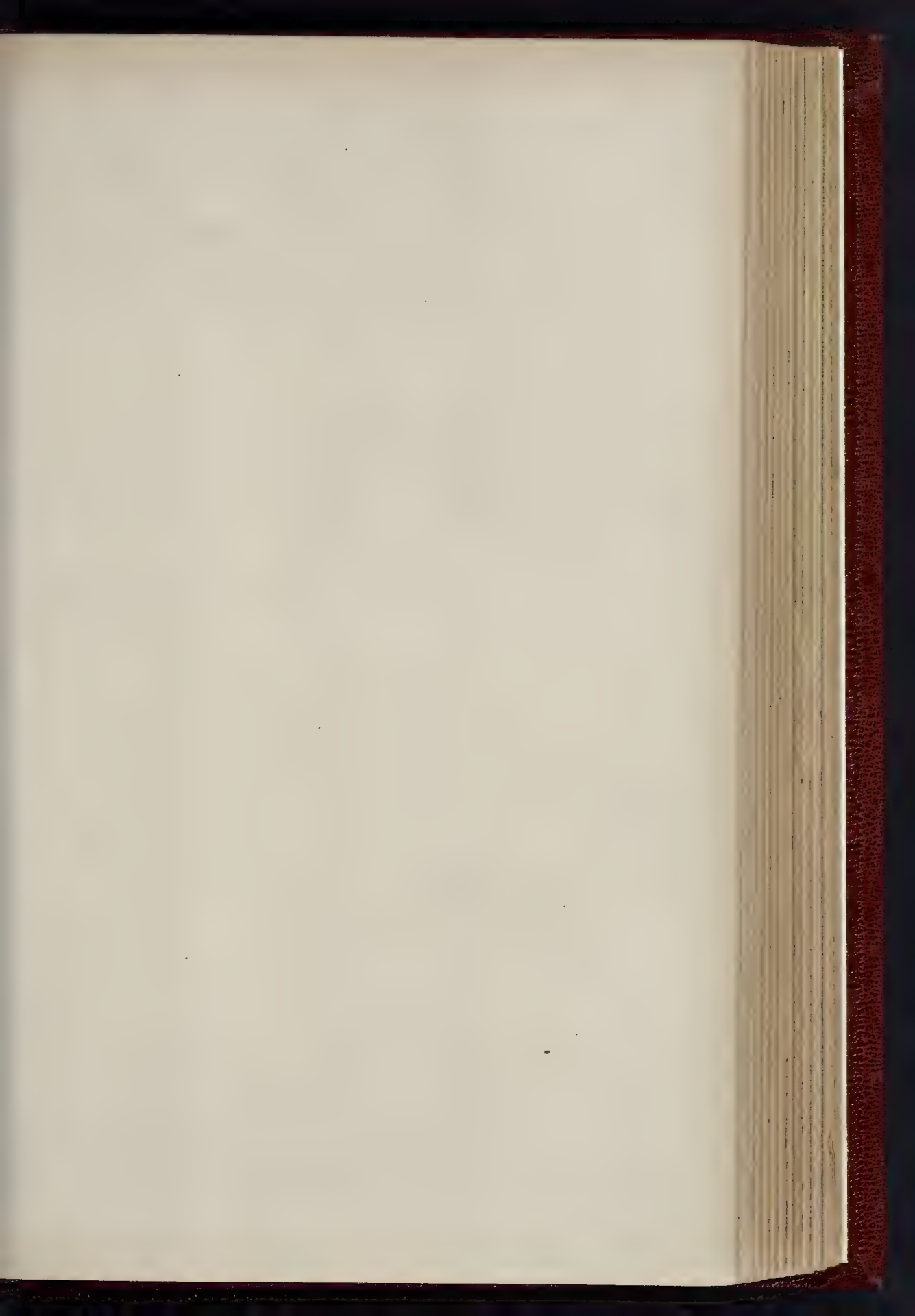
The principal entrance is through the Early

her son William, whom, because he could not write his copies without blots, she murdered. This legend must be true because the identical blotted copybook was found some years ago by the present owner stuffed beneath the joist of the floor.

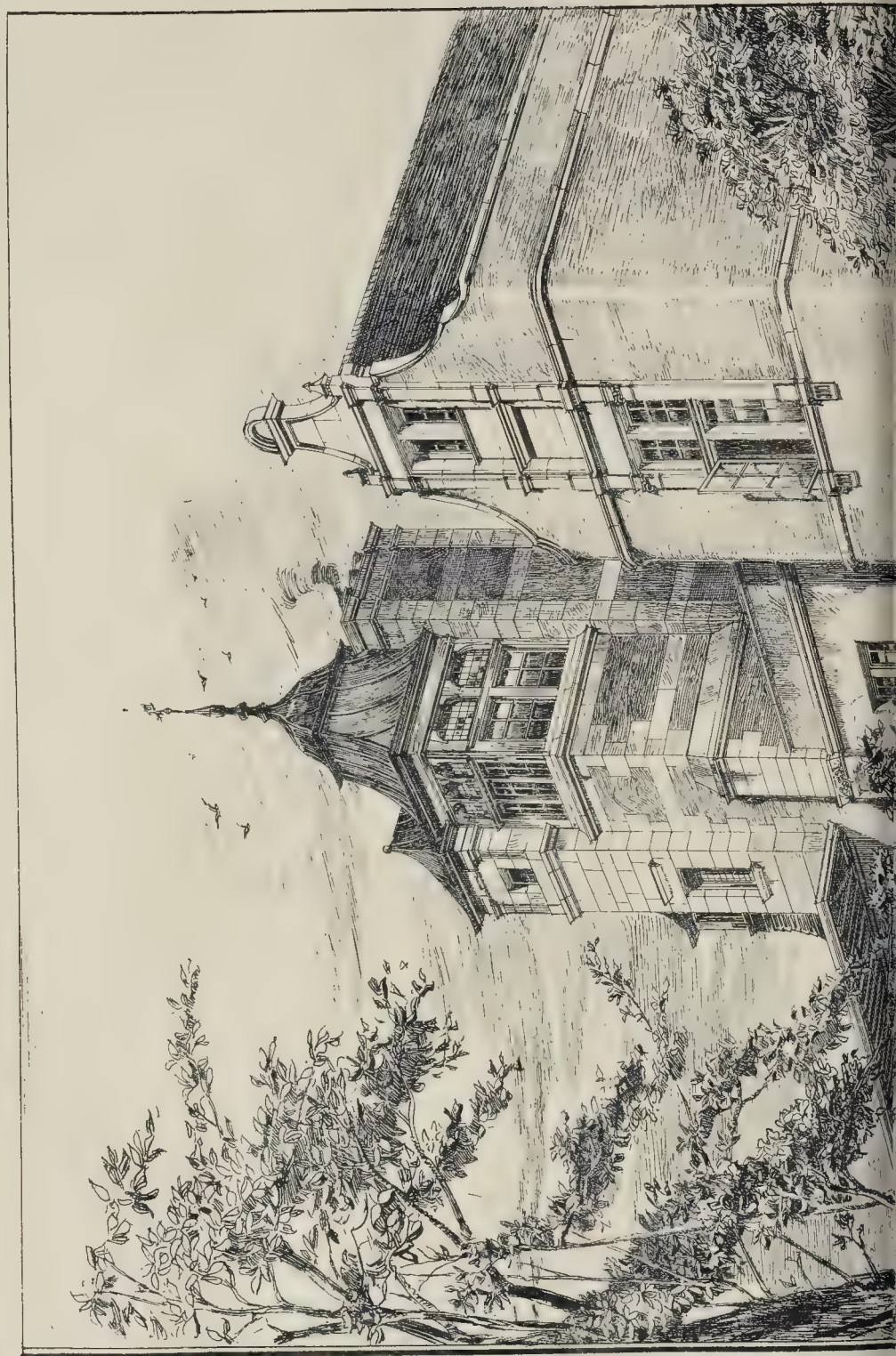
Behind the tapestry of one of the bed-rooms a secret room was discovered, with a fireplace with the fine leading into the flue of the hall chimney, for the sake of concealing the smoke.

The drawing-room was the apartment used by Elizabeth when she was placed by Queen Mary under the charge of Sir Thomas Hoby, and the bay-window is said to have been added for her. The drawing-room has a plaster ceiling, but the roof over it has a fine Early Perpendicular oak roof, which was at one time open. This room has some of the old stained glass left, of which there must have been a great quantity at one time; as when the floor

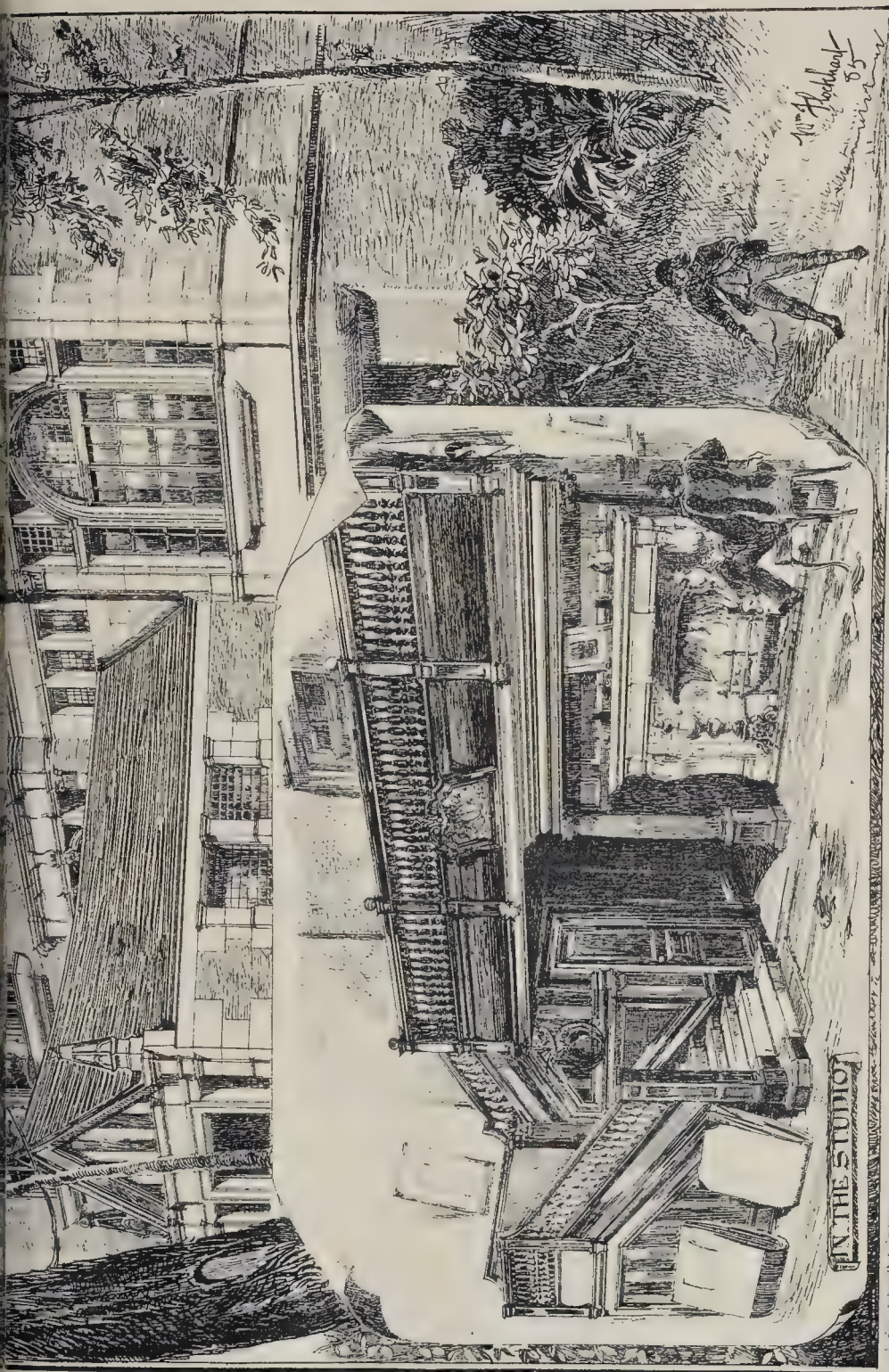




THE BUILDER, OCTOBER 10, 1886







HOUSE AND STUDIO FOR J. MAC WHIRTER, Esq., A.R.A. MESSRS. WALLACE AND FLOCKHART, ARCHITECTS.





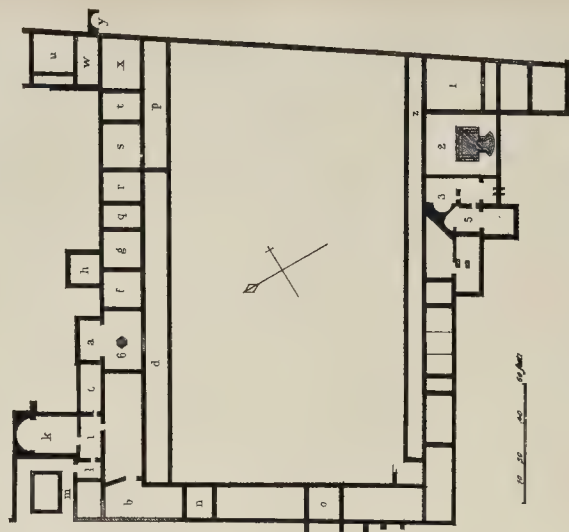




Pavement with head of "Winter"  
Room b on plan



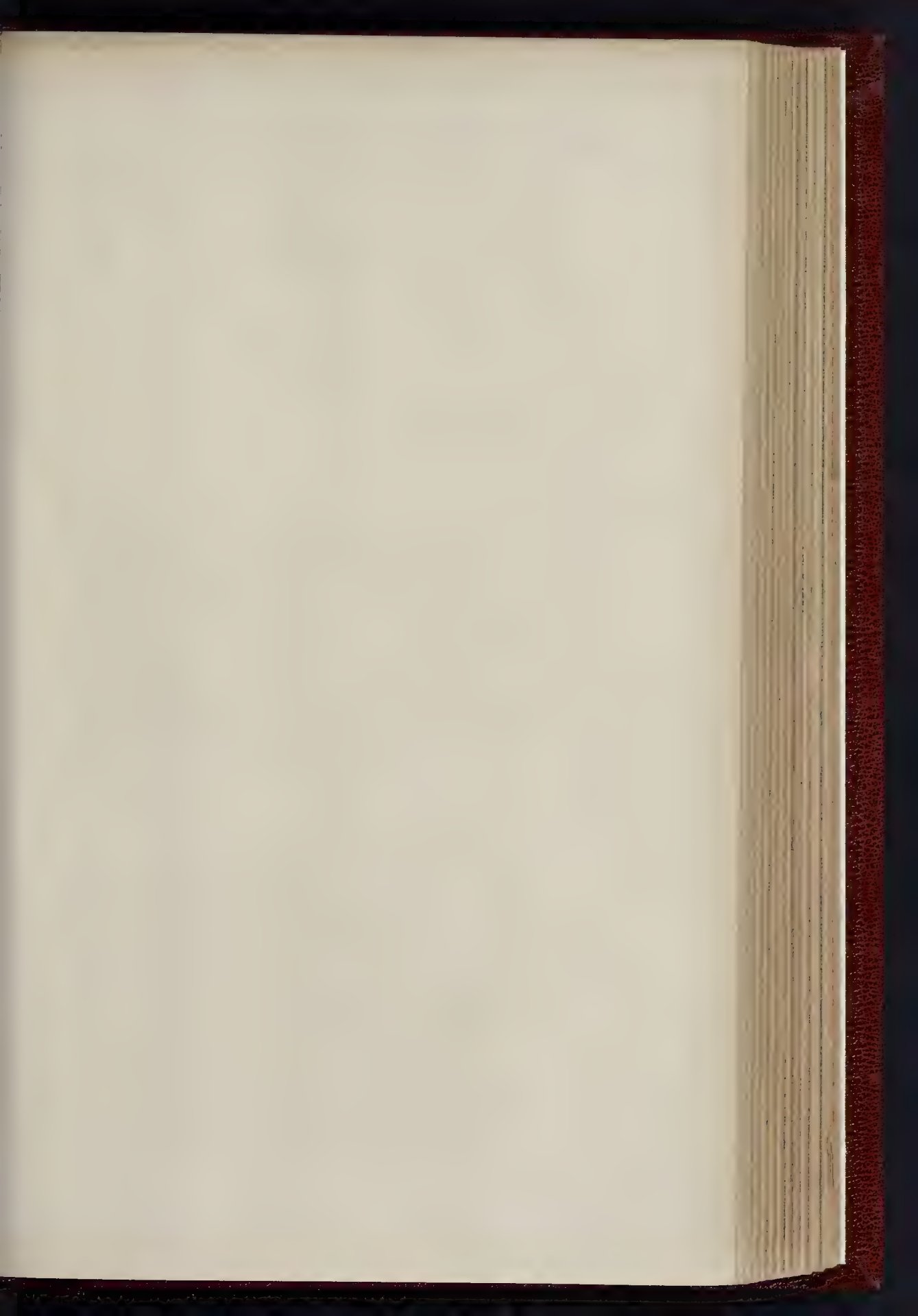
Pavement, Room c on plan



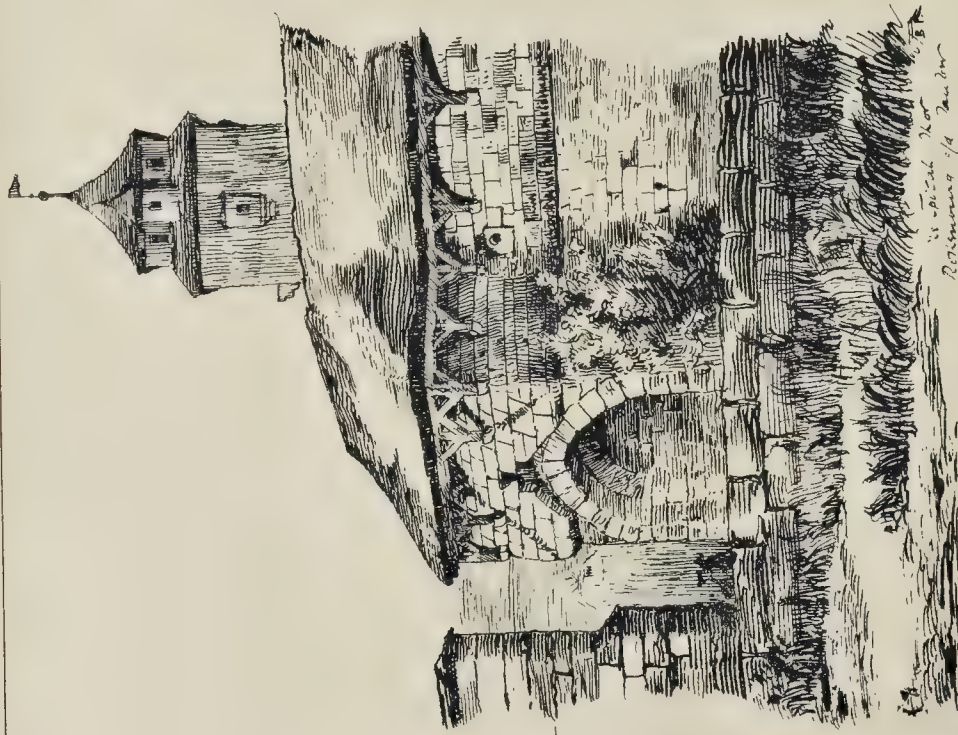
Plan of Villa.

# Portions of Mosaic Flooring from Roman Villa at Bignor





THE BUILDER, OCTOBER 10, 1885



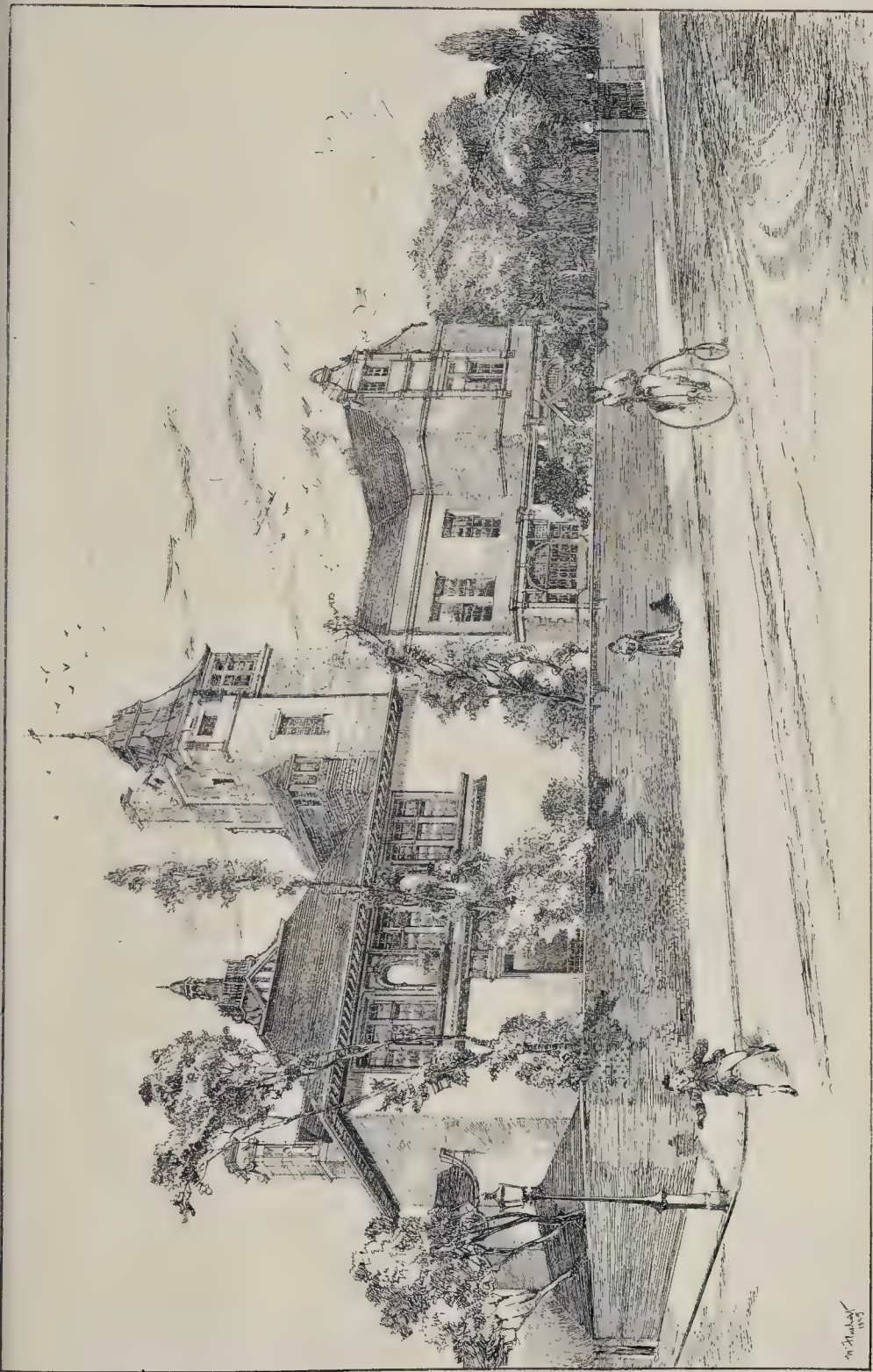
See sketch of  
Rosenburg 1/4 page



See sketch of  
Rosenburg 1/4 page

Full page sketch of Rosenburg 1/4 page





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HOUSE AND STUDIO FOR J. MAC WHIRTER, ESQ., A.R.A. MESSRS. WALLACE AND FLOCKHART, ARCHITECTS.







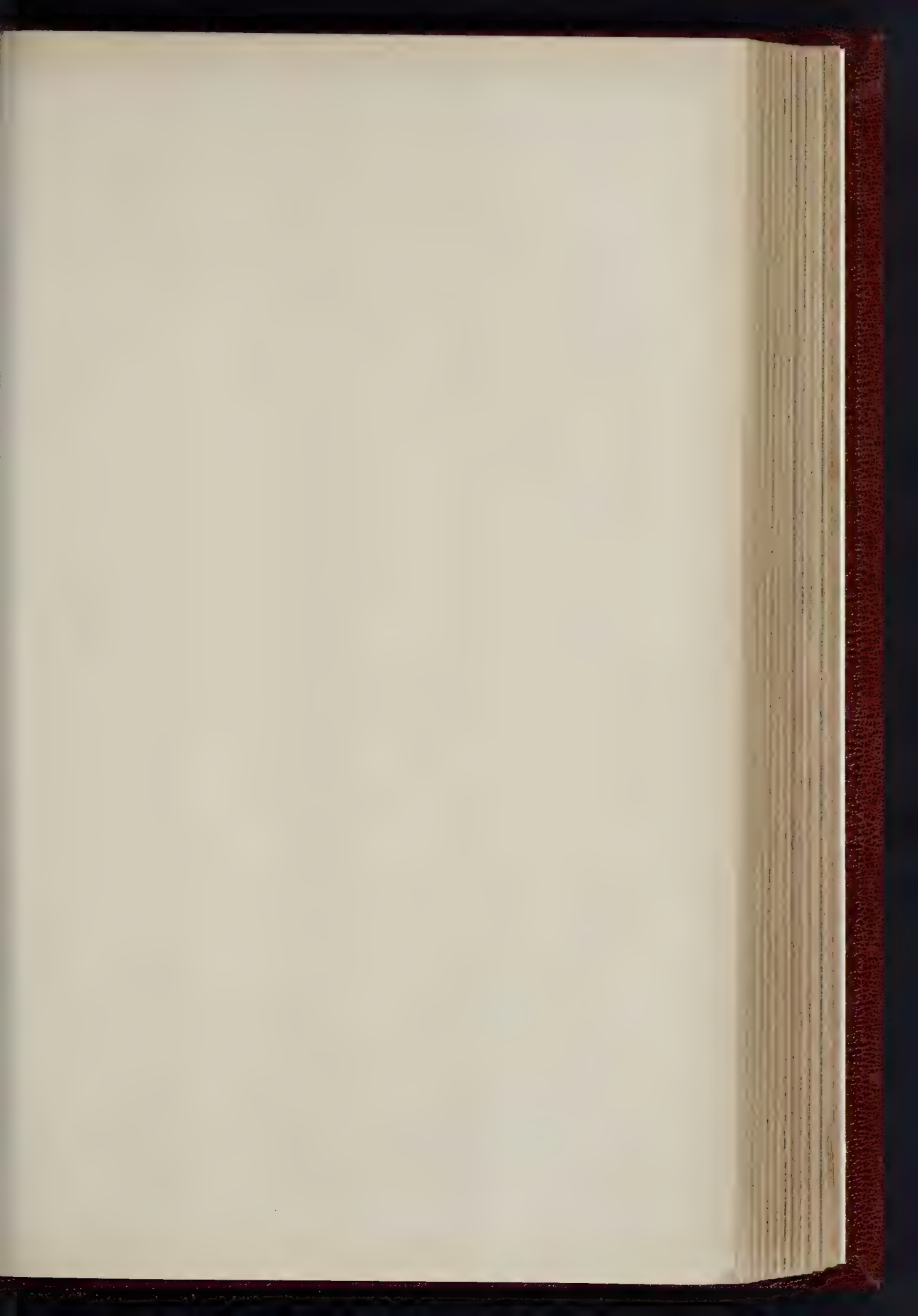
Wm. & A. S. Photo. lith.

SHOPS AT STREATHAM.—MESSRS. WHEELER & HOLLANDS, ARCHITECTS.

Queen St. London W.C.









"THE M.  
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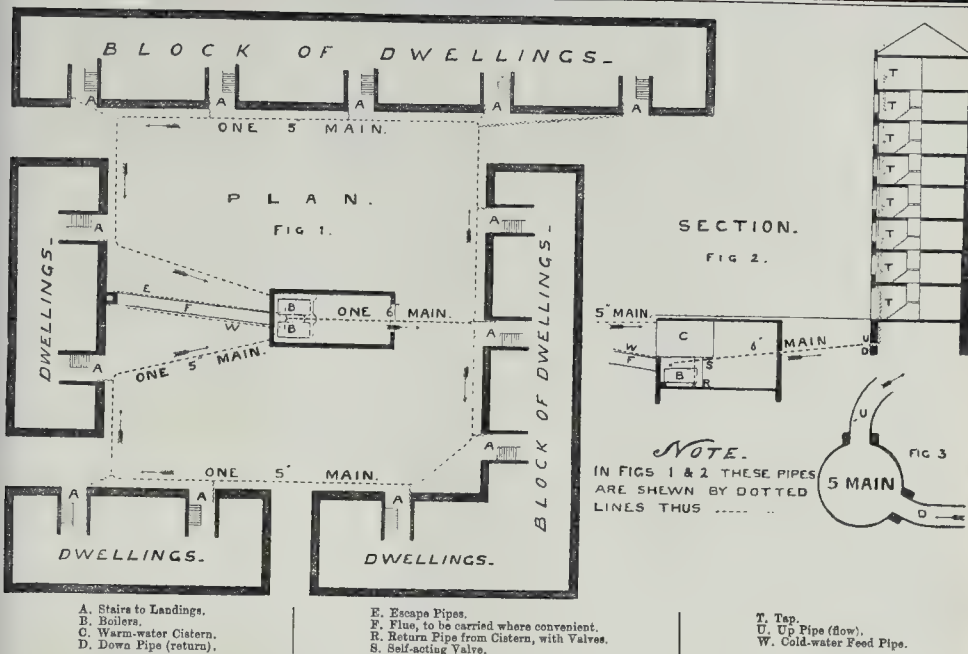




PHOTO SPRAGUE & CO. LONDON







*Suggested Arrangement for Hot-Water Supply to Blocks of Dwellings.*

# SUPPLYING TENANTS WITH WARM WATER FOR DOMESTIC USES.

WHERE a number of tenants occupy dwellings under the same landlord this becomes practicable, as warming water upon a large scale can be done so cheaply that all tenants would find it to their advantage to pay the necessary charge for such a convenience. But where this would be the most practicable, and therefore beneficial, is in those enormous blocks of buildings which we now erect in most of our large towns, designed for the homes of respectable mechanics and others of moderate means. The illustration shows an economical arrangement designed by Mr. R. Felix Campbell, of Queen's Park, London, W., for thus supplying warm water for domestic uses to about 100 tenants, situated in any convenient position on as many buildings.

The plan, fig. 1, shows the usual open square surrounded by four such large blocks of dwellings. In the centre, in an excavated space under the pavement, are shown two small ornish boilers, B B, fixed under the warm-water cistern, C, close down over the boilers, not only the heated water kept in the warmest position, but where there is a constant supply of hot water there would be no necessity for making any preparation made to carry a large cistern in the roof. For the feed supply, a cistern large enough to allow the ball-cock to work freely, would be sufficient, fixed at the top of one of these blocks of dwellings. By a circular arrangement of the connections, see fig. 3 (an enlarged section of the main pipe), only one main is required to carry the warmed water around to each block of dwellings, whilst a small wrought-iron pipes, U and D, would keep the supply of warm water constant at every tap, T, whether frequently drawn off or not. By such a system of one large main instead of the usual method of two smaller mains, the friction to the water is much less, giving a very rapid and certain circulation, thus enabling the heated water to pass to a very considerable distance. Fig. 2 is a section through the boiler-chamber and a block of dwellings, showing the two wrought-iron pipes, U and D, for conveying the warm water to the tap, T, on each landing. The return pipe, W, in the warm-water cistern to the boilers, and the usual valves for working either one of the boilers separately are shown near the letter R.

A self-acting valve, S, is to regulate the circulation so that the temperature of the warm water in the mains and branch pipes would average from 190° to 200°, or as may be required. The action of this valve would be to prevent the warm water circulating into the cistern until the temperature, thus providing for use the hottest water direct from the boilers, which, when not required for immediate use, would pass through the 5-in. main into the large cistern, C, for future use. The mains to be laid in channels, and all the pipes and the warm-water cistern to be coated and covered in to prevent waste of heat.

The advantages of this arrangement to the tenants would be considerable, for it would give facilities for cleanliness in home and person, and it would also be—by the burning up of all ashes and refuse which, if mixed with small coal, would be the only fuel required for the boilers,—comparatively costless. The chances of illness would be much lessened by a constant supply of warm water at all hours night and day, the which is frequently so immediately necessary and advantageous in combating with many causes of illness, excessive fatigue, &c. There would be much comfort, economy, and quickness by the use of the heated water for breakfasts and teas, and in the cooking of vegetables, &c., as a stick or two of wood would boil such water without having to kindle the fire. In those families where the wife has to leave her home to work as well as the husband, he would thus find some of the comforts of home ready on his return.

## WESTMINSTER ABBEY.

THIS was the subject of Professor T. Roger Smith's lecture to the students of University College, at the commencement of the present session on Monday afternoon last, when there was a large attendance of students and their friends, including the Dean of the Faculty of Arts and several of the Professors.

Professor Roger Smith said he claimed for the abbey a richness of historical associations, and a wealth of personal memories and memorials which placed it second to no building in Christendom. He further claimed for it the distinction of being among the foremost, if not the very foremost, work of art of English origin. The abbey was a monument of English

design, English workmanship, and English materials, and had helped to form the taste and foster the devotion of many generations of English men and women; and on all these grounds it held the very highest place among all works of art, whether of architecture, painting, sculpture, or music, designed and wrought in this country, and by men of English birth. A Christian church stood on the site of the abbey about nine hundred years ago, but of that building we knew practically nothing. It was succeeded by a second church erected by Edward the Confessor, which in its turn gave place to the present abbey. The building as we saw it was begun by Henry III., and continued in various reigns down to William and Mary, if not Queen Anne, the western towers having been added by Wren in 1696 and following years. Most of the exterior has had to be renewed, owing to the decay of the stone, and much of it had been more than once so dealt with. No part of the exterior was quite as the original builders left it, and much of it had been sadly blackened and deteriorated by smoke, dirt and decay, and clumsy repairs. On the other hand, the interior was, except for the sad loss of its coloured glass, almost as originally built. At the end of the north transept was a dignified north portal, which was originally, and one day would again be, a grand entrance,—finer, indeed, than most English churches or cathedrals could boast. The French and German architects in the Middle Ages cared far more for great and elaborate doorways than our own. We, indeed, had only one portal (the west entrance to Peterborough) that could be compared with the great enriched porches of Amiens, Reims, or Strasbourg. Just under the shadow of the western towers nestle some low stone buildings of irregular outline and domestic character, possessing great interest. They are part of the ancient abbot's house, and the broad mullioned window is that of the famous "Jerusalem Chamber," which was the scene of the death of Henry IV. Formerly there stood, not far from the present entrance to Dean's-yard, a gate-house of Edwardian architecture, containing two chambers, both used as prisons. Raleigh, Lovelace, and Hampden were amongst those who were here confined. Near here also stood the Almonry, founded by Henry VII., for thirteen poor men. In this building Caxton set up his first printing-press, and in its precinct was produced the first printed book in England. Entrance to the



cloister, from Dean's-yard is gained by a low archway and vaulted passage. Of this cloister the abbey shuts in the north side, and its south transept part of the east side, but everywhere else the cloister is surrounded by remains of ancient masonry—portions of the monastic buildings. Of the monastic buildings and church built by the Confessor remains enough exist to show us that the church, though not quite so wide, must have been nearly if not quite as long as the present one; that the cloister was the same size as now, and that it was surrounded by the requisite dormitories and refectory needed to accommodate a large number of monks. The chief existing remains are the Chapter-house, part of the monks' dormitory with its sub-structures, and portions of the infirmary and the abbot's house. The latter (now the Deanery) has been altered, modernised, and pulled about in various ways, but its fine old hall, with an open-timber roof, still remains, and is now used by the scholars of Westminster School. The parlour known by the name of the Jerusalem Chamber, the ante-room to which is the Jericho Parlour, also remains comparatively unaltered. The entrance gateway from the cloister to the Chapter-house is in general appearance extremely rich with mouldings and sculpture, though sadly decayed. It gives access to a vaulted vestibule, of which the vault is extremely depressed where it passes under the old dormitory, and then up a broad flight of stairs to a magnificent portal. The Professor next proceeded to describe the Chapter-house, which is famous as having been the first meeting-place of the English House of Commons from the time when they sat separate from the Lords. From the reign of Edward I. to that of Henry VIII. this was habitually if not universally their meeting-place. After this period the Chapter-house was converted into a depository for records, and was mutilated in the most reckless and ruthless manner. About twenty years ago the records were turned out, and Mr. Gladstone obtained, in 1866, a vote for a large sum of money wherewith the Chapter-house was restored to its original condition, on the ground of its early connexion with the House of Commons. The date of the original erection of the Chapter-house is 1250. On passing into the abbey church itself, the first impression of the visitor is one of overpowering height and extent. Henry III. in the year 1230 built a Lady Chapel east of the choir of the Confessor's Church. (This Lady Chapel was afterwards swept away to make room for the far more grandiose Lady Chapel built by Henry VII. and known by his name.) What followed was extremely characteristic of the ordinary mode of procedure in the Middle Ages. Henry, after a considerable interval of time, began to pull down the eastern portion of the Confessor's Church—a fine, large building, he it remembered, but one that had simply gone out of fashion, being two hundred years old. On the site of the old church Henry built his new one, beginning from the east with the presbytery and chapels. He next pulled down and rebuilt the transepts and one bay of the nave; and, lastly, he rebuilt the Chapter-house. There was more than one peculiarity in the planning of Henry's building. The most obvious one was that, instead of ending with a square east end having a noble east window, as was customary in England, the church ends in a polygonal east end, known as an apse (showing three east windows of moderate size, two of them seen aslant), and having a series of subsidiary chapels clustering round it, as was customary in France, where such an arrangement was called a *chevet*. Canterbury Cathedral and Tewkesbury Abbey Church have the presbytery similarly arranged, but these, with Westminster, are the exceptions which prove the rule for England. There could be no doubt that the entire design must have been suggested by the great cathedrals going on in France at the time; and Sir Gilbert Scott inferred, probably correctly, that an English architect was sent to France to see and study for himself the works in hand at the time at Amiens and Rheims, since, though the scheme is French, the details are English. Another curious if not unique peculiarity at Westminster is that the cloister encroaches upon the aisle of the transept,—in fact, cuts a corner out of the church, a circumstance which, in the Professor's opinion, denoted that the transepts of the original church had no aisles. No other English cathedral has a nave so high in proportion to its width. The

height from the pavement to the crown of the finely-designed vaulting is 103 ft.; the width of the central aisle is 35 ft. The building presents the triple division in height usual in all great cathedrals,—arcade, triforium, and clear-story. The arcade consists of a series of great richly-moulded arches connecting the nave with the aisles, and the piers with clustered shafts that carry them. The triforium is, as its name implies, a thoroughfare above the vaults on the side aisles and under their roofs. This feature is derived from the tribunes or side galleries in some of the old basilica churches, which, when they existed, were used as a separate place for women. In Westminster the triforium is very spacious, and it communicates with the body of the building by an arcade of great beauty. No single feature of the interior is so finely designed as the triforium arcade, and, in addition to its elegance, it is double,—i.e., there are shafts carrying tracery on the front face of the triforium wall, and similar shafts carrying similar tracery at the back. The intricacy of effect produced by this simple expedient (the tracery behind being seen through the openings of the tracery in front from every possible angle), is remarkable and most charming. The aisles have their own traceried windows, and the aisle walls below the eills of these windows were originally enriched by an arcade of pointed arches carried by little shafts and trefoiled. But by far the greater part of this has been ruthlessly cut away or covered up, to make room for monuments of more modern date. Though the nave exhibits work of three periods, and that erected during the latest period was done slowly and stretched over considerable time, no radical change is made in the larger architectural features such as can readily be detected in comparing the west and south walks of the cloister with the east and north. The ritual choir or enclosure for the choristers and clergy is west of the transepts instead of being in the presbytery. This is an arrangement common in Spanish churches, rare in English ones, but it was necessitated by the comparative shortness of the presbytery and by the wish to form a secluded and central place, high above the general level, and screened in on all sides, where the body of the Confessor should be buried. This space, known as the Confessor's Chapel, is behind the altar-screen. Henry VII.'s Chapel is admitted to be the finest work of English fifteenth-century or Perpendicular architecture, and alike for rich and daring design and consummate skill in execution deserves admiration. This chapel is like a little church, having its own nave and aisles and apse. The vaulting of the nave presents a *tour de force*, as it seems to rest upon pendants which appear to be hung in the air, though really they are carried by strong arches most artfully concealed. The central object in this chapel is the tomb of Henry himself,—a most interesting object, from an architectural point of view. It is surrounded by a splendid grille or metal-work enclosure of the same workmanship as the entrance-gates, of debased though rich Gothic design, but still unmistakably Gothic. The grille and the gates would be among the latest works to be executed in completing the chapel, and they belong in point of date to the closing year of Henry VII., who died in 1509, or perhaps to a still later date. The effigies of the king and queen within this enclosure, and the tomb upon which they repose, are said to have been completed by 1518. They are completely Renaissance, and were executed by an Italian sculptor named Torregiano. Thus we have here in the closest proximity a most striking instance of that remarkable change of temper, manners, and taste which marks the close of the Middle Ages and ushers in the modern. Of all the ancient painted glass in this chapel, and, indeed, throughout the abbey, hardly a shred remains. In concluding his paper, the Professor dwelt at some length upon the historical associations of the abbey, and enumerated some of the principal tombs and memorials. These include the monument, though not the grave, of our greatest poet, and the tomb of Chaucer, who held the post of clerk of works to the abbey for a short time, and to whom was leased, in an agreement now existing, a house standing on a spot over which now a part of Henry VII.'s Chapel extends. Among architects, Sir William Chambers, one of the Wyatts, Charles Barry, Gilbert Scott, and George Edmund Street lie here. Scott for many years held the appointment of Architect to the Abbey. He devoted an immense amount of

time to seeking out every part of its history. He rescued its Chapter-house from ruin and dilapidation, and it would be hardly an exaggeration to say that many parts of the building he knew stone by stone, so keen and affectionate was the interest which he took in it. The lecturer said he had failed to find that a single English painter or sculptor of note had been buried in the abbey, though specimens of the work of all our best sculptors, and alas! of all our worst, crowd the floor of the abbey. Science and its practical applications have so illustrious a series of representatives among those here commemorated that an Englishman must indeed be indifferent who can feel no pride as he reads the names,—Sir Isaac Newton, Sir Humphrey Davy, Lyell the geologist, Herschel the astronomer, Charles Darwin, James Watt, Telford, Robert Stephenson, and Brunel. In conclusion, the lecturer made graceful reference to the late Dean Stanley, who himself had written these words,—“So long as Westminster Abbey maintains its hold on the affections and respect of the English Church and nation, so long will it remain a standing proof that there is in the truest feeling of human nature, and in the noblest aspirations of religion, something deeper and broader than the partial judgment of the day and the technical distinction of sects.”

#### THE ANNUAL REPORT OF THE LOCAL GOVERNMENT BOARD.

THE Fourteenth Annual Report of the Local Government Board, 1884-85,\* just to hand, is divided into three main sections or divisions, viz.:—I. “Relief to the Poor and the Poor-Rate.” II. “Local Government and Public Health.” III. “Local Taxation and Valuation.” From the first section it appears that, notwithstanding the increase in the population of the country, there has been a decrease of pauperism during the year covered by the Report. In the metropolis and elsewhere there would appear to have been considerable activity during the year in providing new workhouses, infirmaries, and schools for Poor Law purposes, or in arranging for the enlargement of existing buildings.

The second section of the Report contains statistical and other information of much interest to the sanitarian. It appears that the Local Government Board, since its constitution in August, 1871, has sanctioned the borrowing by urban and rural sanitary authorities, of 31,567,364*l.*, by far the larger proportion of which has been appropriated to the carrying out of sanitary improvements in urban districts, under the provisions of the Sanitary Acts and the Public Health Act, 1875. Forming part of the amount mentioned is the sum of 2,083,353*l.*, borrowed under the Artisans' and Labourers' Dwellings Improvement Act, 1875, since 1876. Under Section 243 of the Public Health Act, 1875, the Board had recommended the Public Works Loan Commissioners during the year to make advances amounting to 616,988*l.*, at a reduced rate of interest, to urban and rural Sanitary Authorities. The only works in respect of which the Public Works Loan Commissioners are willing, upon the recommendation of the Board, to advance money at a low rate of interest, are works of primary sanitary importance, such as water supply, sewerage and sewage disposal, and the provision of hospitals. During the year a number of Sanitary Authorities, with a view to repayment out of the Parliamentary grant, appointed medical officers of health and inspectors of nuisances (under the General Orders of the Board), the number of appointments in existence during the year (1,136 medical officers and 1,037 inspectors of nuisances) showing an increase upon the numbers recorded in previous Reports of the Board, but these figures do not show the total number of applications received, as, in consequence of the arrangements appearing to the Board (either from inadequate salary or otherwise) to be unsatisfactory, they felt bound in some cases to decline repayment. The Provisional Orders issued by the Board during the year included several under the Public Health Act for schemes of drainage. Among the more important of these were the Lower Thames Valley Orders (the one authorising the Lower Thames Valley Main Sewerage Board to purchase lands at Mortlake for the disposal of the sewage of their

\* London: Hansard & Son, and Eyre & Spottiswoode.



district, and the other extending the time allowed for the execution of their duty by the Sewerage Board, and continuing the sanction from penalties under the Thames Conservancy Act, which were contested before a hybrid committee of the House of Commons, were not confirmed. The Select Committee made a special report, which, with the evidence, is printed and presented to Parliament. With regard to water supply, the Board has interfered in several cases where the water shown to be insufficient in quantity and unfit as to quality. On the application of any Sanitary Authority to the Board, under Section 62 of the Public Health Act, 1875, to determine what is the reasonable rate at which a proper supply of water may be required to be furnished to houses under the provisions of that section, where there is no local Act in force in the district authorising a rate, the Board is empowered by Section 8 of the Public Health (Water) Act, 1878, to fix an Order, for the purposes of the first-mentioned section, a general scale of charges for the whole or any part of the district of the Authority. During the year the Board has fixed seven such scales. During the same period the Board has rejected local inquiries, after public notice, to be made by its Engineering Inspectors in 453 cases. A majority of these related to applications from an urban and rural sanitary authorities for sanction to borrow money for the execution of permanent works under the Public Health Act, 1875, the Public Health (Interments) Act, 1879, the Public Health (Wash-houses) Act, &c. Fifty-nine inquiries related to petitions for Provisional Orders under the Public Health Act, 1875; thirteen to complaints under Section 299 of that Act of the default of Local Authorities performing their duties; eight to applications for consent to the constitution of special drainage districts under Section 277 of the Act; and to general scales of charges for the compulsory supply of water to houses under Section 62 of the Public Health Act, 1875, and Section 8 of the Public Health (Water) Act, 1878; and to applications for suspension for a limited period of the operation of Section 3 of the Public Health Act, 1876. The inquiries also related to various other matters, as the purchase of land for street improvements, the letting of lands under Section 177 of the Public Health Act, &c. By circulars (copies of which are given in an appendix) the Board drew the attention of local authorities, both urban and rural, in England and Wales, to the provisions of the Public Health (Officers) Act, 1884, and the Disused Burial-grounds Act, 1884. The former prohibits proceedings being taken, except by the consent in writing of the Attorney-General, for the recovery of any penalty under the Disused Burial-grounds Act, 1884, which imposes a penalty of 50l. on any owner or servant appointed or employed by the Local Authority who is in anywise concerned or interested in any bargain or contract made by them for any of the purposes of that Act. Disused Burial-grounds Act, 1884, renders unlawful the erection of any buildings upon any disused burial-ground, except for the purpose of enlarging a church, chapel, meeting-house, or other place of worship. The Act does not, however, apply to any burial-ground which has been sold or disposed of under the authority of the Act of Parliament, nor will it prevent the erection of any building on a disused burial-ground for which a faculty was obtained before August 14, 1884. From the third section of the Report, and in an appendix thereto, we find that the total amount received by the local authorities during the year was 53,412,055l., which sum was made up of the following items:—Public rates, 7,086l.; private improvements (rates and cesses), 661,445l.; water supply, 1,932,321l.; supply, 3,217,284l.; tolls, dues, duties, and rents, 4,478,977l.; rents of property, 717,847l.; other subventions, 2,391,090l.; other rents, 4,678,404l.; and loans, 10,957,601l. The expenditure of the same authorities during the year which was not defrayed out of the local money amounted to 43,508,243l., of which sum 10,456,532l., or nearly a fourth part, was spent in the payment of interest and principal of loans. Among the most interesting of the appendices those relating to the Metropolitan Water Supply, including the Reports of Colonel Sir

Francis Bolton (the Water Examiner appointed under the Metropolitan Water Act, 1871), and Professor Frankland. Sir Francis Bolton's Report describes in considerable detail the alterations and additions made by the companies to their works during the year 1884, with the view of increasing the constant-service system, which is now fast becoming general all over the Metropolitan area. The Lambeth Waterworks Company seem to have been particularly active in this respect, and it is recorded to their credit that this company, of their own act and not at the instance of the Metropolitan Board of Works or any other authority, have conferred the benefits of a constant supply upon the poorest and most densely-populated part of their district. "Deacon's waste-meters" have been or are being introduced into the whole of the ten districts of this company which have been put under the constant-supply system. With regard to the quality of the water supplied from the Thames and Lea, Dr. Frankland reports that it was, during the year under review, "exceptionally free from an excessive proportion of organic matter." Dr. Frankland concludes by observing that "the marked diminution in the fluctuations of quality which the river waters, and especially those derived from the Thames, have undergone, is undoubtedly due to the very much greater care and attention which are now bestowed by the several companies, both in selecting the best water which the rivers afford, and in purifying the water after it has been abstracted."

From the foregoing summary of its principal contents, it will be evident that the Fourteenth Annual Report of the Local Government Board contains (as might be anticipated) a great deal of valuable and suggestive information, worth attention and study by sanitarians and members of local authorities.

#### THE SANITARY CONGRESS AT LEICESTER.

We conclude our notice of the Congress of the Sanitary Institute at Leicester by giving a few extracts from some of the papers not yet mentioned by us.\*

Mr. Arthur Ransome, M.D., F.R.S., President of Section I. (Sanitary Science and Preventive Medicine), took as the subject of his address "The Success of Sanitary Effort." With regard to one disease, consumption, he said,—Hitherto this disease has not usually been classed amongst those that can be prevented by sanitary measures; it has been supposed to be mainly a matter of nutrition and of circumstances beyond the control of local authorities; but Dr. Buchanan has demonstrated the enormous ameliorating influence of drainage upon this disease. It appeared to me that it might be desirable to ascertain what was the limit of its preventibility. I had noticed that the disease was comparatively infrequent in the place in which I myself live, and it occurred to me that I might ascertain how many cases originated in the different parts of the locality. A great portion of it is composed of deep porous soil, but it is surrounded by boulder-clay, the result of glacial drift, and a great part of Bowdon, and parts of Dunham and Altrincham, are built upon a thick bed of sand, in many places over 100 ft. in thickness. The climate is thus rendered more temperate, and the air and soil drier. After the wettest weather the paths speedily become dry, and the basement story of a house is often as dry as its attic. It has the further advantage that it is virgin soil. The sand is as pure and free from organic matter as in the days when it was deposited by ice floes or was silted up by the estuary of the Mersey. No house is ever built upon freshly-made ground, or in pits that have been filled up with refuse. The locality is also well sewered, and has a plentiful supply of good water. Moreover, the inhabitants are for the most part well-to-do people. Out of 2,559 of population at the last census, only about 500 are poor, and live on the low-lying clay lands that surround the sandy downs upon which Bowdon is built. The remainder dwell in well-built, salubrious houses; they are well fed and comfortable in their circumstances. It will thus be seen that such a community are in a position peculiarly well fitted to preserve them from attacks of tubercular disease. I was, how-

ever, hardly prepared for the result of my inquiries. I obtained from the superintending registrar of deaths an extract from the death register of all the deaths from diseases of the lungs occurring in Bowdon in the ten years 1875-84. Of these, twenty-two were from phthisis, but eleven of them took place in the low-lying clay lands before mentioned, and nine of the remainder were found to have contracted the disease before coming to Bowdon. This leaves two to be accounted for, and one of these was the secretary to the City Mission in Manchester, who was, therefore, constantly obliged to attend crowded evening meetings in different parts of the town. The other was a merchant's clerk, who went to town at eight every morning, and did not return until seven p.m. Such a record as this is a strong testimony to the truth of the observations made by Drs. Bowditch and Buchanan as to the influence of a well-drained porous soil upon the disease, and it holds out to us the hope that when further attention is paid to this point, a large part of the terrible mortality that still takes place from this disease may be prevented, and that consumption may cease to be, as it has been called, "the scourge of the English people."

Mr. William Marcet, M.D., F.R.S., took as the subjects of his address as President of Section III. (Chemistry, Meteorology, and Geology), "The Distribution of Carbonic Acid in Nature, and its Sanitary Relations," and "The Influence of Altitude on the Chemical Phenomena of Respiration." From the first section of this address we extract the following paragraph:—Experiments having important sanitary bearings were made by Claude Bernard in 1857. He has observed that birds can live when accustomed by degrees to breathe air more and more unhealthy by admixture with carbonic acid, while other birds, in perfect health and taken from the open air, when subjected to this same bad air would die either at once or very rapidly. It follows that animals weakened by exposure to impure air are less in want of air holding its full proportion of oxygen than healthy animals. The practical bearing of this experiment is very obvious, and it explains how people living in small, insufficiently-ventilated dwellings, and having to keep their windows always closed against the cold air, can apparently be doing well. This satisfactory condition is, however, a delusion and a snare, and the fact of the inmates of such houses withstanding impure air with apparent impunity must be owing to a weak state of health, that same air being unfit for persons of a strong and robust constitution. This also explains how people of advanced and sometimes of middle age require less fresh air for the enjoyment of health, which they undoubtedly do, than others in the full possession of youth and strength.

"Sanitary House Management" was the title of an able paper by a foreign lady, the Countess de Viesca. In the course of it she observed that a clever architect may design and build a house with all the appliances that his skill and experience can suggest, and make it a domestic "Temple of Hygieia" in theory, but unless the occupants are able and ready to put all those clever contrivances to their proper use, and to see that they are always kept to that use, and never allowed to break down through "sheer neglect," that palace of health may become the home of dirt, foul smells, impure air, and all the evils that follow in their train, ill-health of mother and children, ever-recurring sickness, and perhaps death. It is here that the lady's functions come in. It is the servants of a home whose properly directed work has to keep it clean and sweet. It is the lady of the house only who can regulate that labour, and, by adding to it her own intelligent supervision, can make it effective for cleanliness, and for the health to which that cleanliness is the first and greatest step. The Institute, numbering members of all classes, laity as well as professional sanitarians, and appealing to all, has peculiar opportunities of educating the public, the dwellers in houses, to their share of that work to which all must lend their individual aid before success can be counted on as certain. When the ladies,—the mistresses of the houses,—come to see that they can do more and must do more than merely call in masons and plumbers when drains and pipes go wrong, and that, by understanding the conditions that make them go wrong, and avoiding these, they can better secure the bodily welfare of their near and dear ones than a legion of doctors;

\* For the papers already noticed, see *Builder*, pp. 423, 442, 443, 467, and 468, ante.



when it has taught ladies this, then the Sanitary Institute will not only have begun but more than half finished the greatest sanitary work of the age. The writer having lived in Spain and France, and managed her household both in Spain and England, was able to appreciate the advantages which the English attention to sanitary matters gives to residents here. She knew the hopeless state of dirt and smells produced by the utter absence of any sanitary provision in parts of Spain, and for which they were now suffering so awfully. She had long lived in England and rejoiced in the opportunities given here for those who will be and live clean; and yet in England she has seen dirtier houses and smelt worse smells than either in France or Spain, arising only from laziness of servants and want of supervision by the mistress.

Mr. John Underwood read a paper on "The History of Sewerage and Sewage Treatment at Leicester," from which it appeared that various methods of treatment by precipitation have been tried, but with, to say the least, very indifferent success. The two last very dry seasons have put a great strain upon the resources of the corporation at their works, and there being for a long time together during the summer droughts no water flowing, other than the small quantity passed from one pond to another by a very slender canal traffic, the river below the town has, at the end of the summer, been composed mainly of the Leicester sewage effluent. In September last year an inquiry into the condition of the Soar was held at Leicester by Major Talloch, of the Local Government Board. The inquiry resulted in a decision that the state of the river was too bad to be much longer tolerated, and the Town Council undertook to proceed at the very earliest time to consider the matter with a view to an improvement, and this they have been engaged in doing during the last year. Looking to the experience gained, one point was by most people considered settled, that the mere treatment by lime or chemicals would not meet the case of Leicester, and that the application to land was the only solution. A proposal was made to utilise and extend the present pumping outfall station, and lift the sewage to a height of from 150 ft. to 170 ft. on to an estate of 1,362 acres under the control of one owner, the distance being about one mile and a half. In June last the Council approved a report from the Highway and Sewerage Committee, that 100 acres of this estate should be purchased, and the remainder leased for thirty years at an annual rent of 45s. per acre. The idea of the committee is to use this mainly as a broad irrigation area, and it is expected that with this estate in hand, the corporation will be able to deal with the sewage of the town without risk or interference for many years to come.

Mr. J. Gordon, C.E., Borough Surveyor of Leicester, read an elaborate paper on "The Drainage of Continental Towns." After giving a history of the sanitary movement in Germany and Switzerland, mentioning Hamburg, Berlin, Frankfurt, Dantzig, Zurich, Stettin, Basle, and other towns, the author indicated the leading principles of sanitary works on the Continent. With regard to Berlin, he observed, under the head "Materials and Construction of Sewers,"—"One noteworthy feature of Berlin is the principle adopted of having a sewer on each side of the street, which, so far as the author is aware, has not been attempted elsewhere. This principle has no doubt enabled the author of it, Mr. Hobrecht, to adopt pipes in cases where brick sewers would otherwise have been requisite, and accounts to a great extent for the great excess of pipes over brick sewers for a city of such a metropolitan character as Berlin, with its million and a quarter of inhabitants, now is. Various reasons may be given for the choice of this system beyond that of desiring to confine the sizes of the sewers to that of pipes. The subsoil is surcharged with water, and consists of fine running sand, making it most difficult and costly to construct brick sewers watertight. The streets being generally wide, the adoption of a sewer on each side enabled the traffic to be carried on without interruption, and so shortened the length of the house-drains that the necessary fall for them could be obtained without the street sewer being laid so deep as would have been requisite if one sewer had been constructed in the centre. It can scarcely be conceived, however, that the plan has not been more costly than if one sewer had

been adopted. Another noteworthy feature in the sewerage of Berlin is also the theory of the engineer, Mr. Hobrecht, that to prevent the formation of sewer gasses as much as possible, steep gradients should be avoided. His argument is, that with branch sewers of steep gradients, a state of things is involved in which, during the night, and also with the minimum day flow, so small a portion of the invert of the sewer or pipe is covered by the flowing sewage as to leave a large portion of the sides of the pipe covered with slimy matter exposed to the action of the comparatively high temperature of the sewer. This acts upon and tends to dry it by evaporation, and thus to evolve in a greater degree a more pungent and dangerous sewer gas than would be the case if a greater portion of the surface of the invert could be kept covered with sewage flowing at a slower velocity. He urges also that branch sewers, with steep gradients, run practically dry, and that with a minimum flow matters that would float with a given depth of water on the invert are deposited, and not removed by the greater velocity of the maximum flow, and that, consequently, on this head also, it is better to ensure a sufficient depth of water on the invert moving at a velocity not more than sufficient to float forward all such solid matters as find their way into the sewers. Mr. Hobrecht has had the courage of his opinions, and has carried those views into practice by flattening all steeper gradients to 1 in 500."

Mr. Ernest Hart, in the course of a long address on "The Essentials of Local Government Reform," argued in favour of the simplification and unification of the primary area; the creation of one authority for all local business, and only one; the creation of county boards; the reorganisation of the local government officials; and the consolidation of local finance. He expressed his conviction that no system of administration, however complete in theory, upon a matter of such importance and complexity as the health and well-being of the community, can be expected to attain its object unless men of superior education and intelligence throughout the country feel it their duty to come forward and take part in its working. The system of self-government, of which the English nation is so justly proud, can hardly be applied with success to any subject, unless the governing bodies comprise a fair proportion of enlightened and well-informed minds. A more vigorous and intelligent public opinion on local government has yet to be created in many places, and until it is created the action of the authorities will be more or less hesitating and inconsistent. Many questions of vital importance are from their very nature incapable of being completely provided for by any amount of legal enactment, however minute and explicit. So large a discretion must of necessity be left to local authorities as to details, that in practice much will always depend on the energy and wisdom of those who compose such authorities. Moreover, there are limits to the power of any central authority to remedy the evils produced by local inefficiency. It may control, stimulate, and in some cases supplement the efforts of local bodies, but it cannot be a substitute for them. It seems, therefore, peculiarly incumbent, on those who have leisure, to take their share in administering local government. In this work not only prejudices have to be overcome and inactivity quickened to exertion, but a sound judgment must be exercised as to the extent to which, and the limits within which, considerations of public welfare ought to interfere with the absolute rights of private owners of property, and even with the personal liberty of individuals. It is work, therefore, which cannot be performed without effort; but it ought to, and let us hope that it will, be zealously undertaken, now that Parliament and the nation is becoming alive to the importance of the subject.

Captain Douglas Galton's "Address to the Working Classes," which was the last item on the business programme of the Conference, was a very useful résumé of the conditions of a healthy existence. We quote a few passages of the concluding part of the address:—"The improvement of the home means less sickness and more energy for work. To the ratepayer it means a diminished poor-rate, whilst to the individual it means more opportunity for self-education and culture, and it opens out to every one the possibility of having a refined and comfortable home. The improvement in the standard of living and of house accommodation

is only what has been going on gradually for centuries. We are told that in the fifteenth century, in the houses, such as they were, of the poor, the walls were of rough, unheaven stone, without cement, or of mud; the roofs of thatch or of rude straw; the windows unglazed; the floors of bare earth, without tile or boarding; the accommodation of but one room, or, at the most two, let the family have been ever numerous, and their animal stock, where they possessed any, frequently sheltered at night under the same roof as themselves. And, indeed, such cottages were not uncommon fifty years ago. As a rule the working classes would be ashamed of such accommodation now. So they will in time be ashamed of living in bad unhealthy houses. . . . An improved standard of living follows education, and it may be fostered by legislation; but it must come from the people themselves. Therefore do not go away with the idea that Parliament or town councils can do everything for you. They can do something. Acts of Parliament may be necessary to assist sanitary progress and to enforce sanitary discipline, but for real practical progress we must look to our own exertions. Laws can do but little unless aided by the earnest, the strenuous co-operation of every individual member of the community.

"How small of all that human hearts endure,  
That part which laws or kings can cause or cure!  
Still to ourselves in every place consign'd,  
Our own felicity we make or find."

However dirty the locality, and however poor the house in which you live, you can yourself do much to preserve your health."

#### SOME MISCELLANEOUS EXHIBITS AT THE INVENTIONS EXHIBITION.

A few exhibits not hitherto noticed in the several articles which we have given on the contents of this Exhibition, claim attention at our hands.

In the East Arcade, at Stand No. 1,537, Messrs. R. H. & J. Pearson, of High-street, Nottingham, show the "Pearson" patent combination open and close fire cooking range, which appears to possess many good points, and to be well worthy of the attention of visitors. It claims to be the only kitchener capable of baking and roasting simultaneously. The fuel is on the slow-combustion principle; and the bottom under the fire, and the hollow cheeks forming the sides, are fitted with hot-air passages, through which the air is taken, and becoming highly heated, is passed into the flues, thereby adding to the heating-power of the range. This atmospheric action is continuous, whether the dampers are open or closed, the effect of which is that the ovens are always in a warm condition; while, upon the dampers being drawn out, the full cooking-power of the range is, it is claimed by the exhibitor (and apparently with warrant), immediately brought into action. The hollow cheeks of the sides of the fire are arranged with opening and a valve through which the heat and flame of the fire pass into the flues, and, mingling with the heated air from the hot-air passage ensure a very high degree of combustion.

In the north court of the South Galleries (Stand 387), Messrs. Geary & Walker, of Manchester, have an unpretending though most curious display of their well known wood-blo flooring. The specimens exhibited illustrate the almost universal adaptability of such floor for churches, hospitals, schools, and other public buildings, as well as their suitability for hall corridors, and rooms in private residences. A simple combination of different kinds of wood, very effective designs can be obtained with this flooring, so that borders can be obtained where needed, the result being an appearance resembling that of parquetry. The flooring has been and is being extensively used. It is laid in a particular manner, and with specially-prepared composition, so as to ensure accuracy of fit and to prevent damp.

Messrs. George Waller & Co., of Hollis street, Southwark (Stand 1,475, East Arcade) exhibit a series of models of concrete-mixing machinery. For their patent concrete-mixing with continuous action, made for steam or horsepower, they claim special advantages, among which may be named "a more thorough intimate mixing of the materials together, and also with the water, in less time than by machinery on any other principle." It is further claimed that it that there is no delay by stopping



chine, either to fill or empty it: even with large work the cylinder can be filled and emptied when revolving. Furthermore, whilst the machines require a crane to wait upon them, or a jib to supply the hopper, this machine is of small elevation, and so arranged that the material can be delivered on to a stage or hand, and shovelled into the hopper; or, for large quantities, an elevator, worked by the machine, delivers the material into the hopper. The machine is self-contained, and portable.

Messrs. Alexander Wright & Co., of Millbank, (at Stand 1,478) an interesting collection of instruments for the measurement, indication, and regulation of pressure, and for ascertaining the illuminating power and quality of gas.

Mr. J. Robson, of London-street, Fitzroy-square (Stand 377, South Court), exhibits his tent drip-tiles for weathering cornices, chimney-stacks, parapets, &c. In one form the tile made of terra-cotta, and is especially applicable to the weathering of brick cornices. It has a hard top member, and is adaptable to any section of cornice. The lower edge being fluted, an efficient drip is secured, and the water is prevented from running down the face of the mouldings. In another form, the tile is adapted to the weathering of walls, chimney-stacks, &c. It is claimed that, while being thoroughly efficient, the use of this tile will effect a saving of 60 per cent. as compared with the cost of the ordinary tile crenelling. It is very simple, consisting of a flat tile with a portion along one edge inclined at an angle of 45°. The flat portion of the tile is embedded between the cornice-work, the inclined part being made to press downwards and outwards, so as to efficiently serve its purpose. These drip-tiles are becoming into extensive use, and their merits have been recognised by the award to them the Bronze Medal of the International Exhibition.

Mr. R. W. Gardner (Stand 298, South Court) exhibits his useful self-closing window-curtainers, by the use of which it appears to be possible for a window to be left unfastened when shut. The fastener possesses the further merit of being proof against any attempt to get it back by the insertion of a knife or other instrument between the meeting-rails of the upper and lower sashes.

Mr. William Rice, of Fleet-street (Stand 505, East Gallery), exhibits some interesting educational appliances, including a mechanical globe, specially designed to illustrate the alternation of varying lengths of day and night, the succession of the seasons, and other phenomena resulting from the diurnal and annual motions of the earth. The same exhibitor shows "The Universal and Local Timekeeper," a glowing version of time, indicating at a glance the local time at one hundred of the principal places of the globe.

The National Health Society have a Stall in the East Gallery, where their excellent Sanitary Notes and other publications may be had.

#### NEW SANITARY APPLIANCES.

We have lately had an opportunity of inspecting at the factories of Messrs. John Bolding & Sons, of South Molton-street, a few novelties in the shape of sanitary appliances now being introduced by that firm. First and foremost must name their "Paragon" Lavatory, which fully deserves its name. It is fitted with tick-action waste, without chain or plug, and is a very ingenious double-action supply valve. The act of turning over the lever shuts the waste and fills the basin for use. By raising the lever the waste is opened and the basin emptied, and, in addition, the basin is supplied by a sufficient quantity of water, which runs by a flushing rim all round the basin. The action appears to be perfect, and this lavatory seems likely to distance all competitors, so clean is it in working and so little trouble does it give.

Another excellent appliance now being introduced by Messrs. Bolding & Sons is the "Simultaneous" after-flush water-waste preventing cistern for valve closets, which has been devised to meet a special difficulty, and is adapted for use with valve closets where it is compulsory to have a water-waste preventer. It is automatic in action, though not, for an obvious reason, on syphon principle. The problem has been solved in a very simple manner, and the solution

has met with the approval of the London water companies.

Bolding's "Kenon" syphon flushing-cistern is specially adapted for use with the "Kenon" hopper closet, or any other form of valveless closet, as, by a simple pull, the whole of the water in the cistern is discharged with great velocity, carrying everything before it. An excellent and very commendable feature of this combination of cistern and closet is that the cistern is fitted with a separate  $\frac{1}{2}$ -in. service for wetting the pan before use, the water being admitted by pressing the button of a spring stop valve. A special aperture is made in the pan for the admission of this water. The arrangement meets a long-felt want, and its cleanliness and efficiency will be obvious to all who examine it.

The "Kenon" cast-iron and lead soil-pipe junction, for connecting a leaden internal soil-pipe with an iron external pipe, is provided with a strong lead socket cap for soldering to the soil-pipe, making a good joint.

In addition to the appliances already enumerated, Messrs. Bolding & Sons are introducing some new valves and traps which have much to recommend them.

#### THE BUILDING ACT.

At a meeting of the Kensington Bench of Magistrates on Tuesday, Mr. W. Bird in the chair, Mr. J. C. Bailey was summoned, at the instance of the Chiswick Local Board, for erecting houses in Arlington Park Gardens contrary to the By-laws. He was also summoned for commencing the building without depositing plans.

Mr. Glen, instructed by Mr. Finnis, Clerk of the Board, appeared to support the summonses, and Mr. St. John Wortner defended.

Mr. Glen, in opening the case, said that at the end of last year Mr. Bailey submitted plans of the buildings, but they did not show the parapet wall. An amended plan was subsequently submitted showing the parapet wall. Relying on the amended plan the Board accepted it. It was afterwards found that the works were not being carried out in accordance with the plan, and a notice was served upon the defendant in consequence. No notice was taken, but Mr. Bailey proceeded with the erection of the buildings.

Mr. Arthur Ramsden, Surveyor to the Local Board, was called, and said a parapet wall was necessary as a protection against fire.

In answer to Mr. Wortner, Mr. Ramsden said Mr. Bailey wished to be summoned at once to have the matter settled. He appeared before the Board, but his application was not entertained. Witness was not aware that the defendant kept his men from work for several weeks in order that the matter might be settled. The Board were divided in opinion, and resolved to take proceedings by a majority of one. The by-laws have been in force since March, 1884.

Mr. Wortner maintained that the by-laws were unreasonable and not applicable to the present case, and said the parapet wall was inserted in the amended plan without the knowledge of his client. How could it be said that the by-laws were reasonable when six members of the Board out of a possible thirteen came to the conclusion that they were unreasonable? The Board, when it suited them, flung the by-laws to the wind. He called.

Mr. William Stevens, Deputy District Surveyor of Hammersmith, who said he had seen the houses in question, and, in his opinion, they were constructed in accordance with the Metropolitan Building Act. It was not necessary to erect a parapet wall, although it would be an extra measure of safety. Mr. Bailey had constructed similar houses in Hammersmith, against which no objection had been raised.

The defendant was called and said the parapet would disfigure the houses.

Mr. Benjamin Hardy and Mr. George Edwardes, members of the Board, were also called, and gave an opinion that the by-laws were unreasonable and unnecessary.

The Bench retired to consider the matter, and, on returning, the chairman said they were unanimous that the by-laws ought to be enforced. He imposed a nominal penalty of 10s. in each case.

Notice of appeal was given.

#### REPORT OF THE ASSOCIATES' COMMITTEE, R.I.B.A.

SIR,—I should be obliged if you would allow me a small space in your columns to say that if, by some accident, any Associate of the R.I.B.A. has not yet received a copy of the Report to be presented at the general meeting of Associates on Monday next, I shall be happy to send him one, on his writing to me at No. 8, Delahay-street, Westminster, S.W.

G. GRUBBS JULLIAN,  
Hon. Sec. Associates' Committee.

#### "FIREPROOF PACKING."

SIR,—Having noticed in the *Builder* of Sept. 28 an inquiry from "H. G. F." with reference to fireproof packing, I think you will find the material suitable for his purpose in the "mineral wool," now manufactured from blast-furnace slag, a supply of which I have received for a similar purpose, from Messrs. Fredk. Jones & Co., Ferriestown, Ryland-road, N.W.

PAUL LAMBERT.

#### PREMISES IN BISHOPSGATE-STREET.

SIR,—In justice to Mr. T. P. Lilly, we would ask you to allow us to correct a statement made [p. 459, ante] as to the stone used in the erection of these premises. It should have been Chilmark or Wardour stone, not Tisbury.

WADMORE & BAKER.

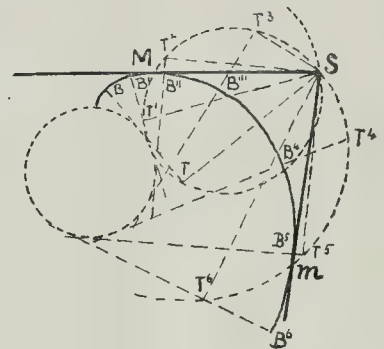
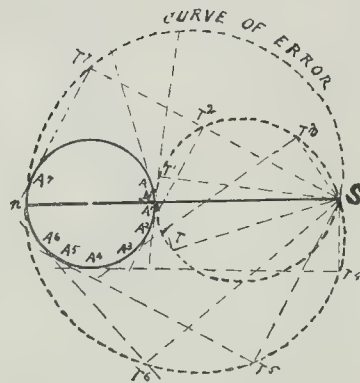
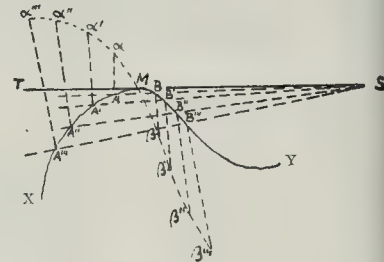
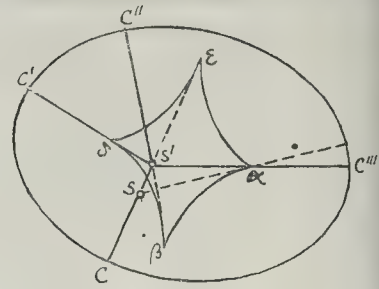
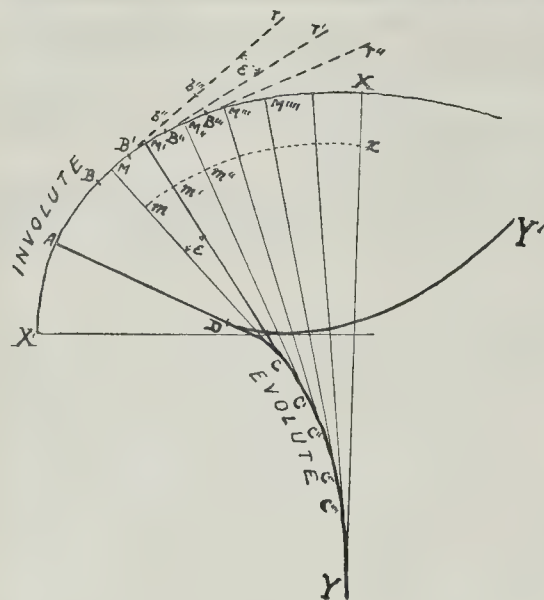
#### PROVINCIAL NEWS.

**Hindley.**—A new Free Library and Museum are about to be built at Hindley, near Wigan, from the designs of Messrs. Thomas Worthington and J. G. Elgood, architects, Manchester, at a cost of about 5,000*l*. A contract has been let for its erection to Mr. John Preston, of Wigan, and the work will now proceed forthwith.

**Coventry.**—The widening and improvement of Hertford-street at its junction with Broadgate have been consummated with the completion and opening of "Hertford-buildings," the extensive new premises of Messrs. Johnson & Mason, wine and spirit merchants and beer dealers. The architect of the buildings is Mr. H. W. Chataway, and the contractor was Mr. T. Mayo.

**Nottingham.**—Owing to the encroachment on the Old Cattle Market at Nottingham, for the purpose of erecting New Municipal Offices thereon, steps are being taken for the formation of a New Cattle Market in the Eastcroft, on the south side of the town. Mr. A. Brown, Borough Engineer, was instructed by the Markets and Fairs Committee to submit plans showing the way he advised the New Cattle Market should be laid out, and these plans had the unanimous approval of the Committee, the cost of the undertaking being estimated at 27,500*l*. to 29,500*l*. The plans afterwards received the confirmation of the Town Council. The actual work was begun in June last, although the process of filling up and levelling the ground had been going on for some time. It is expected that the market will be completed by February or March next. The area of the market, including the main road on the north-west side, so far as this road adjoins the market, but excluding the area of the sidings and loading docks and approach road from London-road, is five acres. The actual area which will be covered by the stalls, pens, lairs, &c., is nearly one acre and three-quarters, the remainder of the five acres being occupied by roads and fences, and by the portion of land intended for the future extension of the auction market and night lairs for cattle. There will be two entrances, the main approach being from London-road by means of a bridge over the canal. London-road has been raised to the level of the bridge over the canal. It was intended originally to have two swing bridges, but some of the owners of adjacent property objected, and the alternative of raising the road was taken. In front of the cattle lairs is an open auction market, with large pens for cattle, sheep, pigs, &c. There are offices for auctioneers and telegraphic purposes, also pay-offices and market inspector's office, and a public waiting-room for payment of accounts, &c. The main and minor roads will be paved with dressed granite randoms laid on a concrete foundation, and the pens, stalls, alleys and lairs and auction marts finished with a perfectly smooth and impervious surface, but grooved so as to give foothold for the cattle. Mr. A. Brown, Borough Engineer, has undertaken the architectural and other works connected with the whole scheme, everything being done under his personal superintendence, Mr. Holloway being clerk of the works. The contractors for the various works are Messrs. Foster & Barry and Messrs. Bell & Sons, Nottingham; and Messrs. Keary & Co., Birmingham.

**Tilbury Docks.**—With reference to our notice of this undertaking on p. 418, Messrs. Perry & Co., of Tredegar Works, Bow, write:—"The hotel is being erected under the designs of Mr. Gruning and we are the contractors."



### The Student's Column.

DESCRIPTIVE GEOMETRY.—PART II.  
XX.

**N**OW we find the generators  $G$  and  $C_2$  of fig. 176? For practical purposes, we think it is sufficient to find experimentally by the means of a few circles drawn from the centre  $S'$ , the smallest circle that can be inscribed within the elliptical base, and the largest circle that can be circumscribed to the same ellipse; then mark carefully the points of contact of these circles with the base: these will be the feet of the shortest and the longest generators of the cone on which the lowest and the highest points of the curve are to be found.

If we want the feet  $g$  and  $g_2$  of the generator  $G$  and  $G_2$  with mechanical accuracy, a more scientific method has to be followed, which we will give because it introduces the reader to very important properties of curved lines, as well as allows him to see why the elevation of the intersection may have sometimes four horizontal tangents and sometimes only two.

Firstly (see fig. 177), if we make any curve such as A B X (this being a question of plane

geometry, we designate the points of the curve by capital letters, divide it into equal small parts,  $B^1 B^1 = B^1 B^1 = B^1 B^1, \dots$ , and on the centre of each of these elementary parts draw a normal to the curve, such as  $M C, M^1 C^1, M^1 C^1, \dots$ ; then each normal will intersect the normal next to it in a point, and the series of the points  $C, C^1, C^1, \dots$  of the intersections will form a curve which is called the *evolutes* of the first curve, which is called its *involute*.

It is evident that the involute  $ABX$  could be described by a series of arcs of circles, such as  $M^1 M^2$ ,  $M^2 M^3$ ,  $M^3 M^4$ , . . . drawn from the points  $C, C^1, C^{11}$ , . . . as centres, without there being any appreciable difference between the curve drawn by this means and the mathematical curve itself. For this reason the length of the normal  $MC$  is called the radius of curvature of the involute curve at the point  $M$ . It is by this means that mathematicians measure the curvature of curved lines; the shorter the radius, the greater the curvature; the longer the radius, the flatter the curve will be.

It is evident, also, that if the evolute curve  $C, C^1, C^{11}, \dots Y$  be given, and we fix a thread of length  $YX$  against it in the point  $Y$ , we could describe the curve  $ABX$  by simply winding the thread round the evolute curve  $C, C^1, C^{11}, \dots Y$ . If the length of the thread

were only equal to  $Yz$ , then the point  $z$  would draw the curve  $m, m^1, m^{11} \dots z$ , which would be another involute of the curve  $C, C^1, C^{11} \dots Y$ . We see, therefore, that for every curve there are an infinite number of involutes but, on the other hand, there is only one evolu-

The reader will easily see how practical importance this property of the Ionic capital considers that the volutes of the Ionic capital are the involutes of their eye, and can be drawn by winding a thread round the same. The Roman and the Italian methods of describing volutes by arcs of circles are founded on what we have said about the radii of curvature. For our part, we have only found that after drawing a curve freehand guided purely by our sentiment of beauty, I obtained a still greater refinement by redrawing it with the help of a number of centres: curvature; besides which, we can thereby produce, if necessary, a series of curves parallel to the original curve, as in ironwork for instance.

As examples of the character and properties of evolute curves, we shall say that if the curve  $ABX$  (fig. 177) were a parabola of the second degree, its evolute would consist of two infinite branches,  $DCY$  and  $DY'$ , placed symmetrically above and below the axis  $AD$  of the parabola. The point  $D$ , where the evolute curve re-



a sharp angle, would be the centre of curve of the parabola at its vertex A. an ellipse (fig. 178) the evolute is an inner curve formed of four branches, such as  $\lambda, \mu, \nu$ . We can now see how it is that there are points from which four perpendiculars can be drawn to the ellipse, and that there are points where only two perpendiculars can be drawn. From the very construction of the ellipse we know that any perpendicular to the ellipse will be tangent to the evolute, and we can see that from any point S outside the ellipse only two tangents can be drawn to the ellipse, whereas from the point S<sup>1</sup>, the evolute, four tangents, such as S<sup>1</sup>C, S<sup>1</sup>D, S<sup>1</sup>E, S<sup>1</sup>F, can be delineated; these are the plans of the generators G<sup>2</sup> we see in fig. 176.

We have selected as base of our cone an ellipse which is a conic section, the laws of which are well defined, and to which we can draw tangents and normals according to well-known methods. But we are not restricted in our work to such mathematical curves, and we could be able to draw tangents and normals to any curve.

ough a point S outside a curve X A B Y draw a tangent to the curve. (See fig. 179.) of course, we could draw the tangent S T with a ruler without using any construction; nevertheless, but there would be cases in which it would be very difficult to fix exactly the point of contact M. We can use the following artifice: in the point S draw a series of cords such as  $\alpha, \alpha', \alpha'', \alpha''', \alpha''''$ , produce perpendiculars to these at  $\alpha, \alpha', \alpha'', \alpha''', \alpha''''$ , at the extremities of each cord of the same length as the cord itself, then the series of points  $\alpha^1, \alpha'^1, \alpha''^1, \alpha'''^1, \alpha''''^1$ , by a curve; the point M where this curve will cut the original curve X A B Y will be the point of contact of the tangent. This is the method, for the law which governs the auxiliary curve we have constructed is also satisfied by the curve M where the length of the cord is reduced to nothing, and where the perpendicular at the extremities of the cord would also be nothing. Of course, for drawing the auxiliary curve we are to trust somewhat to our natural instinct, it will be found that this is far easier than would expect before trying it.

ough a point S outside a curve draw a normal to that curve. (See fig. 180.)

We shall draw the normal by the help of what is called a curve of error, so called as being the plot of a series of mistakes when trying to find a normal. In this method we must know how to draw a tangent through any point of the curve given, and to make our operations all the easier we give ourselves as selected curve a circle.

We mark on our circle a series of points such as A, A<sup>1</sup>, A<sup>2</sup>, A<sup>3</sup>, and so on; to each of these points we draw a tangent such as A T, A<sup>1</sup> T<sup>1</sup>, A<sup>2</sup> T<sup>2</sup>, . . . and from the point S we take a perpendicular such as S T, S T<sup>1</sup>, S T<sup>2</sup>, . . . to each of those tangents; the series of the points will form a curve which we call the curve of error. The curve of error is sure to touch the original curve; in our case it touches the circle at the points N and n, and S N is normal to the circle in both points.

The curve of error has the defect of not floating with sufficient precision the point of contact N which the normal should reach, but it will be absolutely correct for the deviation of a tangent to a spire such as B' B'' . . . in fig. 181. The circular series of normals to the spire, and if we use normals we carry perpendicular lines from the point S we shall get a series of points T<sup>1</sup>, T<sup>2</sup>, T<sup>3</sup>, . . . of a curve of error identical with that of fig. 180. The curve of error cuts the spire in two points M and m, and the tangents are, therefore, M S and m s.

## Books.

Stone-working Machinery. By M. POWIS BALE, M.E., M.A., Assoc. Mem. Inst. C.E. London: Crosby Lockwood & Co.

THE above will prove to be a welcome addition to the class of practical hand-books upon the various kinds of mechanical appliances for facilitating the execution of public works. The author, in a modest preface, claims that "it is the first work of the kind published in this country," and very naturally appeals that due allowance should be made for any shortcomings

that may exist; but a careful perusal of its pages enables us to express an opinion that a somewhat difficult task has been very successfully accomplished,—a difficulty, in no small degree, by having no book of reference upon the subject.

A short, but highly interesting chapter, by way of introduction, treats the working of stone from its earliest history to the period when its manipulation by the hand alone ceased to keep pace with the advance and requirements of the age. Only a thoroughly practical man could, in such brief terms, describe the various kinds of stone suitable for conversion by machinery. These are classified under four general divisions, viz., Limestone, Sandstone, Granites, and Slates, and are treated geologically, with valuable hints as to the best means of discerning their applicability; and a well-written chapter concludes with a list of the various stones for building purposes found in Great Britain, and the localities in which they are found. The third chapter is devoted to the important question of "the arrangement of stonework for general purposes," chiefly with a view to economy in working. The author

gives a typical plan of the best manner in which to lay out such a plant, which bears on the face of it the consideration of one well acquainted with the requirements of the generality of cases. There is possibly no subject which requires the attention of a builder more than in the arrangement of his workshops and the motive-power for driving the various machines required in large building operations, and we can recommend those interested in such questions to carefully note what Mr. Bale has to say about it. In somewhat chronological order, chapter iv. deals with stone-sawing, wherein we learn that so far back as 1748 machinery was established at Ashford in Derbyshire for sawing and polishing marble, the motive power being water; whilst in 1730, in Aberdeen, granite was sawn and polished by other than manual labour. The circular-saw was invented in 1777 by Samuel Miller, of Southampton, who employed a horizontal windmill to work it; whilst the great Bramah has laid claim to the invention of "certain machinery for working wood, stone, and metals," and so the author gradually builds up a complete history of the process of mechanical sawing up to date, which is ably dealt with in chapters iv., v., and vi., including sawing with diamond points. Under the head of "Stone Dressing and Planing Machines" we have an exhaustive treatment of the most important branch of the subject. Thus chapter vii., which is elaborately illustrated, traces from the earliest commencement of the application of revolving tools (actuated by other than manual power), the various modifications and improvements that have been effected, with an amount of reliable detail, that considerably enhances the value of the work. Similarly the succeeding chapter on "Stone-moulding Machines" places before the student the question (hitherto unattempted) in a practical form; for the greatest care seems to have been taken to produce information not only affecting the general manipulation of the machine; but the most minute detail has not been omitted. And there is a pleasing argumentative tone pervading the book which places the reader on the best and most confident of terms with the author, which is not often the case in technical works. Pursuing his chronological system of treating the subject, Mr. Bale deals with "Rubbing and Surfacing Beds" in chapter ix., being careful not to omit mention of the necessary adjuncts for the process as equally in the following few pages on "Stone-recessing" and "Quarrying Machines."

We suppose a treatise on "stone-working machinery" would be incomplete without reference to those appliances extant for breaking stone; consequently, the specialities of Messrs. H. R. Marsden & Co. obtain full prominence in chapter xiv. Possibly there are no better means of acquiring a knowledge of the process of working slate, for the various uses to which it is now applied, than are provided in the volume under notice; and, seeing that this material is now so largely adopted, by reason of the facility with which it can be produced in marketable forms,—by machinery,—we have no doubt that chapter xv. will be read by those desiring information with considerable interest. The succeeding two chapters on "Miscellaneous Machinery for Working Stone" and "Cutting-tools" bring the practical treatment of the question to a highly creditable

conclusion, a few well-chosen words of advice being added on the "Management of Stone Works."

Signatures of Ancient Sculptors. (Inscriften, Griechischen Bildhauer mit Facsimiles herangegeben von Emanuel Loewy. Gedruckt mit Unterstützung der Kaiserlichen Akademie der Wissenschaften zu Wien.) Leipzig: Teubner. 1885.

It sometimes happens that a very learned book, of purely professional intent, has incidentally and,—if it hail from Germany,—quite unintentionally, a popular interest. It is so with the ponderous volume before us. Five years ago, at the close of his student years, Dr. Loewy conceived the idea of a publication that was to be essentially monumental in its character; he set to work to collect in one volume every Greek inscription that contained a sculptor's signature. Subsidised by the Vienna Academy of Sciences, he was able to have every inscription cast and carefully facsimiled, so that the reproduction should be carried out with the utmost possible accuracy. Nor was he content with a mere unclassified corpus. The inscriptions are arranged century by century, with a cross division of geographical provenance. The idea was not quite a new one. In 1871 Dr. Hirschfeld had published his "Tituli Statuariorum Sculptorumque Græcorum," but his list had only extended to something short of three hundred. Since 1871 Olympia has given up a wealth of inscribed vases, to say nothing of Delos, Pergamos, and a host of other smaller excavations. There was ample field for a new collection, and Dr. Loewy has almost doubled the list. He has added also a searching, and we are inclined to think too voluminous commentary; we have not only the inscription in facsimile and a select interpretation, but we have a collection of literally every interpretation and every comment, however wild, that has been made upon it. We think that opinions might well be excluded which have nothing beyond antiquarian interest. It is possible to be too "durchgehend."

Obviously the chief value of such a book will be its scientific contribution to the history of epigraphy,—in this field its importance cannot be over-rated. It is complete even up to inscriptions discovered while it was going through the press, and it is, so far as we have been able to examine a book of such minute reference, perfectly accurate. It has also a series of model indexes. But it is the lighter human interest of the book to which we would call attention. Many a modern artist, and, indeed, many an educated layman, will never know, or care to know, the distinction between the Eukleidian and pre-Eukleidian alphabets, but every one who cares for Greek sculpture at all will care to know the fashion in which the artist wrote his name, what he cared to say about himself and his work. At the Combe Pastoral play, beneath the great figure of the presiding Pan, the artist, by a pleasant conceit, inscribed himself, Greek fashion, "Conrad, the son of Dressler, made me and dedicated me, a beautiful offering to Pan." It was in such naïve statements that, as Dr. Loewy shows us, the ancient artist delighted in good sober earnest. "Miklades and Archermos made this beautiful statue together, and dedicated it to far-darting Apollo. They are Chians, and dwell in the city of their ancestor Melas." Often we have, as here, the picture of a friendly pair working together, father and son, or two brothers carrying on a craft traditional in the family. In the channel-ings of a pillar that supported a statue, a pious Ægean sculptor writes, "Son of Zeus, receive this blameless statue from Ekphantos, for he finished it and dedicated it a thank-offering to thee." Not always, even in these early reverent days, is piety the sole inspiring motive. One sculptor writes, "Alxenor the Naxian made; now do just look at me" ( $\alpha\lambda\lambda' \epsilon\iota\delta\epsilon\sigma\theta\epsilon$ ).

Not only is there abundant charm in the matter of these early inscriptions, but the irregular form of the letters themselves and the arrangement of the lines has a beauty of its own. Print has been the ruin of our own stone-writing, imposing upon it a dull, mechanical regularity. One cannot look at an ancient inscription without feeling that the artist regarded it, not as a mere means for conveying information, but as a thing decoratively beautiful, worthy even, we find, sometimes to be written on the limbs of the statue itself, often adorning the hem of its robe.

And last, this book, with its countless



ancient autographs, fills us with a delighted sense of the personal character of Greek art. Egypt, with all her throng of monotonous statues, has left us no single artist's name; Greece, with her delicate fragments all too few, yet leaves us the names of more than 500 sculptors.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

15,816, Construction of Panelled Furniture, Doors, &c. A. J. Beckmore.

The frame of the bedstead, door, &c., is made of metal tubing, secured at the angles by screws. Grooved pieces fixed to the tubes by screws receive the panels. This construction is applicable to parquetry, and all kinds of joinery in which panels are used.

8,081, Non-conducting Coverings for Heat. S. Leoni.

Consists in lining the wooden jackets used to surround gas-cooking stoves and the like with slag, wool, or other non-conducting material, kept in place by a wire gauze netting.

7,144, Fireplaces, G. Wright.

The size of the grate is adjusted by making the front bars and half of the bottom slide in and out. The grate is arranged for either quick or slow combustion by making the bottom of bars or solid, or half of bars and half solid.

10,560, Gas Lamps, F. Siemens.

Consists of an arrangement for supplying air to the burner, carrying off the products of combustion, and a reflector to increase the lighting power of the lamp. A modified form of the lamp is made with four cones over the burner, air to support combustion ascending between the second and inner cones, while the products pass down between the second and third and ascend between the third and outer cones.

10,576, Street Lamp, H. Culabine.

A reflector at the top of the lamp is made of an inverted conical shape with a central opening for the escape of the products of combustion. A novel arrangement for fixing the panes of glass by means of balls or blocks sliding upon pins, is also described in the specification.

11,181, Oil Cans, G. Pickford.

A thin rod or needle fits loosely in the spout of the can, preventing the entrance of dirt, and forming a guide down which the oil flows steadily. Projections prevent the withdrawal of the needle.

11,595, Line Reels, J. Nuttall.

The object of the invention is to provide an easy means of tightening the line in laying out brick-work. The reel is formed with a square bore, and fits closely upon the lower part of the spindle, which is also made square, but can revolve freely on the upper part of the spindle, which is made round. To tighten the line when the spindle has been driven into the brickwork, the reels drawn on to the upper part, the slack of the line taken in, and the reel then put back on the square part.

11,660, Coating Wood, &c. H. H. Lake.

Sublimated zinc powder formed in process of reducing zinc ore, or the dust, which is one of the products of the distillation of zinc ore, is utilised for the purpose of metallising the surface of the wood or as a paint. The zinc is mixed with oil or any suitable vehicle with or without an admixture of colouring matter. After the wood has been coated with this composition it may be burnished and afterwards varnished.

11,817, Bolt for Doors, Windows, &c. E. J. Lines.

A spring bolt is fixed within a mortise in the door, and is actuated by a knob working on a slot. By this means greater strength is obtained than by fastening the bolt to the door with screws.

12,280, Composition for Coating Surfaces. A. Parkes.

Carbolic acid preferably in crystallised condition and camphor are mixed with resins, fatty acids, bituminous matters, &c. The proportion of the mixture of carbolic acid and camphor to the other substances should be as about 10 to 20. The ingredients are incorporated thoroughly either at the ordinary temperature, or at about 325° F., at which temperature they liquify. The product may be used as a thick coating, or may be thinned with turpentine or other suitable liquid, and applied like varnish.

13,915, Protecting Edges of Saws and other Tools, &c. F. Rees.

The edge of the saw or other tool is inserted and clamped in a groove in a piece of wood or other material, or between two pieces connected together by hinges.

#### NEW APPLICATIONS FOR PATENTS.

Sept. 22.—11,225, E. Jones, Gate Latches.—11,228, J. Totton, Improvements in Treads for Staircases, Passages, &c.—11,230, S. Farrar, Draught, Rain, and Dust Excluder for Doors.—11,234, K. Proctor, Improvements in Wheelbarrows.—11,270, E. Killick, Manufacture of Cement.—11,271, E. Killick, Improvements in Kilns.—11,282, J. Howie, Manufacture of Bricks, Tiles, and Slabs.—11,285,

J. Ludlam and S. Harvey, Fire and Sound-proof Flooring.

Sept. 23.—11,309, C. Sullivan, Machine for Draining for Wells and Subsid Foundations.—11,334, E. Sloan, Window Fastener.—11,349, E. Edwards, Improved Clamp.

Sept. 24.—11,387, J. Colbran, Cooking Ranges.—11,395, A. Brogan, Manufacture of Plate Glass.—11,397, J. Beresford and W. Restall, Indicator for Water-clocks and other Pumps.

Sept. 25.—11,403, J. Howlett, Water-waste Preventing Syphon Cistern.—11,405, J. Smith and G. Duxbury, Apparatus for Heating Public and Private Buildings.—11,408, H. Milson, Faring Heads and Cutters for Wood-working Machinery.—11,441, G. Glasville, Improvements in Screws.—11,442, W. Doehring, Watchman Detector and Alarm Apparatus.

Sept. 26.—11,458, J. Farmer, Apparatus for Making and Pressing Bricks.—11,462, C. Walton, Machinery for Making and Pressing Clay into Bricks, Tiles, &c.

Sept. 28.—11,530, W. Gill, Releasing the Spring-bolt of Door Locks and Latches.—11,534, F. Cox, Improved Fastening for Sashes, Casements, &c.

Sept. 29.—11,547, J. Radford and A. Litchfield, Balance Door-Latch.—11,549, J. Parker, Manufacture of Fire-clay Bricks.—11,553, C. Lea, Construction of Door-knobs.—11,566, N. Thompson, "In and Out" Electrical Push Indicator.—11,607, E. Knight, Water-waste Preventers.—11,610, G. Rodfern, Apparatus for Preventing Concussion in Water-pipes.

Sept. 30.—11,634.—L. Brodie, Porcelain Enamel Btths.—11,661, C. Groombridge and J. Rickman, Improvements in the Construction of Seats.—11,666, F. Thompson, Pocket Saws.

Oct. 1.—11,677, H. Shaw, Attachment for Screw-drivers.—11,680, F. Gowing, Sanitary and other Traps and Pipe-connections for same.—11,680, E. Lucas, Improvements in Water-closets.—11,692, H. King, Apparatus for Opening and Closing Fanlights and Casements.—11,694, F. Simmons and J. Williams, Improvements in Lifts.—11,698, J. Rae, Simplifying Repairs to Water-Fittings by an Improved Water-tap.—11,716, M. Holb, Ventilating Sewers and Deodorising Sewer-gas.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

9,150, J. Corlett-Williams, Conveying Smoke from Towns.—9,215, H. Doulton, Embossing and Decorating Window and other Glass.—9,435, T. Jenkins and Another, Ventilators.—9,760, C. Ryan, Machine for Shaping Wood, &c.—9,765, J. W. & J. L. Howard, Manufacture of Cut Nails and Machinery Wreath.—9,808, H. Swete, Anti-vacuum Valve for Preventing the Escape of Gases into Water Service-pipes.—10,282, T. Beverley, Apparatus for Blowing, Ventilating, Exhausting, Pumping, &c.—10,538, F. Giraud and E. Neo, Gas-burner with Electric Ignition.—10,721, T. Mercer, Collection and Storage of Rain-water from Roofs, &c.—10,760, G. Garson, Suspension Bridges.—10,761, C. Smith, Facing Tiles or Plates for Concrete Constructions.—10,811, J. Hatch, Construction of Purills for Glazing Purposes.—10,861, J. Macleish, Bramah Water-closet, filled with a Metallic Ground Valve.—10,882, H. Leo, Pile Drivers.—8,640, J. Richmond, Register Stoves.—10,038, W. Large, Improvements in Nails.—11,488, H. Chocquet, Improved Screw-driver.—10,644, M. Farrington, Kilns, &c., for Lime and Cement.—10,547, E. Langlois, Apparatus for Driving Ventilators, &c., in Buildings.—10,585, G. Butcher, Kilns.—10,586, W. Pope, Ventilators.—10,884, J. Welsh, Manufacture of Bricks, Pipes, Tiles, &c.—10,928, A. Commoa, Improved Water-closet.—11,112, W. Johnson and Another, Improved Construction of Water-pipes for Buildings.—11,145, H. Girdwood, Glazing Windows, Doors, Frames, &c.—11,176, D. Nicoll, Foundation for Movable Cottages and other Structures.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to opposition for two months.

14,362, G. Redfern, Parquet Flooring.—16,111, J. Edwards, Improved Unpickable Lock.—17,031, W. Thompson, Apparatus for Drawing Ellipses.—10,213, A. Feist, Sewing Joint for Pipes.—15,978, W. Teague, Improvements in Rock Drills.—16,452, B. Badham, Combined Manhole Covers and Ventilators for Sewers.—11,443, J. Müller, Manufacture of Tiles, &c., in Imitation of Majolica Ware.—10,814, E. Douglas, Improved Method of, and Apparatus for, Gritting Marble.

#### RECENT SALES OF PROPERTY.

##### ESTATE EXCHANGE REPORT.

SEPT. 24.  
By HARRIS & JETTINGSON.  
Lewisham, Elmira-street.—A plot of freehold land £175  
SEPT. 25.  
By W. H. MOORE.  
Folkestone—96 and 98, Guildhall-street, freehold... 1,039  
Dover—72, Maison Dieu-road, 78 years, ground-rent 5l. 17s. 605  
SEPT. 29.  
By CHATFIELD, HARRIS, & CO.  
Brixton—17, Bonham-road, 82 years, ground-rent 17l. 10s. 345  
By J. W. JOHNSON & CO.  
Bethnal Green—23, Taria-street, 64 years, ground-rent 7l. 410  
St. George's-parish, freehold... 3,000  
2, St. George's-street, freehold... 650  
Leytonstone—1 to 6, Dore Behning-villas, freehold 1,410

By HARRIS, SON, & DAW.

Finbury—Ground-rent of 5l. 10s., reversion in 21 years  
Ground-rent of 5l. a year, reversion in 20 years...  
Streatham, Lewin-road—Freehold residence...  
By HARRIS, BURNER, & RANNEY.  
Bishopgate—30, Brushfield-street, freehold...  
Horton—3a to 6a and 9a, Bristow-street, 22 years, ground-rent 31l. 10s. ...  
Kensington—38, Holland-street, 58 years, ground-rent 5l. 15s. ...

SEPT. 30.  
By Mr. GIBSON.  
Camden Town—227, High-street, 26 years, ground-rent 5l. 5s. ...

OCT. 1.  
By Messrs. CHADWICK.  
Lambeth—125 to 137 odd, Stamford-street, 23 years, ground-rent 25l. ...  
139 to 151 odd, Stamford-street, 23 years, ground-rent 21l. ...

An improved ground-rent of 77l. term 23 years ...  
By F. HARRIS.  
Lee, Lee-terrace—The Hollies, 24 years, ground-rent 15l. ...

By A. RICHARDS.  
Wood Green, Truro-road—Berkeley Cottage, freehold ...

#### MEETINGS.

##### MONDAY, OCTOBER 12.

Royal Institute of British Architects.—Meeting of Associates. 7-30 p.m.  
Inventors' Institute.—(1) Opening Address, by the President, Admiral Selwyn; (2) Mr. S. J. Mackay, "The International Inventions Exhibition." 8 p.m.

##### WEDNESDAY, OCTOBER 14.

Essex Archaeological Society.—Visit to Fingring Church. Start from Colchester at 1 p.m.

#### Miscellaneous.

**Discovery of Roman Pavement.**  
Another discovery of Roman pavement has just been made at Leicester, near the site what is supposed to have been the residence of the Roman Governor of Roman Leicester. The pavements hitherto discovered are from 4 ft. to 5 ft. below the present street level, considerably above the level of the river, and the present pavement is not only at a low level than the others, but is also below the level of the Soar, and was found while excavating a cellar. The pavement, so far as it has been unearthed, measures about 14 ft. by 4 ft. and is in excellent preservation. Although the tesserae are rather larger and coarser than those previously discovered, the pattern is very distinct, and the pavement is in an excellent state of preservation. Local authorities supply the pavement to be the floor of Roman bath which existed in Leicester some 1,700 years ago, when Leicester was a Roman town. Steps are being taken to have the relic preserved, and the Leicester Archaeological Society are making arrangements to have the excavations continued with a view of ascertaining whether any further portions of the original edifice exist.—Times.

**Essex Archaeological Society.**—A meeting will be held on Wednesday next, the 14th of October, for the purpose of visiting Fingring Church, and seeing the mural paintings recently discovered there. The church is interesting, and there is a good carved font-cover, well preserved. It is proposed to start from Colchester Castle for Fingringhoe at one p.m. precisely. On the way to the church, Donyland Heath will be passed. After inspecting the church, some very fine parquetry will be visited at Wyvenhoe—also the church of Wyvenhoe where there are some fine examples of monumental brasses, viz., of William, Viscount Beaumont, and Lord Bardolf, A.D. 1507; of La Elizabeth (Scrope), second wife of John Vere, Earl of Oxford, and widow of William Viscount Beaumont, 1537; and of Sir Thomas Westley, priest, chaplain to the Countess of Oxford, 1535.

**The National Agricultural Hall, Kensington.**—In our notice of this building last week, it should have been stated that the glazing (103,000 square feet) is to be done on Mr. T. Helliwell's patent system. The zinc roofing also to be done on Helliwell's system, the extent being 53,000 square feet.

**Messrs. Waterlow & Sons' Office London-wall.**—The American Elevator Company have been awarded the contract for one of their Standard Hydraulic lifts, to be erected in the new office building of Messrs. Waterlow & Sons (Limited), London-wall.

**University College, London.**—Professor C. T. Newton will commence his course of lectures on Greek Inscriptions and Greek Myths this Friday, October 9th, at four p.m. The public will be admitted to the first lecture without payment or ticket.



**Bridges on the Furness Railway.**—Society of Engineers held its first meeting the session 1885-6 on Monday evening last, at the Town-hall, Caxton-street, Westminster, Charles Gordon, President, in the chair, and a paper was read by Mr. Charles Light on "Opening Bridges on the Furness Railway," the author described in this paper the Bouch Dock Bridge, a double-leaf swing bridge, carrying the railway and a carriage road and footways across a water passage, 80 ft. in length, between the Bacleuch and Cavendish locks at Barrow-in-Furness, and the Ulverston Canal Bridge, a traversing bridge carrying the main Branch of the Furness Railway, at a right angle, across the canal. Both were designed by Mr. F. C. Stileman, the Chief Engineer of the Furness Railway, and have been erected and in use for some time. The object of special interest in the Bacleuch Dock Bridge were the "spring girders" of which the author believed to be a new mode of construction for swing bridges, and possessing great advantages, the chief of which were the ease and rapidity with which the bridge was opened or closed (a point of the highest importance for railway purposes), whilst, when closed, not upon rollers, but on solid bearing-plates, and those at the ends of the water-way, the clear span being reduced to a minimum. The paper described fully these spring girders and their relations with the main girders of the bridge. The author gave the results of the testing to which the bridge was subjected before being put in place, and stated that during the six years since the bridge was completed it had never been necessary to use the adjusting apparatus provided to any permanent set in the spring girders. The Ulverston Canal Bridge the novelty was attributed to the arrangement by which the bridge traverses at right angles to the canal, leaving to a minimum the clear space of the locks, their weight and the extent of traverse. The author showed the value of these reductions in the case of an opening bridge crossing a canal at skew (in the present instance) of 48 deg.

## PRICES CURRENT OF MATERIALS.

| TIMBER.                         |    | £. s. d. | £. s. d. |
|---------------------------------|----|----------|----------|
| import, B.G. .... ton           | 10 | 0        | 10       |
| E.I. .... do low                | 12 | 0        | 0        |
| do, U.S. .... ft. cube          | 0  | 2        | 6        |
| (Canada) ..... load             | 3  | 0        | 0        |
| " ..... " "                     | 3  | 0        | 0        |
| " ..... " "                     | 3  | 10       | 0        |
| Danitic, &c. ....               | 1  | 10       | 0        |
| " ..... " "                     | 8  | 0        | 0        |
| Canada ..... " "                | 3  | 0        | 0        |
| " red ..... " "                 | 3  | 0        | 0        |
| " yellow ..... " "              | 3  | 15       | 0        |
| Dante ..... " "                 | 3  | 0        | 0        |
| Petersburg ..... " "            | 5  | 0        | 0        |
| Sect. Riga ..... log            | 3  | 0        | 0        |
| Finnland, 2nd and 1st, std. 100 | 8  | 0        | 0        |
| " 4th and 3rd ..... " "         | 7  | 0        | 0        |
| " ..... " "                     | 7  | 0        | 0        |
| Petersburg, 1st yel. ....       | 10 | 0        | 0        |
| " 2d ..... " "                  | 10 | 0        | 0        |
| " white ..... " "               | 6  | 10       | 0        |
| edible ..... " "                | 7  | 0        | 0        |
| ine Sea ..... " "               | 8  | 10       | 0        |
| mada, Pine ..... " "            | 15 | 0        | 0        |
| " 2d and 3rd ..... " "          | 12 | 0        | 0        |
| " 3rd, &c. .... " "             | 7  | 0        | 0        |
| " Spruce ..... " "              | 10 | 0        | 0        |
| " 3rd and 2nd ..... " "         | 6  | 10       | 0        |
| " Brunswick, &c. ....           | 5  | 0        | 0        |
| ns, all kinds ..... " "         | 4  | 0        | 0        |
| ..... " "                       | 0  | 9        | 0        |
| barrel, 1st ..... " "           | 0  | 7        | 6        |
| and ..... " "                   | 0  | 8        | 0        |
| ner qualities ..... " "         | 0  | 8        | 0        |
| ..... " "                       | 0  | 8        | 0        |
| vendras ..... foot              | 0  | 8        | 0        |
| stralian ..... " "              | 0  | 3        | 0        |
| pany, Cuba ..... " "            | 0  | 0        | 0        |
| Donningo cargo av. ....         | 0  | 0        | 0        |
| ..... " "                       | 0  | 0        | 0        |
| chaco ..... " "                 | 0  | 0        | 0        |
| vendras ..... " "               | 0  | 0        | 0        |
| Rio ..... " "                   | 0  | 0        | 0        |
| hite ..... " "                  | 0  | 0        | 0        |
| St. Domingo ..... R.            | 0  | 0        | 0        |
| nto, Italian ..... " "          | 0  | 0        | 0        |
| lto, Rio ..... " "              | 0  | 0        | 0        |

| METALS.                         |     | £. s. d. | £. s. d. |
|---------------------------------|-----|----------|----------|
| -Pig in Scotland .....          | ton | 2        | 2        |
| W, Wales .....                  | 0   | 5        | 0        |
| " , in Wales .....              | 4   | 7        | 0        |
| St. Staffordshire, London ..... | 0   | 0        | 0        |
| Standard, in London .....       | 0   | 0        | 0        |
| ops ..... " "                   | 6   | 10       | 0        |
| ops thords ..... " "            | 6   | 0        | 0        |
| ES- ..... " "                   | 4   | 0        | 0        |
| cho, and ingt. .... ton         | 4   | 0        | 0        |
| selected ..... " "              | 4   | 10       | 0        |
| ets, strong ..... " "           | 5   | 0        | 0        |
| " India ..... " "               | 0   | 0        | 0        |
| etral, fine ash. ....           | 0   | 0        | 0        |
| il, bars ..... " "              | 4   | 0        | 0        |

## METALS (continued)

| METALS (continued).          |     | £. | s. | d. | £. | s. | d. |
|------------------------------|-----|----|----|----|----|----|----|
| YELLOW METAL.....            | lb. | 0  | 0  | 44 | 0  | 0  | 44 |
| Lead—Engl. Spanish .....     |     | 0  | 0  | 0  | 0  | 0  | 0  |
| .....Engl. com. brands ..... |     | 0  | 0  | 0  | 0  | 0  | 0  |
| SPIRITS—                     |     |    |    |    |    |    |    |
| Silesian, special .....      | ton | 14 | 10 | 0  | 14 | 12 | 6  |
| Ordinary brands .....        |     | 14 | 7  | 6  | 14 | 10 | 0  |
| TIN—                         |     |    |    |    |    |    |    |
| Strips .....                 |     | 61 | 10 | 0  | 62 | 0  | 0  |
| Australian .....             |     | 90 | 10 | 0  | 81 | 0  | 0  |
| English ingots.....          |     | 63 | 0  | 0  | 0  | 0  | 0  |
| TINPLATES—                   |     |    |    |    |    |    |    |
| 10 coke .....                | box | 14 | 8  | 0  | 18 | 6  | 0  |
| 1X ditto .....               |     | 21 | 0  | 0  | 25 | 0  | 0  |
| 10 coke .....                |     | 26 | 0  | 0  | 30 | 0  | 0  |
| 1X ditto .....               |     | 29 | 0  | 0  | 27 | 0  | 0  |

## OILS

| OILS.                |           | £. | s. | d. | £. | s. | d. |
|----------------------|-----------|----|----|----|----|----|----|
| Lined                | .....ton  | 23 | 0  | 0  | 23 | 16 | 0  |
| Cocanac, Ceylon      | .....ton  | 27 | 0  | 0  | 28 | 0  | 0  |
| Ceylon               | .....ton  | 27 | 0  | 0  | 27 | 15 | 0  |
| Calm.                | .....ton  | 28 | 0  | 0  | 0  | 0  | 0  |
| Min. Lagos           | .....ton  | 30 | 0  | 0  | 0  | 0  | 0  |
| Palmitac, Ceylon     | .....ton  | 27 | 0  | 0  | 27 | 0  | 0  |
| Reaped, English pale | .....ton  | 25 | 15 | 0  | 0  | 0  | 0  |
| " brown              | .....ton  | 23 | 5  | 0  | 0  | 0  | 0  |
| Cottonseed, refined  | .....ton  | 21 | 10 | 0  | 23 | 0  | 0  |
| " Old                | .....ton  | 20 | 10 | 0  | 20 | 0  | 0  |
| Lubricating, U.S.    | .....ton  | 7  | 0  | 0  | 10 | 0  | 0  |
| " Refined            | .....ton  | 8  | 0  | 0  | 15 | 0  | 0  |
| TERPENTINE—          |           |    |    |    |    |    |    |
| " American, in bks.  | .....cwt. | 1  | 5  | 0  | 1  | 5  | 6  |
| Tax—Stockholm        | .....bbl. | 0  | 19 | 6  | 1  | 0  | 0  |
| Archangel            | .....bbl. | 0  | 11 | 8  | 0  | 13 | 0  |

## COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS:

*Epitome of Advertisements in this Number*

## COMPETITIONS.

| Nature of Work.                       | By whom required.     | Premium. | Designs to be delivered. | Page. |
|---------------------------------------|-----------------------|----------|--------------------------|-------|
| Design for Stained-Glass Window ..... | Lawrence Dillon ..... | 20L..... | Not stated               | ii.   |

## CONTRACTS

| Nature of Work, or Materials.                | By whom required.                     | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|----------------------------------------------|---------------------------------------|-----------------------------------|--------------------------|-------|
| Pipe Sower, &c.                              | Bromley U. R. S. A. ...               | A. Williams                       | October 15th             | ii.   |
| Laying-out and Planting Grounds              | Met. Asylums Board ...                | Pennington & Bridgen              | do                       | ii.   |
| Earthenware Pipe-Sever                       | East Hamlet Valley L.B.               | F. J. Rumble                      | October 17th             | iii.  |
| Eight or Ten Houses, Victoria Docks.         | Vestry of St. Giles                   | .....                             | October 19th             | xiv.  |
| Paving Streets                               | Camberwell.                           | Official                          | do.                      | xiv.  |
| Public Mortuary, Ebury Bridge                | St. George's (Hanover-square) Vestry  | do.                               | do.                      | xiv.  |
| Filter Beds, Pure Water Tank, &c.            | Horsforth Water Co.                   | McLandsborough & Preston          | do.                      | xiv.  |
| Portland Blinds at Asylum, Darenth           | Met. Asylums Board ...                | Official                          | do.                      | ii.   |
| Portland Cement                              | Leamool Corporation                   | do.                               | do.                      | ii.   |
| Paving Carriageways                          | Bermundsey Vestry ...                 | do.                               | do.                      | ii.   |
| New Steam Flour-Mill, Warehouse, &c.         | The Proprietors, Silloth              | T. Taylor Scott                   | October 20th             | ii.   |
| Well-Boring                                  | Tottenham Local Board                 | — De Paes —                       | do.                      | xiv.  |
| Drainage Works                               | W.C. C. Bacon                         | Official                          | October 21st             | ii.   |
| Repairs, &c., Lambeth Old Workhouse          | Lambeth Guardians                     | Official                          | October 21st             | xiv.  |
| Rebuilding Church, Chiswick                  | John Kelly                            | do.                               | October 22nd             | ii.   |
| Construction of Sewers, Harefield            | Uxbridge U. R. S. A. ...              | Official                          | do                       | ii.   |
| New Post-Office, Warwick                     | Warwick & Works                       | do.                               | October 24th             | ii.   |
| Station Buildings, Bodmin                    | Great Western By. Co.                 | do.                               | October 27th             | ii.   |
| Subways (in lieu of Level Crossings), Risca. | do.                                   | do.                               | do.                      | ii.   |
| New Mortuary Buildings                       | Vestry of St. Pancras.                | F. Eggar                          | October 28th             | ii.   |
| Concrete Sea-Wall and Promenade              | Hartlepool Corporation                | H. Blair                          | do.                      | xv.   |
| Cooking Apparatus, Boilers, &c.              | Guardians of St. George's in-the-East | Wilson, Son, & Aldwinckle         | October 30th             | xv.   |
| New Post-Office, Windsor                     | Comm. of H.M. Works.                  | Glasgow and Paisley               | Nov. 2nd                 | ii.   |
| Widening Railway and Re-modelling Station    | Joint Railway                         | do.                               | Nov. 3rd                 | ii.   |

## PUBLIC APPOINTMENTS.

| Nature of Appointment.                    | By whom Advertised.      | Salary.    | Applications to be in. | Page.  |
|-------------------------------------------|--------------------------|------------|------------------------|--------|
| Surveyor and Inspector of Nuisances ..... | Lymington Local Board    | 60l.       | October 14th           | xix.   |
| Banitary Inspector .....                  | Vestry of St. Pancras... | 120l.      | October 18th           | xix.   |
| County Surveyorship, Ireland .....        | Civil Service Com.       | Net stated | October 23rd           | xix.   |
| Accountant Clerk .....                    | do.                      | do.        | October 30th           | xviii. |

## TENDERS.

**ACTON** (Middlesex).—For the erection of thirteen houses, Montgomery-road, Acton Green, for Mr. Lavender. Mr. C. Nicholson Lailey, architect. Quantities not supplied. —

|                       |        |   |   |
|-----------------------|--------|---|---|
| Balaam Bros.....      | £4,100 | 0 | 0 |
| W. & F. Croaker ..... | 3,864  | 0 | 0 |
| Linfield .....        | 3,614  | 0 | 0 |
| Sabey & Son .....     | 3,611  | 0 | 0 |

BECKENHAM (Kent).—For the erection of a pair of cottages, in connexion with the new Athletic Ground, Mr. R. W. Collier, architect, Lincoln's Inn-fields :—

|                                     |      |    |   |
|-------------------------------------|------|----|---|
| Pilbeam Bros., Beckenham .....      | 2850 | 0  | 0 |
| Eustace & Son, Sydenham .....       | 753  | 16 | 4 |
| Hollingsworth, Beckenham (accepted) | 682  | 10 | 0 |

**BELLINGHAM.**—For works of water-supply, for the Local Authority. Mr. R. Grieves, Hexham, engineer:—  
Marshall Jarrow-on-Tyne 6934 2 61

|                              |     |    |    |
|------------------------------|-----|----|----|
| Robson, Blackhill .....      | 586 | 13 | 6  |
| Batty, Ackington .....       | 563 | 8  | 3  |
| Brebner, Edinburgh .....     | 522 | 2  | 4  |
| McDonald & Son, Hawick ..... | 515 | 1  | 7½ |

|                                    |     |    |   |
|------------------------------------|-----|----|---|
| Smith, Hexham-on-Tyne .....        | 510 | 0  | 0 |
| W. & M. Young, Jarro-on-Tyne ..... | 496 | 7  | 5 |
| Smith, Haltwistle.....             | 491 | 17 | 2 |

|                               |     |   |   |
|-------------------------------|-----|---|---|
| Carrick, Durham .....         | 486 | 8 | 4 |
| Maughan, Jarrow-on-Tyne ..... | 471 | 5 | 2 |
| Aynsley, Bellingham .....     | 438 | 5 | 0 |

BOYMOOR.—For the erection of eight cottages and two shops, St. John's-road, Boy Moor, for Mr. E. Keen

two shops, St. John's-road, Boxmoor, for Mr. E. Keen.  
Mr. W. A. Fisher, architect and surveyor, Hemel Hempstead. —  
W. L. Sear, Hemel Hempstead ..... £2,121 17 6

|                               |       |   |   |
|-------------------------------|-------|---|---|
| S. Monk, Hemel Hempstead..... | 1,955 | 0 | 0 |
| W. Sear, Hemel Hempstead..... | 1,900 | 0 | 0 |
| J. Bushell, St. Alban's ..... | 1,860 | 0 | 0 |

|                                   |       |    |   |
|-----------------------------------|-------|----|---|
| T. F. Reavel, Hemel Hempstead ... | 1,842 | 10 | 0 |
| G. Burrage, Sutton, Surrey .....  | 1,718 | 0  | 0 |
| J. Payne, Hemel Hempstead .....   | 1,599 | 0  | 0 |

|                                     |       |    |   |
|-------------------------------------|-------|----|---|
| C. Monk, Hemel Hempstead .....      | 1,465 | 15 | 0 |
| A. P. Tomlin, Boxmoor (accepted)... | 1,350 | 0  | 0 |

**BROAD BLUNSDON (Wilts).—**For Hospital Farmhouse, Broad Blunsdon, near Swindon, Wilts. Mr. Thos. S. Lansdown, architect, Swindon. Quantities supplied by the architect (proprietor supplying all building stone, lime, sand, and cartage) :—

|                             |     |    |   |
|-----------------------------|-----|----|---|
| Henley, Swindon .....       | 554 | 10 | 0 |
| Newcombe, Cirencester ..... | 515 | 0  | 0 |
| Barrett, Swindon .....      | 464 | 8  | 9 |
| Phillips, Swindon .....     | 450 | 0  | 0 |

|                                                            |         |
|------------------------------------------------------------|---------|
| Williams, Swindon (accepted, subject to modification)..... | 410 0 0 |
| <hr/>                                                      |         |
| FULHAM.—For roads and sewers on the United Land            |         |

|                        |        |   |   |
|------------------------|--------|---|---|
| No well & Robson ..... | £1,793 | 0 | 0 |
| Here .....             | 1,695  | 0 | 0 |

|                        |       |   |   |
|------------------------|-------|---|---|
| S. Chafen .....        | 1,680 | 0 | 0 |
| W. Harris .....        | 1,643 | 0 | 0 |
| W. J. Bottersell ..... | 1,571 | 0 | 0 |

|                      |       |    |   |
|----------------------|-------|----|---|
| Clark .....          | 1,556 | 13 | 3 |
| Peill & Sons .....   | 1,423 | 0  | 0 |
| C. Killingback ..... | 1,421 | 0  | 0 |
| T. Wainwright .....  | 1,405 | 3  | 6 |
| J. C. B. M. ...      | 1,404 | 0  | 0 |

|                        |       |   |   |
|------------------------|-------|---|---|
| J. G. B. Marshall..... | 1,401 | 0 | 0 |
| W. Nicholls .....      | 1,313 | 0 | 0 |
| Geo. Bell .....        | 1,249 | 0 | 0 |
| James & Wimpey .....   | 1,169 | 0 | 0 |

|                              |       |    |   |
|------------------------------|-------|----|---|
| James & Whitpey .....        | 1,169 | 0  | 0 |
| S. & J. Saunders .....       | 1,156 | 0  | 0 |
| R. Mayo .....                | 1,101 | 19 | 0 |
| Neave & Son (accepted) ..... | 1,068 | 0  | 0 |

W. Kew ..... 1,052 10 0

---

HERNE BAY.—For the erection of stable buildings.

East Cliff, Herne Bay, Kent, for Mr. John Boosey, Mr.  
Robert Willey, architect, Ludgate-hill, E.C.  
Welby..... £482 10 0

|                        |     |   |   |
|------------------------|-----|---|---|
| Adams.....             | 450 | 0 | 0 |
| Brown (accepted) ..... | 378 | 9 | 0 |

LONDON.—For additions, decorating, and sanitary works at 16, Half Moon-street, Piccadilly, for Mr. Robinson. Mr. D. Cubitt Nichols, architect :—

|                                        |      |   |   |
|----------------------------------------|------|---|---|
| Wilkins & Kent .....                   | £815 | 0 | 0 |
| Wetherilt, Lee, & Martin (accepted)... | 745  | 0 | 0 |

LONDON.—For the erection of a new warehouse, Nos. 1 and 3, Great Chapel-street, Oxford-street, W., for Messrs. Jeffrey & Co. Messrs. Lansell & Breda, architects, Bedford-row House, Great James-street, W.C.—

|                       |            |
|-----------------------|------------|
| Greenwood             | 21,378 0 0 |
| Brass                 | 1,345 0 0  |
| Patman & Fotheringham | 1,273 0 0  |
| Lambie                | 1,265 0 0  |
| Mattcock Bros.        | 1,175 0 0  |
| Axford                | 1,169 0 0  |
| Lawrance & Sons       | 1,150 0 0  |
| Macey                 | 1,145 0 0  |
| Toms (accepted)       | 1,143 0 0  |

LONDON.—For rebuilding stables at Holloway-road, for Messrs. Cooper & Co. Mr. R. M. Shaw, architect, 22, Henrietta-street, Covent Garden—

|               |                  |
|---------------|------------------|
| Years & Co.   | £1,300 less £283 |
| Batt          | 1,225 " 80       |
| Picton        | 1,190 " 84       |
| Coombes & Son | 1,188 " 88       |
| Taylor        | 1,098 " 77       |

LONDON.—For alterations and additions to the Dunster Arms, East-road, Hoxton, for Mr. Godwin. Messrs. Stock, Page, & Stock, architects, 6, Duke-street, London Bridge—

|             |          |
|-------------|----------|
| Wells       | £900 0 0 |
| Greenwood   | 899 0 0  |
| Rider       | 878 0 0  |
| Years & Co. | 833 0 0  |
| Marsden     | 808 0 0  |
| Wells & Co. | 780 0 0  |
| Jackson     | 767 0 0  |

SOUTHAMPTON.—For the extension of the Southampton Corporation Waterworks. Mr. Wm. Matthews, C.E., engineer—

No. 1 Contract.—Well, &c.

|                                     |            |
|-------------------------------------|------------|
| W. Taylor, Reigate                  | £2,521 0 0 |
| H. J. Sanders, Southampton          | 1,560 0 0  |
| W. Hill, Gosport                    | 1,525 0 0  |
| Legrand & Sutcliffe, London*        | 1,500 0 0  |
| J. Jackson, Westminster (withdrawn) | 1,200 0 0  |

[Engineer's estimate, 1,000] \* Accepted.

Contract No. 2.—Engines, &c.

|                                    |             |
|------------------------------------|-------------|
| Easton & Anderson, London          | £18,141 1 3 |
| Goodfellow & Matthews, Hyde        | 16,850 1 3  |
| The Lillishall Company, Shifnal    | 16,235 1 3  |
| Hathorn, Davey, & Co., Leeds       | 14,035 1 3  |
| J. Watt & Co., Birmingham          | 13,650 0 0  |
| W. & J. Yates, Blackburn           | 13,434 6 9  |
| Stott & Co., Haslingden            | 12,215 1 3  |
| Simpson & Co., Fimlico (accepted)* | 12,108 11 3 |
| Gimson & Co., Leicester            | 12,076 7 3  |
| Wood Bros., Sowerby Bridge         | 11,937 9 9  |
| T. Vernon & Co., Westminster       | 9,411 14 10 |

[Engineer's estimate, 12,300.] \* Guaranteed coal consumption 2 1/2 lb. per actual horse-power.

Contract No. 3.—Reservoir, &c.

|                                    |             |
|------------------------------------|-------------|
| Small & Son, Jersey                | £7,97 0 0   |
| J. Jackson, Westminster            | 5,744 0 0   |
| Aird & Sons, London                | 5,230 0 0   |
| Turner & Griffin, Leamington       | 5,269 9 5   |
| Pickhall & Co., Merthyr            | 5,076 16 11 |
| W. Hill, Gosport                   | 4,856 0 0   |
| Vernon & Co., Westminster          | 4,728 0 0   |
| Jones & Fitzmaurice, Birmingham    | 4,693 16 6  |
| G. Moss, Oxford                    | 4,410 2 9   |
| H. Sanders, Southampton            | 4,397 0 0   |
| Crook & Son, Southampton           | 4,347 0 0   |
| Bull & Sons, Southampton           | 4,328 0 0   |
| S. Stevens, Southampton (accepted) | 4,188 0 0   |

[Engineer's estimate, 4,900.]

Contract No. 4.—Main Lays, &c.

|                              |             |
|------------------------------|-------------|
| W. Taylor, Reigate           | £9,488 13 8 |
| Small & Son, Jersey          | 4,240 0 0   |
| J. Jackson, Westminster      | 3,483 0 0   |
| W. Maddock, Baltham          | 3,254 0 0   |
| Turner & Griffin, Leamington | 3,242 0 0   |
| Deville & Forrest, London    | 3,083 8 0   |
| Aird & Sons, London          | 2,961 0 0   |
| Wainley & Co., Freston       | 2,747 0 0   |
| Pickhall & Co., Merthyr      | 2,701 19 8  |
| Bull & Sons, Southampton     | 2,678 0 0   |
| H. Sanders, Southampton      | 2,521 9 6   |
| Turner & Griffin, Leamington | 2,490 16 2  |
| E. Follett, Southampton      | 2,397 0 0   |
| G. Moss, Oxford              | 2,260 18 9  |
| H. Gould, Ely (accepted)     | 1,995 0 6   |

[Engineer's estimate, 2,200.]

WALWORTH.—For the erection of artisans' dwelling-houses, &c., Elated-street, Walworth. Messrs. George Lansdowne & Harris, architects—

|                     |            |
|---------------------|------------|
| Sabey & Son         | £3,159 0 0 |
| Dearing & Son       | 3,181 0 0  |
| Canning & Mullins   | 3,167 0 0  |
| J. Sawyer           | 3,100 0 0  |
| Wood, Harris, & Co. | 3,100 0 0  |
| J. Tyerman          | 3,097 0 0  |
| J. Marsland         | 3,075 0 0  |
| R. Eldridge         | 3,074 0 0  |
| E. & R. Evans       | 3,039 0 0  |
| Tarrant & Son       | 2,995 0 0  |
| H. & F. Croaker     | 2,936 0 0  |
| Stayner & Son       | 2,937 0 0  |
| W. & F. Castle      | 2,777 0 0  |
| Geo. Parker         | 2,765 0 0  |
| Pack Bros.          | 2,727 0 0  |
| W. Smith            | 2,569 0 0  |

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# The Builder.

Vol. XLIX. No. 228

SATURDAY, OCTOBER 17, 1888.

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### Classical Forms in Modern Architecture.



NOTHING in the history of art is more remarkable than the persistent vitality of the principal forms stamped upon architecture by the Greeks; or, if it is not quite correct to speak of persistency in a

career in which there have been so many breaks, at least their perpetual and unexpected resurrection from time to time, after they have been supposed to have run their course and been decently interred. In one sense, indeed, their history since they were "carved out" by "the supreme Caucasian mind" may be considered an almost unbroken one, since the slender shaft of the Gothic builder claims a direct though long descent from the column of the Greek. The difference in stamp and expression between these two widely-separated members of the race is so great, however, and their actual æsthetic function so distinct,—the column being used to express resistance to vertical pressure, the vaulting shaft to simulate the absence of such pressure,—that it is only in a scientific sense that they can be regarded as related. But when the Gothic shaft had played itself out,—died of inanition, as it were,—up came the column again, with its faithful adherents the architrave, frieze, and cornice, like John Barleycorn risen from the dead, and ready to run a new race,—and a pretty long and important one too. Gothic has made a quasi-resurrection again in modern days, with so much blowing of trumpets that men have verily believed that Pagan forms were for ever beaten from the field; but Gothic has not been able to hold its own for more than a generation, though the revival has left influences behind it that will long be felt; and here once more are the column and capital and their adjuncts coming forward as persistently as ever. How are we to welcome them?

We spoke of the forms in question as stamped on architecture by the Greeks, for it is to the finish and polish given to all the details by that keenly-critical people that their value and vitality are due. The Egyptian forms, although they are now recognised as the raw material of Greek architecture, would never have acquired the hold over the world which the Greek edition of the same idea has obtained. They were too cumbersome, even in purely æsthetic point of view, to have run the gauntlet of the criticism of ages, independently of constructive and economic considerations. The secret of the hold of the Greek

forms over the admiration of so many generations is that they represent the architecture of refinement and culture. A cultured generation prefers such architecture to ruder, though more powerful, forms, and a cultured generation generally exercises considerable influence on the aggregate taste of the world in the times that succeed it. This was the secret of the great Classical revival of the Renaissance. Classic literature had fired the minds of the Renaissance scholars, and everything Classic was holy. Hence the adoption of the column and entablature as a mere ornamental facing to a building. It was pleasant to have it there, though only as a kind of scenic decoration, for it represented the beloved period of the apotheosis of culture. The Romans had, indeed, used Greek architecture in this scenic manner to a great extent; but the Renaissance architects carried it much further. The "order," in some form or other, was the Shibboleth of architecture. The application of it was the direct way to raise mere building to the level of architecture.

So far as this resulted in what may be called mere "Palladianism," it was an excusable weakness; hardly anything better. But the Renaissance really shows a good many types of treatment, of very varying value in regard to artistic effectiveness and logical character. The Palladian column, or pilaster, running up the face of a building, regardless of stories, is hardly defensible on any healthy theory of architectural design. But the introduction of columnar forms within the story, as a method of giving expression to the piers of the building, does not by any means come under the same category of offences. The fancied necessity of accompanying it by the full complement of architrave, frieze, and cornice, led in many cases to an exaggeration of the horizontal divisions of the building; but this mistake was not necessarily involved in the principle, and was sometimes avoided. The style associated with the reign of Francis I., and which has become rather popular lately, is really a very logical, and very pretty and graceful, adaptation of the idea of the Classic column to buildings which were not columnar. It achieved the additional success of making a real blending between features derived from Classic and features derived from Gothic work. It forms, in fact, a very good example of a successful attempt to adapt, rather than imitate, the features of a past style. The Renaissance on Italian soil, even when it escaped the formal and pedantic method of Palladio, was much more imitative as to detail than the style created on French soil; but, as a general application of previously-existing features to new conditions, it was, in many of its forms, not only graceful and charming, as every one

knows, but quite logically defensible, and does not deserve the doubtful countenance which some critics have turned upon it. Just as the flutings on a column give expression to the shaft of the column, so the column itself, introduced as a forming or shaping what would otherwise be a blank pier, gives expression to that pier. So far, it is an adaptation of forms originally invented for a more constructive purpose and expression, but capable, at least, of being not unfitly used in order to impart expression, by applying to a dead wall forms which have, by long association, become associated in our minds with the idea of the graceful support of superincumbent weight.

It is not very easy to realise, even to our own minds, how far the pleasing effect to our eyes of these Classic forms, used as means of expression, is really due to habit and association, and how far it is due to their inherent artistic refinement and suitability. The interest at present taken in many of the forms of Jacobean and subsequent styles or fashions of architecture, and their revival all round us, must be taken to be due almost entirely to association. It is curious to note Mr. Fergusson's remark, published only twelve years ago ("History of Modern Architecture," page 225), in regard to the taste of some of the châteaux of the Henri Quatre period. One specimen, he said, must suffice to illustrate the style, the elevation of the Château Gaillon. "It is impossible to conceive anything more fantastic or vulgar, and it is difficult to conceive how French taste could ever have sunk so low as to admire such a thing as this. . . . Examples are only too common, and not only rival but surpass the absurdities of the Jacobean age in our country. . . . At the present day we can hardly understand how architects could desert the constructive propriety and elegance of detail of the Middle Ages for such a style; still less how they could fancy they were reproducing Classic art when they did so." The Château Gaillon is, to our thinking, worse than anything that can be credited to our own Jacobean or even Queen Anne age in England; but the word "absurdities" is not too strong to apply to many details of the English architecture of those periods, which are now being reproduced all round us, although only a little more than a decade ago a leading writer on architecture could say that "in the present day it is difficult to understand" how such things could ever have been admired.

All this is the fruit of going on mere association and impulse, rather than on critical judgment. The cutting up and corruption of classic detail, which is seen in the architecture referred to, had its origin in the mere desire of novelty, and it is revived from the desire,



springing from various causes, to revive the social and artistic associations of that period. This latter feeling was also at the bottom of the first classic revival of the Renaissance; but the details then revived were really artistic and logical for their original purpose, while much of the Jacobean detail could claim no such praise. The applications made of the Order and its appurtenances, as a means of architecturalising a building, were, on the other hand, often very unreasoning and illogical; but they gave the same sort of charm to the eye and taste that Latin quotations give to a speech; they may not have much to do with the main object, but they are graceful additions, and are evidence of scholarship, and give at least the appearance of propping up respectively an argument or an architrave in a decorative manner.

Has not the new classic revival (as we seem to be coming to it) something better to do with these beautiful materials of expression left us by the Greek or Latin mind, and as inextricably wound into our architectural ideas as the Greek and Latin elements into our speech? The mere imitation of the features of the decadence of the Renaissance is, at all events, a task not worth the thought or abilities of an architect who looks for anything higher than commercial and fashionable success. If we are going to imitate, let us imitate the best forms, not the corrupt ones. There seems to be a vague idea that by taking these latter as a starting point we shall pave the way for originality and for new developments; that is to say, that is the defence made for the process sometimes, when a defence is asked for; though with the majority, probably, fashion rules the day. A more hopeful, and certainly a more intellectual, method of aiming at original development would be to take the original classic features in their best form, and consider whether we cannot make better modifications of them for our own purposes than were made by the architects of any period of the former Renaissance. If we look back at the history of the classic forms since the Renaissance, although there are many varieties in the way of applying the whole collection of features called the "Order," there is little variety in the treatment of their several parts, except what includes obvious inferiority to, and corruption of, the original forms. Surely there is something else to be done than this. It is hardly possible that we can beat the Corinthian capital, for instance, in its main design and idea as a decorative finish to a column in buildings of an ornate and graceful type; but is there really no leaf except the acanthus (if acanthus it be) which is capable of effective conventionalising for this purpose? Is not the classic form of capital, if we fairly take it in hand, capable of as much variety of treatment as the Early English capital? Not, of course, as much freedom in individual cases; symmetry must be preserved, or we lose the inherent character of the feature; but as much variety within its own lines. Are there no forms of fluting a column, or otherwise emphasising its vertical expression, but the two or three usually employed and mechanically repeated? Then, what does the column really represent? The special treatment of a cylindrical mass of stone, to express weight-bearing capacity in a graceful and suggestive manner. How about applying some of the same suggestions in treatment to such vertical masses as piers, in positions where columns would be unsuitable and superfluous? Many hints from columnar design might be borrowed and adapted for what we may call pier design; for, in spite of a certain esteemed Professor of Architecture, we hold that the pier and the column are two essentially distinct things. The experiment of using the entablature and surbase without the columns, the whole building forming the order, has often been tried; the special treatment of the pier masses not so often. The entablature offers many opportunities for new treatment. In most forms it is a mere survival, the frieze space having been originally the space for upper lights or openings, having necessarily a lintel over the columns and a second lintel over the frieze openings, so that the three-fold division of architrave, frieze,

and cornice has become impressed upon the architectural mind of the modern world, and is religiously carried out, even when, in fact, they are only so many solid courses of stone or other material, one over the other, with no constructive necessity or excuse in their threefold arrangement. The eye has become used to the threefold division, and expects it, and there is a feeling of something wrong if it is not carried out; but this is only habit, and there is a considerable field for the designer of Classic cornices in bringing to them, when used without columns, new and modified treatment suitable to their altered circumstances. Even if we go back again to the actual built-up threefold arrangement of the Doric style (which in certain cases might have its practical *raison d'être* in connexion with the ventilation and lighting of the roof of a modern building), there is a good deal to be done in improving the supports between the lights, represented in the original Doric by the triglyph, which is the one feature in Doric architecture that has something clumsy and unsuitable for its position about it. It always suggests itself to us as the one remnant of the old wooden structure from which the wooden element has not been eliminated. It is not often possible to refine on Greek detail, it must be admitted, but it would certainly be possible to refine on the triglyph. But, without cherishing the ambition of refining, what we would suggest is that the adaptation and modification of the materials of what is called "Classic" architecture is an experiment of the highest interest and affording almost endless scope for thought and artistic invention in architecture; and that we are far more likely to arrive at originality combined with grace and expression (and no other sort of originality is worth the name) in that way than by picking up the broken fragments from the degradation of Classic architecture. The former method, however, does require much thought and study; the latter, no thought and little study.

#### ARCHÆOLOGICAL NEWS FROM ROME.\*



It becomes a harder task every year to overtake the ever-increasing strides of classical archaeology. The annual publications of the German Archaeological Institute at Rome lie before us in the usual form of "Annali, Bulletini, Monumenti." Each year the printed report increases in bulk, and we are glad to be able to add, in interest. *Pari passu*, each year the plates of the published "Monumenti" advance, both in finished accuracy and in splendour of execution. A little while ago, it was possible for the reviewer to summarise, now he must be content to select.

Naturally, our eyes first turn to Corneto, the modern archaeological Eldorado. Nor are we disappointed. Just at the mouth of a tomb not otherwise remarkable for its contents, the excavators were fortunate enough to find an amphora of the very early Attic style, of the date when Attic vase-painting was still under Corinthian influence. The vase is in the finest possible preservation; it contained, when it was found, a quantity of ashes and burned bones. The designs upon it are executed in a remarkably vigorous style, and we are glad to see that the beautiful coloured plates ("Monumenti," xii, 9, 10) lose scarcely anything of the freshness of the original. The chief interest of the vase lies, however, not so much in the style as the subject of the designs. On the obverse is represented the fight of the hero Herakles with the Amazons: on the reverse, the hunt of the Calydonian boar. In both cases, the names of the *dramatis personæ* are inscribed.—"Herakles" lifts his sword against the Amazon "Andromache" while to the right the comrade of Herakles, "Telamon," comes up with a second Amazon, "Lauke" (no doubt intended for Glauke); to the left, an Amazon, Iphito, is about to slay a nameless Greek. It will be seen that the contest falls, as usual in an archaic

design, into a number of disjointed combats. This vase is the earliest yet known on which the Amazonomachia appears; to all students of the typography of the myth it will, therefore, have a special attraction. The design on the reverse, with the inscribed names, "Castor," "Peless," "Melanion," and "Gorgos" (this last a dog), presents no deviation from the usual type.

Corneto has yet another contribution to offer. It is a noticeable factor in archaeological progress that every new discovery brings with it a new era in the interpretation of already well-known monuments. Since the finding of the Praxitelean statue of Hermes carrying the child Dionysos, this subject of the nurture of the infant Dionysos has been rediscovered, so to speak, in a number of minor representations. In the present number of the *Annali* (Tav d'Agg., E. F.), Dr. Rohden, the well-known authority on terra cotta, publishes two,—the one from the lid of a terra-cotta box, the other from the cover of a mirror now in the Corneto Museum. On both, the designs are substantially the same; a youthful female figure seated to the right holds on her lap a naked child; the child clings in his arms a cornucopia; to the left, evidently engaged in conversation with the maiden, a youth, who is scarcely more than a boy, leans against a column; on the terra cotta he is accompanied by a dog; on the mirror the space occupied by the dog is filled by a term. In the terra cotta there is nothing to characterise the youth: he might be Eros or Adonis, or, in fact, any chance shepherd boy making love to a maiden. Such would be the natural interpretation of the scene, but the Corneto mirror lends a different clue, and proves the boy no lover at all. On the pedestal of the pillar against which he leans is carved a caduceus, marking him undoubtedly as Hermes. This conventional, idle fashion of indicating rather than expressing a personality is common enough in late art: the artist chose any ready-made figure that lay to hand and added a symbol to characterise the particular god he wished. Given Hermes, and the rest of the scene is easy of interpretation. The child with the cornucopia is Dionysos, god of the fruitful earth; he is seated in the lap of one of the nymphs of Nysa: Hermes has just entrusted him to her care. Of course the special interest of the two designs lies in the fact of the same mythological type occurring on two monuments belonging to widely different classes,—the one Etruscan, the other Apulian. Dr. Rohden collates the remaining instances of similar representations of this myth, all of which are of about the same date, i.e., the second or third centuries B.C.: a mirror case similar to that published by Dr. Rohden may be seen in the British Museum, and a terra cotta in the South Kensington Museum.

If the Hermes of Praxiteles has aroused new interest in the story of Dionysos and the nymphs of Nysa, still more the recent discoveries at Pergamos have prompted the systematic investigation of the far more obscure local mythology that gathers round the hero Telephos and his mother Auge. Until the discovery of the smaller Pergamene frieze, with its scenes from the life of Telephos, even to professed archaeologists Telephos and Auge were but shadowy names. Recent excavations at Pompeii have added to our list of Auge representations two very interesting frescoes. The meaning of these frescoes would until quite recently have been matter of great uncertainty; in the light of the Pergamene discoveries there is no possibility for doubt. Both frescoes represent the same scene (Annali, 1885, Tav d'Agg., H. I.). To the left of the picture a woman crouches near a stream in the act of washing a garment, which she drops from her hands; she is surprised by a male figure advancing from the right. He catches her cloak, and she in terror claps her attendant maiden, who seeks to warn off the intruder. This intruder is undoubtedly Herakles; he is sufficiently characterised by his lion's skin and club. He is in the act of surprising Auge. The son of Auge and Herakles, it will be remembered, was Telephos, mythical founder of Pergamos. At Pergamos there was a special shrine to Angos worshipped there as

\* Annali, Bulletini, Monumenti dell' Instituto di Correspondenza Archæologica, Anno 1884. Roma, 1885.



Eleithia. The version of the rape of Auge followed by the painter is not the one followed by Euripides, and most commonly current. According to Euripides, it was within the precincts of a temple where Auge was serving as priestess that Herakles surprised her during a Dionysiac revel. The local version, however, ran that Auge was surprised at a fountain outside the temple, whither, no doubt, as the painter has depicted her, she had gone, like Nausikaa, to wash the family raiment. One figure in both frescoes remains unexplained. Behind the principal actors stands a tall female figure with wings, and an elaborately-rayed nimbus about her head. She must be some presiding local divinity. Dr. Man conjectures her to be the nymph of the mountain locality, Parthenion, where the incident took place. We think this attribution needs further evidence for confirmation.

Perhaps the most interesting contribution to this year's "Annali" is a paper by Dr. Froehner on two recently-discovered vases, one of which has passed into his own hands. The first of these, a kotylos of the fine red period, has, on the obverse, a design which, though not unknown on vases previously discovered, has always been regarded as enigmatic, or, at least, of uncertain interpretation; a slender maiden figure is in the act of rising out of the ground; she has emerged as far as the knees, and is faintly holding up with either hand her dress, which impedes her upward motion. At each side of her a satyr is gesticulating in wild wonder and delight at her appearance. The second vase, an amphora of late Lower Italy style, represents the head of a woman emerging in like fashion from the ground; to the right a satyr starts away with arms extended in surprise. Dr. Froehner's conjecture as to the meaning of these and similar designs seems to us to amount to a certainty. The maiden figure in each case he thinks to be Persephone up-rising in the spring-time from her winter spent with Hades below the ground. This myth of the spring-time, — the uprising of Persephone, — took, we know, strong hold of the Greek mind, and from other monuments we know that in art form this uprising was represented in this simple, straightforward way. The only difficulty is the presence of the satyrs. We have to remember, however, that the worship of Demeter and Persephone was closely linked with that of Dionysos. Both were native divinities, and nothing could be more likely than that the return of the spring goddess should be welcomed by a wild satyric revel. The recurrence of the motive on repeated vase-paintings makes us sure that the juxtaposition was familiar to the popular mind.

We have confined our notice to the remains of Greek art; but, naturally, in a publication appearing at Rome, much space is given to Latin archaeology. Dr. Jordan has an interesting paper on the votive cups (*pocula*), now numbering fourteen, signed with the name of a god or goddess in archaic Latin. These cups are of so uniform type, that, with the help of epigraphy, it is no difficult matter to fix their date. They are of black highly-glazed ware, decorated in white. The decoration mostly consists of a wreath of ivy leaves and a centre design, consisting of a Cupid, riding or driving some animal. Above the inscription, "Veneres pocolum Jumanones [sic] pocolum." The series of names are interesting, as showing the deities popular at the time (about the third century B.C.). We have, besides Juno and Venus, "Menerva," "Volcani," "Lavernai," "Salutes," "Aisclapi," "Fortunai," "Seturni." These are familiar names, but the cups have given us two goddesses hitherto unknown, "Acetiai" and "Coerai." Dr. Jordan believes we have here *Æquita*, a sort of goddess rather of Fate than Justice in our sense, and *Cura*. The cups, we note, are found at Vulci, Corneto, Ostia, Chiusi, Rome, and even as far as Otranto; they were, no doubt, at one time, a wide-spread fashion, but probably a fashion that died with her inventive potter.

Dr. Hellig contributes a valuable paper on the origin of the Etruscans, a difficult subject, peculiarly his own; his conclusions are based entirely on evidence that is monumental, not

philological. Dr. Dressel gives an exhaustive account of the excavations carried on in the Necropolis at Alifiae, to which last year we called attention; and the number closes with an article by Dr. Hülsen, on an ancient building near to the Church of St. Adrian at Rome.

#### THE RAILWAY SERVANTS' CONGRESS.

THE debates which have taken place at the Congress of the Railway Servants, at Leicester, have a ring of truth and earnestness which commands respect. The subjects brought forward are, for the most part, of pressing public importance; and their temperate and intelligent discussion, by the *élite* of that great army to whose patient vigilance the unrivalled safety of the railways of the United Kingdom is due, can not fail to have good results.

We have previously called attention to the contrast presented by the percentage of accidents to life and limb occurring to railway passengers and of those occurring to railway servants. One fatal accident in every six millions, and one non-fatal reported accident in every one and three-quarter millions of passengers in six months, contrast with one fatal accident in every 1,736, and one other reported accident in every 408 railway servants, in the same time. But in this simple way it is evident that the risk run by the latter is positively frightful. Nor can there be any doubt that the railway servants, — thus toiling for the public with their lives in their hands, — have gone straight to the main causes of the great danger that they undergo; or that their practical recommendations, if adopted, would remove grave sources of preventable danger.

First among these we are disposed to rank the absence of an automatic coupling arrangement between railway vehicles. The resolution of the Congress recommending the enforcement of this improvement, though strongly worded, is not too strongly worded. "In view of the appalling loss of life, and the large numbers of non-fatal injuries occurring annually to railway servants engaged in shunting operations, owing to the system of railway couplings now in use, this Congress urges the Legislature to confer power upon the Board of Trade to order the adoption of some system of improved coupling which will obviate the necessity and remove the danger of having to pass between vehicles for the purpose of coupling or uncoupling them." This is no vague unpractical suggestion. The present coupling, a double screw link, was invented in or about 1834, and was an admirably ingenious mode of doing what was then required, *i.e.*, drawing the carriages together so as to avoid those repeated shocks which attend the progress of trains that are not elastically bound together. But with the enormous increase of traffic, this link is, — or rather ought to be, — a thing of the past.

Side by side with this prime mechanical requirement we should rank the resolution proposed by the Hasland delegate to the effect that strict adherence to rules should be enforced, and that any rules which are not so enforced should be expunged from the order-book. Without now saying a word as to that constant struggle that many persons experience as to the feeling of the railway servants, we would point to the rules as to crossing the line. These are generally conspicuously placarded at every railway station, and no less generally openly broken by a scramble of porters over the rails, a little in advance of an incoming train. How many deaths are due to this permitted, if not enforced, foolhardiness, it is not easy to say. With the men there seems to be something of the excitement of a stiff leap in the hunting-field. But the danger they run is at the same time unnecessarily great, and demoralising, as an instance of contempt for regulations.

As to the proposal for the return of working railway men to Parliament, we must be content to refer our readers to the debates, only remarking that this forms only one case of a new problem regarding Parliamentary repre-

sentation, the solution of which it would be very rash at the present moment to anticipate. It is by no means clear that a general assembly made up of a number of class specialists would prove an available institution. On the other hand, the value of special information is not to be despised, although it is usually of more use in Committees than in the House itself. We are content now to indicate that there are *pros* and *cons* as to this part of the proceedings of the Congress.

Less hesitation attaches to the complaints as to overwork. As to these, the railway servants have the warm sympathy of those who best know what work is and how much may be advantageously done by the workman, not only day after day, but year after year. But neither sympathy with men who seem in some cases to have been much overdriven, nor selfish remembrance of the personal risk to which each one of us, in the character of railway passengers, is exposed by any over-fatigue on the part of the railway servants, should lead us to overlook one consideration of primary importance. That is, — the difference in the working capacity of man and of machine, and the importance of so regulating the hours of work as to obtain the best results from the latter without overtasking the former.

There can be little doubt that this view of the case has been disastrously neglected; nor do we think it can be disputed that much of the present depression of industry is due to that fact. It may be matter for doubt what is the true economic maximum of the hours of labour, so far as a man is concerned. It is possible that fifty-four hours per week is, — if not the best possible, yet a fair and good allowance. Personal experience in the matter is rather in favour of short time, as far as the efficiency of the workman is concerned. Remarkably is this the case when we compare the long hours which are, — or which some years ago were, — worked by the French with the shorter English time. Trouble was found by English contractors in France from the fact that the French workmen refused to rest on Sunday, and there is much to show that fifty-four hours of steady English work were as productive as the eighty-four hours for which the Frenchmen demanded to be paid.


But the moment machinery comes into play, the case is altered. There are 168 hours in the week, and for every one of these hours during which machinery is idle, interest of money and many items of cost go on, and earning does not. Thus, where three shifts a day can be worked, the utmost is made both of man and of machinery. And the experience of the Irish Constabulary, — one of the finest bodies of men, perhaps, anywhere to be found, — and, indeed, that of our own Police force, is decidedly in favour of the physiological advantage of working in eight-hour, or even shorter, shifts.

In many cases, however, this method is inapplicable. The driver of a locomotive can not, for example, be expected or allowed to get off his foot-board when the clock strikes, irrespective of any other consideration. A railway is a machine which must work, in many cases, for eighteen hours out of the twenty-four, even if it is possible to secure a rest for the other six of them. The introduction of shifts as an inflexible rule would hardly be consistent, with regard to the safety of the public, or even to the interests of the railway servants themselves.

It remains, then, that without attempting to draw a hard-and-fast line, the managers and directors of railways should be induced to give very serious and pointed attention to the question of overtime. It is probable that this might best be done by making it compulsory to send in returns of every case in which a certain number of hours' work, — say, for example, sixty in the week, — was exacted from any person employed. A system of returns that would provoke inquiry on the part of some inspecting authority, in any case of real over-work, would probably be more effectual in the prevention of such a thing, except when needful for the public welfare, than any absolute, and sometimes mischievous, prohibition.



## NOTES.

 IN the 9th inst., the Wolverhampton Chamber of Commerce were engaged in considering the replies to be sent to the questions put to them by the Royal Commission on the Depression of Trade. It will be remembered that we drew attention to the suggestion made in various quarters that the Commission should include the subject of railway charges in their inquiry, and it seems that the body referred to regard the unequal railway and canal rates as the chief drawback to the trade of that district. While admitting that the falling off in business is partly due to successful competition of foreign producers in the markets abroad, they complain that the unfair charges for conveyance of goods by rail to the seaboard affects them to a still greater extent. The Black Country, and Wolverhampton in particular, may be regarded as the head-quarters of the recent successful movement against the Railway Rates and Charges Bill, the *Daily Telegraph* of February 18th last describing the manifesto emanating from the Wolverhampton Chamber as "exceptionally concise and clear," and the prominence given by them to this question in their reply to the Commission proves the reality of the grievance. They experience that most unsatisfactory side of English railway competition,—the coalition of the competing companies for the purpose of "keeping up" rates, it being a well-known fact that they are all bound by agreement to make no reduction in tariffs without each other's consent. In a paper read at Birmingham during the recent agitation, the extension and improvement of canals as competitors of the railways was strongly recommended, though it was remarked at the time that Parliamentary aid in redressing grievances was much more desirable; and it is noticeable that the Wolverhampton Chamber now adopt the latter recommendation and complain of charges by canal as well as by railway. Mr. G. W. Medley, in the pamphlet he has just issued on "Trade Depression, its Causes and its Remedies," also introduces this question, and it is evidently one that must be kept to the fore.

WITH a private prospectus for the issue of 8,000,000l. share capital, and 2,000,000l. borrowing powers, the Directors of the Manchester Ship Canal have issued a map of considerable interest. It covers an area of above 100 miles north and south, by 75 miles east and west, the nearest approach to the centre of which is occupied by Macclesfield. This busy and populous district reaches from Skipton on the north to Wolverhampton in the south, and from Rotherham and Sheffield on the east, to Wigan, St. Helen's and Chester, on the west. The numerous towns that it contains are represented by circles, of sizes proportionate to the populations; and the total number of the inhabitants amounts to 27 per cent. of the population of England and Wales. Manchester and Salford, nearly central as regards longitude on the map, contain 850,000 inhabitants, within a radius of five miles. Manchester is more than thirty miles nearer to the great manufacturing districts of Lancashire, Cheshire, Staffordshire, Derbyshire, and the West Riding than any existing port; and the saving, which ranges from 5s. 6d. per ton on timber, to 12s. 10d. per ton on sugar, effected by the maximum rates authorised by the Canal, over the present cost from ship in the Liverpool Docks to railway station at Manchester, is an object the proposal of which fully accounts for the enthusiasm awakened by the project in Manchester.

ALTHOUGH the Kensington magistrates in the Chiswick parapet wall case upheld the by-law, the proceedings seem to confirm a point of law, which is not very widely known among local authorities. It is that the magisterial bench has the discretionary power to set aside any by-law of a local authority,—even after such by-law has been drafted on the model and received the sanction of the Local Government Board, on the ground of its un-

reasonableness in a particular case. The magistrates can say whether the enforcement of a certain by-law in a particular case is a reasonable or an unreasonable exercise of the power of the Local Authority. The "particular case or circumstances" are the governing elements in the question; and therefore we may find, as we have seen in some recent cases, the magistrates in one instance upholding and in the other setting aside a certain by-law. Among the by-laws of many of the suburban Local Boards there is one which requires that houses within 15 ft. of each other should have their external walls carried up 1 ft. above the roof so as to form a parapet wall, which is intended to be a preventive against the spread of fire. In a case before the Croydon bench recently, in which a firm of builders were summoned by the Local Authority for non-compliance with this by-law, the magistrates set it aside; but in the Chiswick case the magistrates upheld the by-law. There are, however, apparent reasons for this difference in magisterial opinion in the particular circumstances of each case. In the Croydon case the houses were 9 ft. 6 in. apart, and it was admitted that they were situated in a comparatively rural part of the district. In the Chiswick case, however, the houses in one instance only 2 ft. and in another 1 ft. 11 in. apart, so that if a parapet wall were any protection against the spread of fire at all it was much more necessary in the Chiswick than in the Croydon case. On the ground that the parapet wall renders a substantial class and character of house unsightly in exterior, and harbours accumulations of snow and rain which get into and damage the interior, many builders have considerable objection to this by-law. It also suggests difference of opinion among the public as to its need or utility that the chairman of the Chiswick Board, who signed the by-laws, should appear in Court and assert that the by-law is unnecessary.

THE recently reported case of *in re Dawdy*, shows how necessary it is for persons making agreements which are intended to operate as submissions to arbitration to be careful of the language. The agreement in question was one between a landlord and a tenant, and was to the effect "that the tenant shall be paid, at the expiration of the tenancy, the usual and customary valuation as between outgoing and incoming tenant. And it is hereby mutually agreed and declared by and between the parties hereto that when any valuation of the covenants shall be made between the tenant and the landlord, the persons making such valuation shall take into consideration the state, &c., of the premises, and if not left in a proper and creditable state shall determine what sum of money shall be paid to the landlord as compensation therefor, and shall deduct such sum from the amount of the said valuation." The question arose if this was a submission to arbitration so as to be capable of being made a rule of Court. The Court of Appeal held that it was simply an agreement for the appointment of valuers, and not arbitrators, that their functions were not judicial, and that, this being so, the attempt to make this a rule of Court failed. To many persons, the agreement at first sight would appear to be a submission, but when we remember that arbitrators are judges, it is clear that the document did not go to the length contended for.

WE can hardly concur in the decision embodied in the report passed by the meeting of Associates of the Institute on Monday last, to require that Associates should be allowed a vote in regard to all by-laws affecting their interests. A by-law once passed becomes a very important engine in the working of a society, and it is hardly to be contemplated that the senior class of members should put themselves in the position of allowing a by-law to be passed against their wish by a numerical majority of the junior class. Nor is it practicable or logical to propose to divide by-laws into two classes. There would probably arise on this, from time to time, troublesome questions as to whether this or that by-law did or did not affect the

privileges of the Associates. Nor is it any more practical or business-like to propose to right the discrepancy of power by giving the Fellows two votes and the Associates one. This is a kind of fancy legislation which will never work, as in fact the meeting seemed to think, the resolution embodying this idea finding no seconder. Mr. Richards Julian's enumeration of the new advantages which the Associate Members will already receive from the new Charter indicated an advance in their influence in the Institute which ought to satisfy all reasonable expectations.

A PICTURE by Rubens is stated to have been discovered at Alost (Belgium). It represents "Christ Blessing the World," and bears the painter's name, and the date 1614. It is 31 in. high and 24 in. wide. About twelve years ago it was bought for one franc in the sale of the furniture of an old doctor by a tailor of the name of Michiels, who, although it was begrimed with smoke and dirt, hung it up, but did not take any further notice of it. Quite recently it was accidentally seen by a painter, more closely examined, and, after being cleaned, found to be a genuine Rubens. The owner has been offered fabulous sums for the picture.

WE have received two numbers of a very handsome portfolio of forty photographs of the house and furniture which the late Mr. Burges designed for himself, and of which illustrations in this form are being published by subscription, under the editorship of Mr. Pullan. Mr. Burges, in designing and furnishing this house, made it, as is well known, a kind of repository and exponent of his ideas and sympathies in regard to domestic Gothic art. In this respect the work now published is of the greatest interest and suggestiveness; for whatever difference of opinion there may be about Burges's style and taste, it must be admitted by all that he is never commonplace in everything he touched, was stamped with the mark of a strong artistic individuality. This is nowhere better displayed than in his designs for the decorative detail of furniture, church plate, and other articles offering scope for artistic treatment. The exterior design of his house is not remarkable architecturally; the interior is full of remarkable things, many of which are admirably illustrated in these photographs. The solidity and weight of expression in his furniture designs is, perhaps, over-accentuated. It is full of a kind of grim force, but it is certainly not the expression of the highest civilisation; it represents rather a comfortable but defiant nineteenth-century Medievalism. Distinct faults of taste may be discovered here and there; for instance, in the library bookcase, to divide up the edge of the side framing of the bookcase with jointing in imitation of masonry, and to continue this jointing over the convex surface of the foot, is a piece of eccentricity which seems to us quite indefensible. Nor certainly can we join Mr. Pullan in his admiration for the painted sculpture in the reredos at Waltham Abbey, which he calls the best of all Mr. Burges's sculpture designs. If so, the only conclusion can be that Burges had better not have meddled with sculpture. But these drawbacks do not detract from the interest of a publication which represents more fully than any other the most pronounced Medieval art-culture to which the modern Medieval movement gave rise. Others may have played at Medievalism; Burges really took it into his nature, as far as art was concerned, and almost out-did the Middle-Age artists in force and piquancy.

WE have received the following letter from "A Mason":—

"I was employed at the bank and shops at Atonemason, to fix terra cotta. Shortly afterwards the bricklayers struck against us for setting the terra cotta. Now, sir, I wish to ask if you can give me any information on this very vexatious question between masons and bricklayers? Mr. the builder, offered one half to the bricklayers, and the other half to the masons, which was not accepted by the former; therefore we were discharged."

This is an old dispute, and one not creditable



to the artisans who raise the grievance. Once upon a time those working under a responsible chief would have accepted his orders as to which should do any particular portion of the work. We have, of course, got long past that; but the plain fact is, that terra cotta, if it be decorative work, involves much more skilled work in setting than ordinary bricklaying, and ordinary bricklayers are not competent to execute it. Although the material is much more like brick than stone, the work is analogous to the better class of masons' work. The bricklayers, in claiming to do it, are claiming the right to execute what in all probability they would do badly, and what requires the assistance of skilled masons, or artisans of equal training and experience. It is the nature of the work, not the chemical composition of the material, that is to be considered.

**SIGNOR GIACOMO BONI**, of Venice, to whom we owe a spirited protest against the proposed demolition of the ancient fortifications of Bassano, which was noticed in these columns at the time it appeared in print, has just published an interesting little pamphlet, reprinted from *Archivio Veneto* (2nd series), vol. xlix., part ii., giving the results obtained from excavations made in the month of July last for the purpose of ascertaining the nature of the foundation of the Campanile in the Piazza of St. Mark at Venice. These excavations were made at the suggestion of Mr. Blackall, of Boston, who was desirous of obtaining information with regard to the substructure of ancient buildings in Venice, with a view to the application of the principles observed to buildings in his native city, the soil of which bears some resemblance to that of Venice. These excavations were carried out under the direction of Signor Boni, who carefully noted every fact observed during their progress with pen and pencil. The cost of the labour and planking was defrayed by Mr. Blackall, with the assistance of a small contribution to the cost of labour from the Cavaliere Ongania, who is preparing an illustrated work on the basilica of St. Mark, including the Campanile.

IN the Museum at Vienna there is a remarkable bronze statue now being exhibited, which is generally believed to be a relic dating from the old Persian period. The statue is in a tolerably good condition, and represents a man astride on a kneeling bull, both front and hind legs of the animal being completely under the body. This position recalls the horse and bull capitals of columns at Persepolis. The attitude of the man is somewhat analogous to the majority of those reliefs of the ruined city. The large quantity of hair covering the neck and shoulders, as well as the shape of the hat, appear precisely similar. Unfortunately, a portion of the forehead is missing, as are likewise the arms reaching from the hands to the elbows. The ornamental design and the stiff drapery show a striking resemblance to the extant monuments of Assyrian art.

THE Naval and Military Club, Piccadilly, has been the first of this class of buildings in London to adopt electricity as a means of lighting. The installation has been carried out by Messrs. Verity & Sons. Some old stables in the rear of the house have been removed to make way for an engine-house. Two engines and dynamos are supplied, either of which is sufficient to light the whole house, but they are coupled so as to give greater security. There are also fifty large accumulators, to provide against any possible stoppage of the machinery. Incandescent lamps of the Edison type are used. This spirited move of the Naval and Military Club will no doubt be followed before long by other clubs. Indeed, we understand the same firm have already a contract for lighting the new Constitutional Club when completed.

ACCORDING to the Vienna *Allgemeine Zeitung*, a fresco, representing the Crowning of Christ with Thorns, was recently discovered by some workmen whilst engaged in

repairing the cathedral at Gratz, the capital town of Styria. The fresco is in excellent preservation, and is surrounded by a piece of sculpture, believed to have been erected in honour of a bishop who died about the year 1570.

IN the "Notes" in the *Builder* for June 20th of this year we alluded to the fact that a fund of 6,000*l.*, in the hands of the Vestry of the Parish of St. James, Westminster, had been set apart for the purpose of erecting model dwellings suited to the wants of the labouring poor in that parish, and that four architects, selected for special experience in that class of work, had been invited to enter into a limited competition for carrying out these dwellings. We are now able to state that the plans by Mr. H. H. Collins have been selected for the purpose and will be carried out. The three other architects invited to send plans were Mr. E. C. Robins, Mr. Ernest Turner, and Mr. Eyton. The site is at the corner of Silver-place and Ingestre-place.

THE *Journal of the Clerks of Works' Association* very justifiably animadverts upon the ridiculously inadequate salaries sometimes offered by public bodies or quasi-public bodies to "clerks of works." A case is cited in which the remuneration offered by certain bridge trustees to a clerk of works was,—a pound a week! Such an "estimate of value" as this betrays either an utter ignorance or a total disregard of the fact that the prime essentials in a clerk of works are ability and integrity. The *Journal* observes:—

"There are clerks of works and clerks of works, not only good, bad, and indifferent, but of half a dozen intermediate grades, and there always will be, so long as totally inadequate salaries are paid for positions whose occupants need a large amount of technical knowledge, and upon whom it is almost a necessity that implicit reliance should be placed. This is understood by none better than by architects, and if the latter were always in a position to employ whom they thought proper, and to pay what they considered a fair equivalent, thereby creating justifiable expectations of securing thoroughly capable and trustworthy representatives, clerks of works, as a body, would become more efficient than it must be admitted, a great many are at the present time."

THE Architectural Association of Minnesota are the pioneers of a new movement in mensuration. They have passed a resolution to the effect "That on and after the 1st day of January, A.D., 1886, the members of the Architectural Association of Minnesota abandon the system of measurement by feet and inches, and adopt a system of measurement by feet and decimal parts of a foot." Also, "That the Secretary notify all the leading architectural journals of the United States and the local papers of this action of the Architectural Association of Minnesota." We should doubt if the game were worth the candle. The inch has lived long, and will die hard.

WE published a little while since an illustration of a form of ship projected for the object of carrying away the London sewage day by day and quietly slipping it into the sea at a distance from the coast. Mr. J. O. Phillips, the general manager of the Gas Light and Coke Company, suggests, in a letter to the *Times*, an even more immediate application of the method, without building any specially contrived vessels. He proposes that the empty coal-lighters of his Company should take all the sewage away, in the form of dried cakes, with the moisture pressed out, on their return voyages, shovelling it overboard on the way. Whether sewage is a commercially marketable commodity is a question into which Mr. Phillips does not undertake to enter. What he says is, as a summing up, that "if the Metropolitan Board of Works choose to deliver daily some 1,200 to 1,500 tons of dry and inodorous cake or slab into the railway trucks of the Gas Light and Coke Company, alongside the presses, and to pay the necessary and comparatively moderate price for the work, the Company can most unquestionably ship and

"Almost"! Surely this is a misprint for "absolutely"?

dispose of it for them at sea." There is one point Mr. Phillips does not touch upon,—perhaps he has satisfied himself upon it,—will the press-dried sewage sink or float? "That would be scanned," as Hamlet says. If it floats, what a pleasant line of sea-voyage that would eventually become, between the Thames and the Tyne.

#### ROUND STAMFORD.

A few months ago the members of a small architectural club met at Stamford and passed one or two pleasant days in exploring the neighbourhood. The subjoined sketches are selected from those made on the occasion.

Among the buildings examined was the Manor House at Woodcroft, which dates from the time of Edward I.\* There is not much detail left, and what remains is of a simple and severe character. The most notable feature is the round tower at the corner, which rises abruptly from the moat, over which hang dense masses of yew, giving the place a sombre and melancholy aspect, strictly in keeping with its history. Here occurred one of those incidents of the Civil Wars, which, though it serves to amuse the present generation, must have been sufficiently horrible to those concerned. Dr. Michael Hudson, one of Charles I.'s chaplains, having, at the head of a small body of men, endeavoured to harass the forces of the Parliament, was finally compelled to retreat to Woodcroft for protection. Here he was speedily attacked, and driven gradually from floor to floor, till at length he and his surviving comrades stood at bay on the roof of the tower. Being at length wounded and overpowered, he was flung over the battlements, but managed to cling to a projecting gargoyle till his fingers were chopped off, when he fell into the moat below. Here he is said to have begged to be allowed at least to die on dry land, and attempted to swim to shore; but his assailants granted him no mercy, and despatched him with their pikes. Perhaps, under the circumstances, this was true kindness, for not only had he lost his fingers, but, according to one account, the upper part of his face had fallen over the lower through a tremendous wound. Readers of "Woodstock" will, no doubt, recognise in this legend the source from which Dr. Rochcliffe's most exciting adventure is derived.

Not far from Woodcroft is the village of Northborough, where stands a building of much greater interest, architecturally speaking. Next the road is a great recessed gateway, in which are the usual large and small doors; passing through the gate, the visitor finds himself in a small irregular court-yard, with the old Manor-house in front of him (see lithograph). The porch, the buttress between the tall windows, the crocketed gable, and octagonal chimney, combine to produce a group of unusual interest. Indoors, the original arrangements have been considerably modified; but the old wooden screen of the hall remains, as well as the doors to the kitchen and buttery. The side of the court-yard next the road is formed by the stables, said to have been built out of the ruins of the upper part of the gate-house. On one of the gables, a sun-dial serves as a final. The idea is, perhaps, more commendable than the delicacy with which it has been carried out.

The ancient lords of Northborough were a sturdy race, and one of their number, Geoffrey de la Mare, who flourished in the early years of the fourteenth century, stands prominently forward by reason of an action he brought against the Abbot of Peterborough to recover the constableness of the abbey. A perusal of the privileges appertaining to that office throws a curious, and even entertaining light, on the manner in which those grim barons lived and gained their means of living. "By virtue of this office," says Bridges, "he claimed the privilege of commanding the men with which the convent furnished the king's army in war, being supplied for that purpose, with horses, armour, and whatever else was needful for himself and one knight; of setting the first dish on the table before the abbot, at the installation dinner of every newly-elected abbot [a curious privilege for a haughty baron to claim; but see the reason why], and of taking to his own use all the gold and silver vessels that should be then placed on the abbot's table; with the liberty of sojourning in the abbey, as long as

\* See lithographed sheet of sketches in this number.







The Hall, once the chief apartment of the family, is now devoted to the servants, and the late has been removed for the better enjoyment of the dance. Partly in consequence of this shifting of the centres of life, and partly in consequence of the reckless planning of Jacobean architects, the house is less adapted to modern

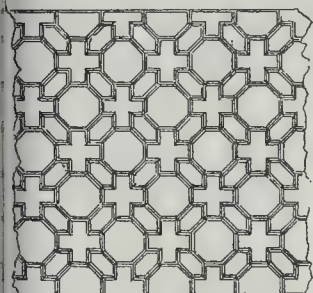


Fig. 4.—Ceiling, Long Gallery, Apethorpe.

habits than the inmates could desire. Nevertheless, no destruction is contemplated, and it is satisfactory to think that Apethorpe will remain unchanged and undiminished in beauty, amid its lawns and its yews, to give as much pleasure to the next generation as it does to the present.

The church at Apethorpe is not of very great interest, but we give sketches of the screen, one of the vases, and the cresting of an iron gate (figs. 5, 6, and 7). The most

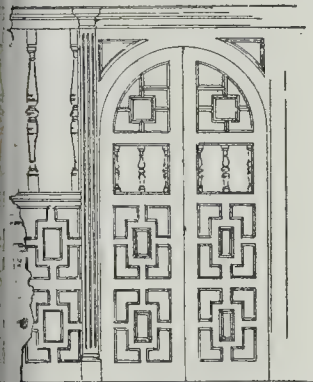


Fig. 5.—Screen in Apethorpe Church.

noteworthy feature being a very fine monument to Sir Anthony Mildmay and his wife Lady Grace, who, "having lived here



Fig. 6.

worthily dyed comfortably" in 1617 and 1620 respectively. Their sole daughter and heiress, Mary, married Sir Francis Fane, who erected this monument in 1621. Sir Francis

was subsequently advanced to the dignity of Baron Burghersh and Earl of Westmoreland, and in his family Apethorpe has remained ever

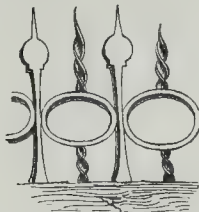


Fig. 7.—Iron Cresting to Gates, South Porch, Apethorpe Church.

since. The title Burghersh, borne by the eldest son, is said to be a corruption of Burwash, a village in Sussex, near the borders of Kent, from which country the Fanes came.

With Apethorpe the visit to the neighbourhood of Stamford came to a conclusion, and the members of the club went their several ways all the better for their short contact with the fields, the woods, and the old buildings of Northamptonshire.

#### A NOTE ON SEPULCHRAL SYMBOLISM.

The author of "Gothic Contrasts" reproaches us for dispelling the cross from our places of worship and burial, and substituting emblems of a heathen nature, and the charge is only too true; while another authority laments "the marble pyramids and mural tablets, and tall, white, monotonous slabs of our churches and churchyards" as the result of our rejection of the great Christian type of redemption.

We turn to the more ancient of our monuments to learn from them some of the lessons they have to teach in their silent but most eloquent language.

"The boast of heraldry" enters largely the adornments of Medieval tombs, and tells the history of their dumb occupants in its own impressive tongue of quaint designs and fading colours, recording alliances and descents in this shorthand of history.

We learn from Boutell that the Templars are unchronicled amongst the dead, not one of its order being met with even in their own London church, and he gives two probable reasons for this: either that some now-forgotten rule forbade any such record of these military priests, or else that the evil repute they ultimately fell into caused the destruction of every memorial appertaining to them. Cross-legged effigies are often mistaken for these guardians of the Holy Sepulchre, but our author dispels the fond illusion, much as we may regret it. He adds that as so many admirable specimens of knightly figures are to be met with of this period, the absence of Templar traces is the more remarkable. We meet with some interesting particulars of sepulchral symbolism in a work by Ellen J. Millington, who tells us that at first kings and nobles alone were accorded heraldic surroundings to their tombs, and that knights or simple gentlemen were only entitled to such distinctions when they had lost their lives in battle. Those who had so died on the victorious side had naked swords laid by their effigies on the right hand, with the point turned upwards, and on the left a shield, with their arms. Such as died in prison had neither spurs, helmet, nor sword; while those who fell on the field fighting on the vanquished side were represented in armour without a surcoat, with swords sheathed, vizors open, hands joined on the breast, and a dead lion at the feet.

The son of the commander of a fortress, who died during the siege of it, was always represented in complete armour (no matter how young he might be) with his head resting on the helmet.

Some warriors at the last assumed the monastic habit to atone for their sins, and such are presented to us partly clad in armour and partly in the attire of the monk.

King John's effigy at Worcester Cathedral lies between two smaller ones of St. Wulstan and St. Oswald, and perhaps none of our monarchs had more need of such holy supporters. The king's figure is the oldest regal effigy in England.

Statuettes (known as weepers) are often met with carrying shields of arms, and very appropriate they appear around a monument.

Badges enter largely into the adornment of sepulchral architecture, being often repeated in profusion, and yet without wearying the eye or appearing in any way obtrusive.

We recognise a bishop by his mitre and pastoral staff, and some writers hold that he may be distinguished from an abbot by his crook being turned *outwards* to show his more extended jurisdiction, but this rule has not been always observed, and it is not a safe one to follow. We may just add that the older the figure is the smaller will be the mitre, and the more beautiful, in our opinion, the tall convex form belonging to a later period and not a change for the better.

Inverted torches in Christian burial-places are strongly condemned for their heathen associations, but in some of our modern cemeteries the chapel is a heavy example of Pagan architecture, and we cannot wonder at the surrounding tombs showing a tendency in the same direction.

We have little sympathy with some of the obtrusive memorials of the seventeenth century overloaded with Italian scroll-work and reaching to the roof of the church, the very snobbery of the grave.

When angels are sculptured the work should be of the very best. We have met with these would-be celestial creatures, cumbersome as weights, hovering over their dead charges with inverted wings like broody hens, a mockery, a snare, and a delusion, a warning to avoid such scarecrows in the future.

#### THE "MONT DORE" OF BOURNEMOUTH.

If you take up one of those early prints of the Ordnance Survey of England which were issued from the Tower in the first quarter of the present century, and look thereon for that town of Bournemouth the name of which is so familiar to our ears, you may look long, and you will look in vain. The Bournemouth, indeed, is indicated by a thin wavy line, broadening seaward, till it is merged in the graceful curve which marks the coast line from Studland Bay to the bold headland with the Saxon-sounding name of Hengistbury. For miles behind the sea margin all is open heath or primeval forest, and there is no sign of human habitation from Poole, on the west, to the more ancient Christchurch, on the east. The little Bournemouth which Hengist saw, or might have seen, still courses swiftly down the valley, to mingle its silvery waters with the open sea; but instead of threading its devious way through a tangled dell of fern and bramble, it flashes by level stretches of smooth-shaven lawn, and reflects the glowing colours of a thousand flowers. We have arched over and built upon our Bournes, Old Bournemouth, Tye Bournemouth, and the rest, converting them into noisome sewers, to Mr. Ruskin's unmeasured indignation and all wise men's regret. But with a wiser conservatism the Hampshire men have preserved their bright little river from pollution, and its pine-sheltered valley from the inroads of the speculating builder, and have by the aid of art so assisted nature that the unfrequented wilderness has become little short of an earthly paradise. In half a century the population of Bournemouth has grown from 0 to 30,000, and continues to grow at compound interest. For this remarkable rate of increase there is, as may be supposed, a very sufficient reason. Owing to a variety of causes, its climate is unique, and its value as a health resort,—unsuspected by our forefathers,—is known all over Europe. The balsamic emanations from the evergreen pine, which is indigenous here, have proved their efficacy in those special diseases to which we English are particularly subject. The rapid spread of its reputation has been accompanied by as rapid an extension of the town for the accommodation of visitors who flock thither from the four corners of the world. Shops, banks, hotels, lodging-houses, sumptuous villas, noble churches, the last and noblest being a particularly fine example of Mr. Pearson's skill, have arisen and are arising on every hand. And now a palatial building has been added to their number, combining with the attributes of a modern hotel of the first magnitude a system of baths which is said to be unequalled in Europe for variety and completeness. The Mont Dore of Bournemouth is differentiated from hydropathic institutions by the use of a



particular water, which is in part a natural spring, and in part an artificial compound. Since the time of the Roman occupation of Gaul, the therapeutic virtues of certain hot springs at Mont Dore in the Auvergne have been known and well attested. The country there is mountainous and extremely beautiful, and the air is perfumed with the scent of fir woods.

The accident of the reputation of Bournemouth being connected with its pine woods suggested to Dr. Horace Dobell the idea of converting Bournemouth into an English Mont Dore. He thought that the mild and equable temperature of the place, with its coast line sheltered from the winds, and its soft sea air "perfumed with the scent of pines," might even possess advantages which were not to be found at the Auvergne resort. By exact analysis he ascertained the constitution of the Auvergne water, and saw no reason why it should not be artificially reproduced. The outcome of his idea may be seen in the Mont Dore of Bournemouth, which was publicly opened on Saturday last, in the presence of the directors, their chairman (Dr. Meadows), and a large number of medical, scientific, and other friends interested in the undertaking. Dr. Emond, who was the physician in charge of the establishment at the Auvergne, and is now in charge of that at Bournemouth, explained, to an attentive audience, the rationale of the "Mont Dore cure," and demonstrated the action of the many beautiful contrivances connected with its application. The water used contains, with the ordinary salts, slight traces of arsenic. For drinking, in carefully prescribed doses, the genuine water is brought from France; but for outward application an artificial water is chemically compounded. For affections of the eye, ear, throat, &c., the water is applied in a "pulverised," or finely-divided, state, at any required temperature, and with any required degree of force, by the aid of a series of beautiful mechanical appliances made by M. Mathieu, of Paris. The Russian, Turkish, electric, and other baths have been arranged by Mr. John Smeaton; and the salt-water and other pumping machinery by Messrs. Morryweather. The elaborate system of gas-lighting throughout has been entrusted to Mr. D. Hulet, who has, it will be remembered, amongst other modern works on a large scale, recently carried out the gas-fitting to the Hôtel Métropole.

The building, which stands upon four acres of high ground, a short distance from the sea, has accommodation for 120 residents. The dining-room, drawing-room, billiard, reading, smoking, and other rooms, are on a suitable scale, and have been planned in such a way as to bring the comforts of home into what is, in a measure, a great public institution. As the King of Sweden, whose queen attributes her restored health to a stay in Bournemouth, laid the foundation-stone, and has since manifested a strong interest in the building and its objects, a suite of apartments for the royal use has been provided in one wing of the building. And it is in contemplation to considerably extend the structure so soon as the "cure" becomes better known to those who are suffering from the diseases which it is especially calculated to reach.

The architect, Mr. Alfred Bedborough, who was warmly congratulated on the success of his work, is responsible for the whole of the arrangements, and the building appears to be extremely complete in its practical treatment, though we regret that we cannot feel moved to enthusiasm concerning its architectural design. In carrying out the engineering portion of the works, which are of an unusually complicated nature, the architect was assisted by Mr. W. W. Phipson, whose large experience was of the utmost service. The general contract was taken by Mr. Howells, of Bristol, who has succeeded in raising an enormous building upon a somewhat difficult site with much credit to himself.

**Bisham Abbey Excursion.**—In our notice of the Saturday visit of the Architectural Association last week, we omitted to mention that for the sketch of the old Deanery at Great Marlow, as well as for the photograph from which the sketch of Bisham Abbey was made, we were indebted to the kindness of Mr. A. L. Forrest, the member of the Association who has acted as hon. secretary for this series of Saturday visits.

#### NOTES AT THE CHURCH CONGRESS ART-EXHIBITION AT PORTSMOUTH.

In continuation of the description given in our last number (p. 495), we now add some notes on the objects of ancient art exhibited during the Church Congress; and among the lithographed plates in this number will be found some sketches of a few among the objects of interest in the exhibition.

The Rev. J. C. Jackson was a large contributor, lending a valuable collection of ivories, old plate, illuminated MSS., and many other items. The ivories included examples of carving from the twelfth to the seventeenth century. An emblematical group representing Charity (attributed to Fiamingo), and a fine Polyptych in eighteen compartments, with carvings of the Nativity, &c., may be especially mentioned; also, among later specimens, a small medallion of Hercules and the Centaur, and an English covered cup of good Classic design, both of seventeenth-century date.

We noted as curiosities two engraved ivory tablets, representing respectively a pastoral scene and a naval engagement, and a very remarkable ivory folding dial with tables of latitude and longitude. Among the specimens of book-binding in the Jackson Collection were a vellum-bound "Book of Emblems" (see illustration); "La Concordance" of the Evangelists, 1558, in Masoli binding; a Roman missal of 1776, with red velvet sides, and bold rich repoussé silver borders, and arms in centre; and a silver-hinged book-cover of 1702, richly chased with tulip ornament. A fine enamel plaque, with Virgin and Child, in high gilt relief (twelfth century), and an elaborate stamped portrait of Melancthon on pigskin may also be named among the book-covers. A "cuir-bouilli" box for Communion-plate from Chesterton-Parva Church, covered with whorls and other conventional ornament, and assigned to the fifteenth century, resembled in general form the finer one at Cawston in Norfolk. Among miscellaneous items were the silver cup belonging to Philip, father of Matthew Henry (see illustration), and a fanciful sixteenth-century rosary of silver-gilt filigree and coral. From a "Biblia Sacra" (Luther's version, 1600), also lent by Mr. Jackson, was obtained the sketch of the shield bearing a lion rampant, given by us with others this week.

The Rev. Canon Millard sent a collection of bronzes, principally of the sixteenth-century date.

The Rev. Campbell-Lock exhibited fac-simile copies of the interesting but little-known mural paintings in the chancel of Idsworth Church, Hants. They represented St. Hubert, accompanied by hounds and attendants, restoring a Lycanthrope (half man and half wolf, see illustration) to the possession of reason; and the Decollation of St. John. It is said that the only other Mediaeval representation of St. Hubert in England is that on the tomb of Sir Oliver de Ingham, in Ingham Church, Norfolk.

The parish registers from Charlton and Idsworth were also shown. The admirable way in which they have been re-bound sets a good example to the clergy having the custody of such valuable records.

Mr. Montague Knight contributed a MS. "Missal" and a MS. "Hore," of uncertain date, but both very charmingly illuminated.

A jewelled, copper-gilt crucifix, belonging to Canon Portal, attracted notice. The stem was supported by two angels, and rested on a seated figure of the Virgin, the four Evangelists being represented at the angles of the base.

Among the pieces of Communion plate shown were large chalices 10 in. high (1708), and large silver-gilt alms-dish (1728) from St. Mary's, Southampton; chalices and patens from Chilton (1668) and East Chaldon (1570) (see illustration); and a chalice (? temp. Mary) from Sopley.

The Rev. C. Walker exhibited some charming examples of old embroidery and needlework, notably, a very beautiful humeral veil of Venetian brocade; an old Italian chasuble with white lace orphreys on a rich silk ground; and a jewelled Italian stole of gold brocade. The old silk chasuble lent by Miss Lucas (see illustration) also possessed rich colour and design. Amongst the old needlework appeared a modern "allegorical set of ecclesiastical art needlework," which can only have been admitted as showing what to avoid both in colour and design.

Mr. W. H. Saunders gave a little local colour to the show, in his small collection of old prints, books, and seals. The seals included impressions of the ancient seal of Portsmouth (on the obverse of which is a ship with men furling the sails); that of the "Domus Dei"; and the very rich and well-known one of Southwick Priory, Hants.

The rubbings from brasses, sent by Mr. Henry E. Franks, were well selected. The collection included those of Sir John d'Abernon (Stokes), Sir William de Bryene (Seal), Sir Nicholas Hawberk (Cobham), Margaret Cheyne (Hever), Lady Joyce Tiptoft (Enfield), a most interesting one with heraldic mantle; the noble Flemish one of Lewis Cortewille and wife, and that of Andrew Evingar and wife, from All Hallows, Barking, which, judging from its rich diapering and general character, must be also of Flemish workmanship. Rubbings of the modern brasses in Westminster Abbey, to Sir G. G. Scott and Mr. G. E. Street, were also upon the walls.

Of drawings, &c., exhibited, we may name a cleanly-drawn perspective of Worcester Cathedral tower, by Mr. W. Lunn, architect; the interior of Haarlem Cathedral, in sepia, much in the delicate style of Bloer; Mr. Street's design for the restoration of the "Domus Dei," Portsmouth; and two paintings by Miss Francis of the interior of St. Thomas's Church, Portsmouth, which may hereafter prove valuable as records of its quaint arrangements.

A copy-book by Gething (1615) showed some wonderful penmanship (almost an obsolete art), with most elaborate initials, &c., drawn in "free-hand."

We should have mentioned that the very curious Coptic crosser shown in our illustration was in the Jackson collection; and the small cross sketched was exhibited, with other examples of Russian work (a phase of ecclesiastical art which seems rather fashionable just now), by Mr. Bigg-Wittier.

We have been unable to do more than refer to a few of the more important objects shown; but the whole exhibition was interesting, and reflected credit on Mr. John Hart, the secretary, by whose efforts it was mainly brought together and arranged.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

##### MEETING OF ASSOCIATES.

A GENERAL meeting of the Associates of the Institute was held on Monday evening last, at 9, Conduit-street, Mr. Richard M. Roe presiding. The meeting was called "to receive the Report of the Associates' Committee; to discuss the proposed Charter so far as its provisions affect the class of Associates; and to take any further steps that may be thought advisable."

Mr. G. Richards Julian (hon. sec., Associates' Committee) read the resolutions of the former meeting,\* and three letters which he had received. The first letter was from Mr. Mark H. Judge, in which the writer stated that though in most respects the proposed new Charter was admirable, an effort should be made to amend the 24th clause so that the Associates should have some voice in the making of the by-laws.† He did not suggest that they should have an equal voice with the Fellows and he therefore submitted the following amendment:—"That in the opinion of the Associates of the Royal Institute of British Architects, it is most desirable that the new Charter should give them a voice in the making of by-laws, and it is therefore, resolved,—That the Council be asked (1) to amend the 23rd clause of the proposed new Charter by adding the words,—'Every Fellow shall be entitled to two votes in respect to the making, altering, revising, suspending, or rescinding of any by-law'; (2) to amend the 24th clause by leaving out all the words after the words 'Election of Fellows,' and thus provide for the voting power in respect of by-laws being in proportion to the subscription of members." The second communication was from Mr. Elgood, of Manchester, who considered that the terms of Mr. Judge's motion were more definite than the

\* For a full report of this meeting, see *Builder*, May 10, 1884, pp. 475-481.

† The 24th clause of the proposed Charter runs as follows:—"At every General Meeting every Associate and every Honorary Associate shall be entitled to be present, to vote and to take part in the discussion of business provided always that no Associate nor Honorary Associate shall be entitled to vote in the Election of Fellows or in respect of the making, altering, revising, suspending or rescinding of any By-law."



amendment to Clause 24 proposed in the report. The Associates were now assured of having the whole matter before them, and he hoped they would obtain for the future a reasonable voice in the affairs of the Institute. Mr. Brodie also wrote that "though he agreed with the suggestions in the Committee's report, he did not think they went far enough. The election of the Council should be by voting papers, as in the case of the Architectural Association. As to Clause 24, he did not see why Hon. and ordinary Associates should be put on the same footing."

The Chairman pointed out that the movement, which was originally thought of by a few of the members, received afterwards the general and enthusiastic support of a largely-attended meeting. The Committee which was appointed met for the first time on the 29th of May, 1884, and had since held fifteen meetings. The memorial was the first business they had to attend to, and this was presented at the first meeting of the Institute last session. Since that time the Committee had used every effort to obtain a reply to the prayer of the memorial. A deputation from the Committee attended, by invitation, a meeting of the Charter Committee of the Institute, who indicated the lines on which the new Charter was proposed to be drawn. Some dissatisfaction had arisen on account of the delay in calling the Associates together, but until the draft Charter was in the hands of the members there was really nothing definite to submit. It was not his intention to enter into the details of the advantages or disadvantages of the proposed new Charter, but from a personal point of view he was thoroughly satisfied with the results of their labours, provided they obtained a recognition of their interests in the form recommended by the committee. The Associates had, therefore, every reason to congratulate themselves on the success of the movement, which from a small beginning had obtained the almost general support of the younger members of the profession. The new Charter had not yet been submitted to the Institute, except to individual members, and it was by no means certain that the Fellows would not want to make sweeping alterations in the proposals, which might considerably curtail the privileges now proposed to be conferred. It would, therefore, be all the more necessary to show a bold and determined front so as to leave no doubt on the minds of the Fellows that the same unanimity which had been shown up to the present should still continue to prevail. He must now refer to the losses sustained by the committee in the death of Mr. E. E. Hollis, and the departure of Mr. J. P. Power for New Zealand. Mr. Clarkson, though no longer a member of the Committee, was now in a position to aid them as a Fellow of the Institute. The first business, then, of the meeting was to consider the Committee's report, and it would also be necessary to decide on what should be done for the future, and to appoint a committee to represent the Associates until the matter was finally settled.

Mr. G. Richards Julian moved the adoption of the report. It was now nearly eighteen months since the first meeting was held, and although the progress since then had not been very rapid, they might fairly congratulate themselves on what had been accomplished. The Council of the Institute had put into their hands the draft of the proposed new Charter, and, though he was not at all inclined to underestimate the exertions of reformers both on the Council and amongst the Fellows, he might fairly say that had it not been for the exertions of the small committee who got up the meeting during the conference week, and for the labours of the larger committee since then, they would not now have been in possession of the draft Charter. The Committee's report showed that they did not consider the proposed Charter altogether satisfactory. But as he had heard it confidently stated that it gave them nothing which the old one did not give, that it took away with one hand what it conferred with the other, one gentleman saying that it left them worse off than before, he could briefly enumerate the reforms contained in it. First, the Associates were to have the right of voting in the election of all Associates. Secondly, Associates were to vote at all ordinary meetings, except on the question of by-laws. Thirdly, Associates were to vote in the election of the Council and officers. Fourthly, the property of the Institute was to be vested in all members instead of in Fellows only. Fifthly,

Associates might be represented on the Council, and, as he read the Charter, would be eligible for election if a by-law did not prevent it. They were also to be eligible for the office of paid Secretary, as well as for the Auditorship. It would be possible also to obtain for the country Associates power to vote although not present. Surely this was a great deal more than the most sanguine of them had expected two years ago to see proposed by the Council of the Institute. The first step the Committee had taken was to elect seven additional members, and he believed the selection made had given general satisfaction, the Architectural Association being well represented. He need not say anything about the memorial or its presentation, but, as time went on, some uneasiness arose as to its fate, and suggestions were made that it had gone into the Council's waste-paper basket. He was, therefore, requested to bring forward the subject at the Business Meeting of the Institute, and received there what he considered a satisfactory reply. Then followed some correspondence. They were desirous of being in closer touch with the Charter Committee; and, finally, a deputation waited upon that body, when the discussion turned chiefly on the Charter and by-laws of the Surveyors' Institution. The deputation did not feel competent to accept anything on that occasion, but returned to report to the committee. In consequence, the Chairman was authorised to send a letter, stating "that the Associates' Committee will be prepared to recommend to the general body of Associates, for acceptance as a basis of settlement, the Charter and By-laws of the Surveyors' Institution, so far as regards the voting power and privileges enjoyed by the class of professional Associates, conditionally upon provision being made for giving country Associates facilities for voting by means of voting papers transmissible by post." The Council had not accepted that basis; they objected to the Associates voting in the election of Fellows, and therefore that matter was at an end. Then came the Charter, and in considering it, and especially in connexion with clause 24, they had endeavoured to do so, not from the point of view of class interests, but to obtain such a Charter as should be permanently satisfactory to all. The object was not to gain for the Associates something at the expense of other people or of the Institute. Therefore, the claim of the Associates to vote for the election of Fellows, as it was considered likely to cause a great deal of feeling, might well be surrendered, conditionally on power being given to vote on those by-laws which directly affected the Associates. The Committee had, therefore, made a recommendation to that effect. The elasticity which the Council claimed was a desirable thing, as it was not to be desired that if, fifty years hence, large alterations in the constitution of the Institute should be necessary, they should be obliged again to apply for a new Charter. As to the question of the by-laws, in starting a new society it might be allowable for the promoters to frame the first by-laws; but in an old and established society like the Institute, when it had to be re-modelled, it seemed absurd that such a large and influential class as the Associates were, should be without a voice. The Committee's proposal was to give the Associates the right to vote in all by-laws directly affecting them, leaving the Fellows alone to vote on all other by-laws. Mr. Judge had proposed his amendment on this point, an amendment which seemed to savour of the old political fallacy known as "having a stake in the country." Who had the greater stake in the Institute,—the Associate of 25 or 30, whose life was a prospect, and to whom the prosperity and well-being of his profession were all-important; or the Fellow of 50 or 60, whose interest in it was principally retrospective? The report further recommended "that the granting to all country professional members of the practical power of voting is essential to the well-being of the Institute, and would gladly see the right to vote by voting papers,—at least in the election of the Council and Officers,—made an essential part of the Charter, so that no by-law could possibly take it away." This was a very important matter, and if something of the sort was not done the reform of the Institute would fail to reach the hearts of the country members. The Committee had had some correspondence with the Manchester Society of Architects, who had for years been stirring up the Institute on the subject, and it was agreed that no settlement would be considered satisfactory which

did not provide for this. The Committee thoroughly appreciated the amount of labour which had been gone through by the Charter Committee of the Council, in preparing the various schemes, and in arriving at the result which was now before the meeting. In conclusion, he hoped that in all steps to be taken before the new Charter became an accomplished fact, the subject would be treated by those who discussed it in a broad and liberal manner. It should be distinctly understood that the Associates, in asking for these reforms, were not doing so with any desire to gain advantages for themselves at the cost of others, but simply because they were satisfied that if the Institute was to hold the place to which it was entitled, it must advance with the times. There was no such thing in the life of an organism or institution as standing still. The presence of life implied the necessity for activity, and the moment activity ceased to take the form of evolution or progress, degeneration commenced. The next few months must decide whether the Institute, casting off the swaddling-bands of its infancy, was to obtain the healthful freedom necessary for vigorous growth and development, or by an attempt to retain unnecessary restriction, was to court premature decay and unaltered death.

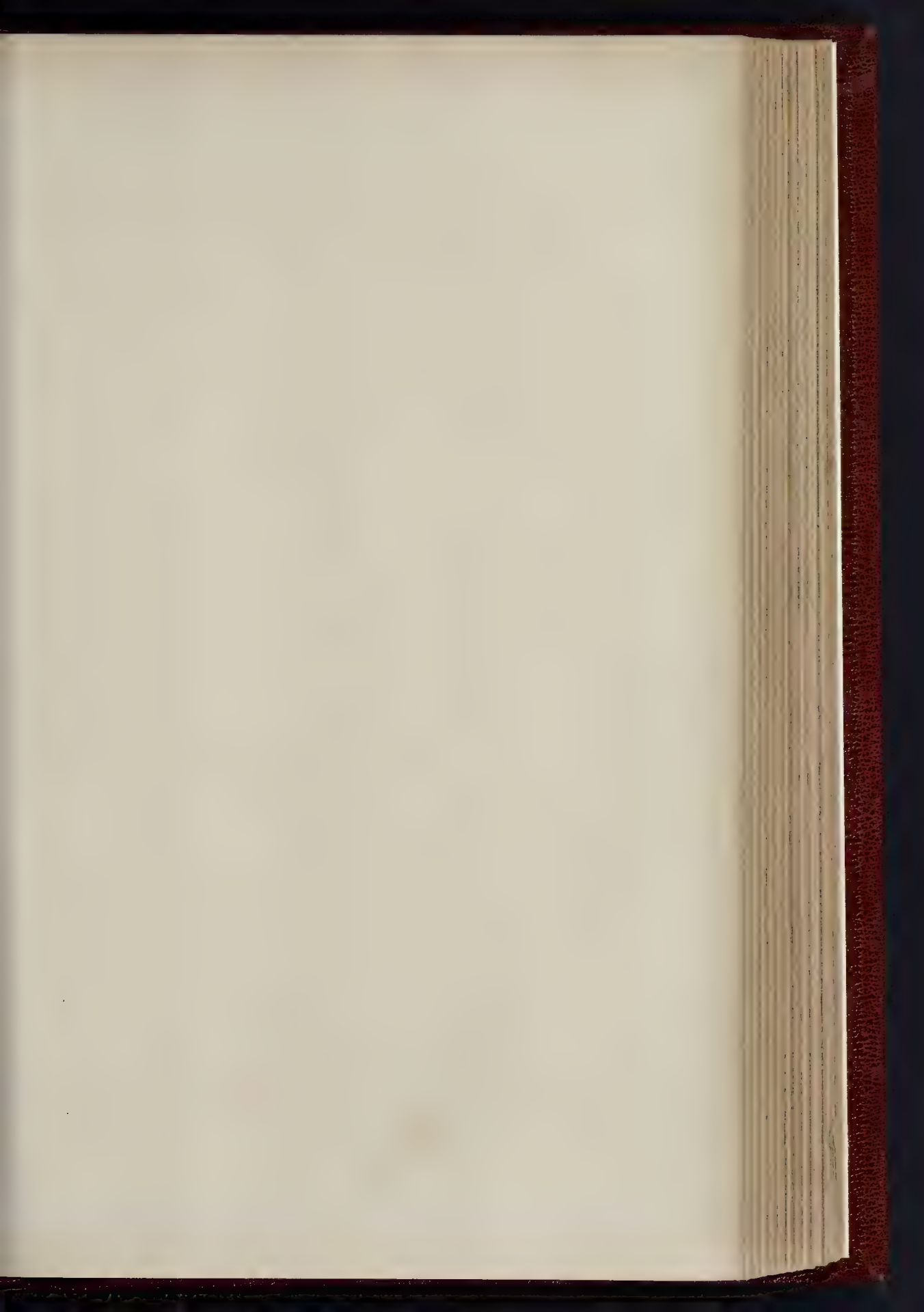
Mr. W. Hilton Nash said he rose with some diffidence to second the motion for the adoption of the report, because up to the present he had not taken much part in the movement, although his feelings had always been with the Committee, who were entitled to the thanks of the Associates for the labours they had undertaken. If they obtained a radical change in the constitution of the Institute, it would be greatly to its advantage, and by that means they would largely increase the number of its members. A great many men who would then feel that they had some voice in the management, would readily join it. He happened the other day to come across a letter of Sir Gilbert Scott's, written in the year 1834, on the subject of the formation of an Institute of Architects. In that letter, Sir Gilbert (then Mr.) Scott said he felt rather doubtful whether he had better join the association, as he heard it was to be composed chiefly of the older men, and the young men would hardly have any voice in its management. He (Mr. Nash) believed that was just the case with a great many architects now, and, no doubt, the ranks of the Institute would be greatly swelled if the younger members could feel they had some voice in its guidance. Although he did not now wish to make any amendment upon the amendment of Mr. Judge, he might have been inclined to strike out all the 24th clause after the words "discussion of business, &c." The Associates were really the working part of the Institute. (A Voice: "Its brains!") If they were not the brains, they were, at any rate, the life and soul of the Institute, and they were, therefore, entitled almost, if not entirely, to an equal voice with the Fellows. It might be possible to give the Fellows two votes and the Associates one.

Mr. C. R. Pink (President of the Architectural Association), supported the adoption of the report, and did so with the more freedom in consequence of the little hand he had had in its preparation. The report was one which might be termed just, moderate, and, at the same time, likely to prove effectual. By some oversight in the draft Charter the right of the Associates to vote upon the by-laws specially affecting their status appeared to have been omitted. This was a point of great importance,—indeed, it was of most vital importance to the Associates, for without having that right their status as members, the terms of their admission, and the amount of their subscription might be altered, while they would have no voice whatever in these important matters. Therefore, this subject had been put very properly in the foremost place of the report. Another point to which he would like to call attention was the suggestion made to the Council that the voting of the country members should be by voting papers, and that this should be placed in the Charter as an essential part of the government of the Institute. At the present time the country members were, to all intents and purposes, disfranchised, for it involved the expenditure of a great deal of time and money for a country member to come up and record his vote. He was glad, therefore, to see that these great reforms were included within the four corners of the Committee's report. For a long time he had felt that on these



THE sketches given here are referred to and explained in the article on the Church Congress Exhibition at Portsmouth, in another column.





THE BUILDER, OCTOBER 17, 1885.





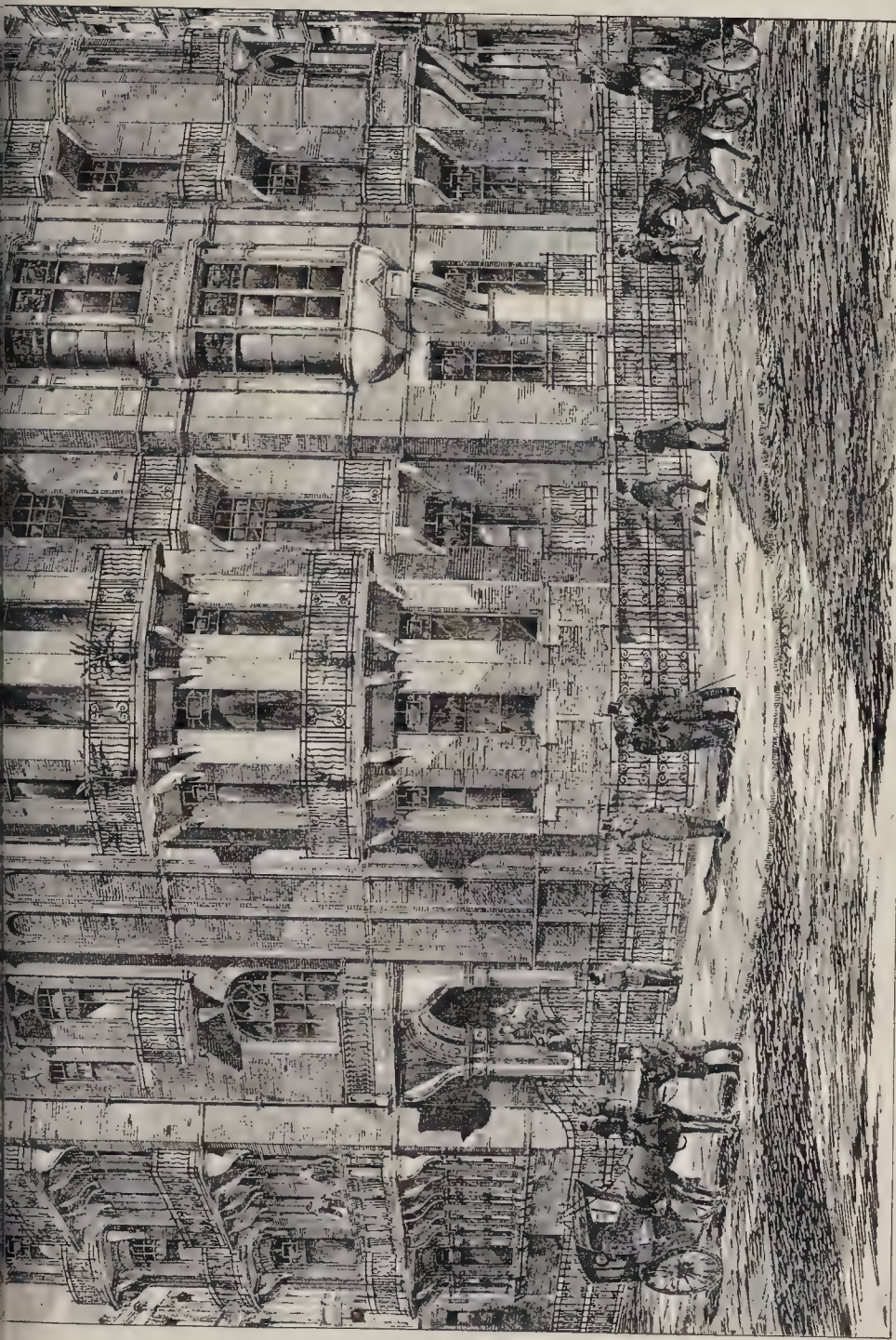


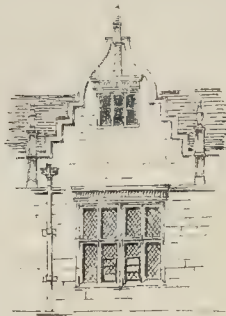
PHOTO BY MR. SPENCER & CO. LONDON

VIEW OF HYDE PARK MANSIONS — MESSRS. C. EALES & SON, ARCHITECTS

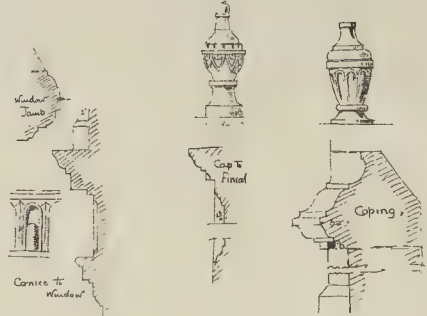








Apethorpe



Gable in Courtyard



Remains of former bridge, Stamford, Lincolnshire.



Remains of Stamford, Lincolnshire.



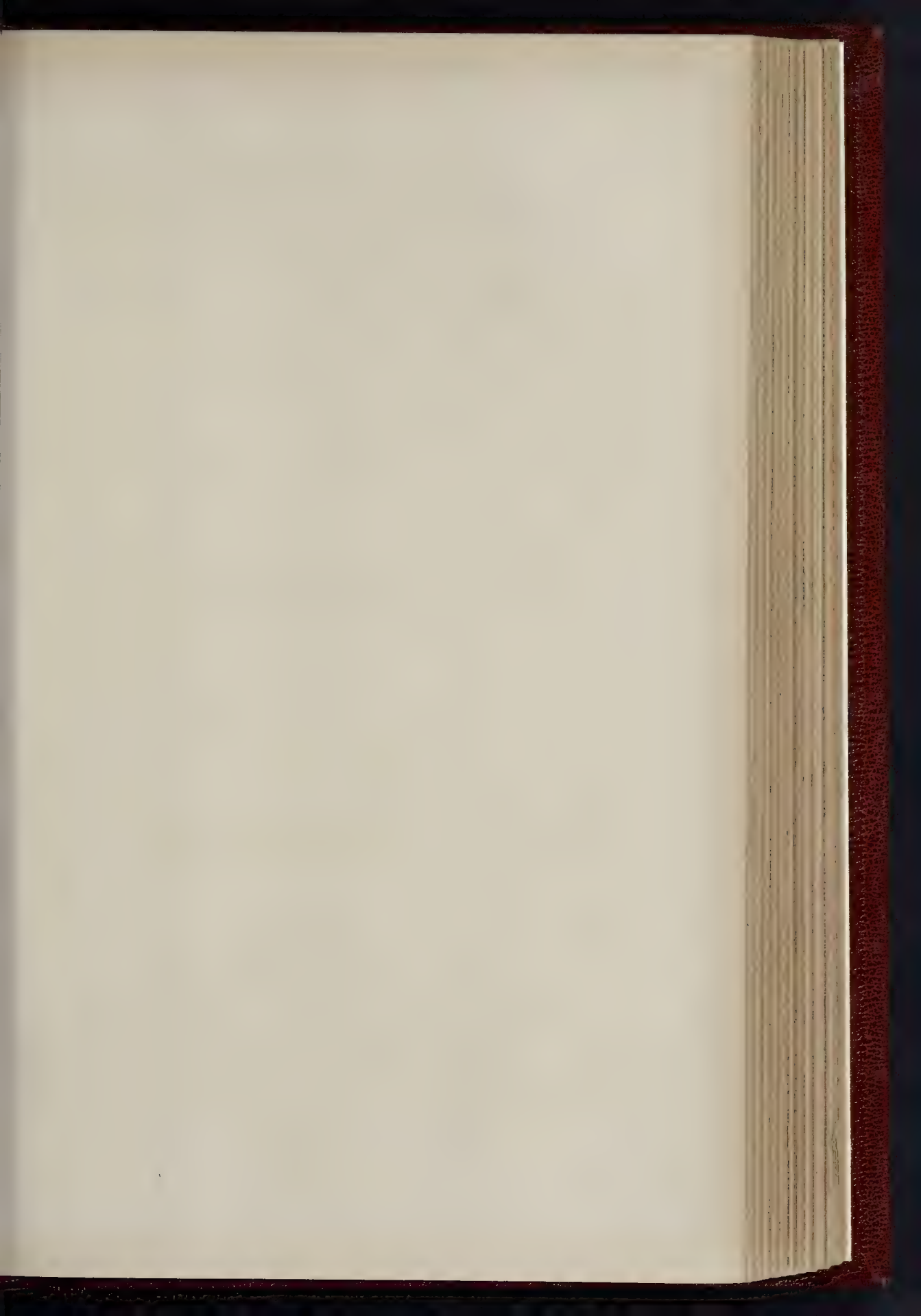
Remains of Stamford, Lincolnshire.

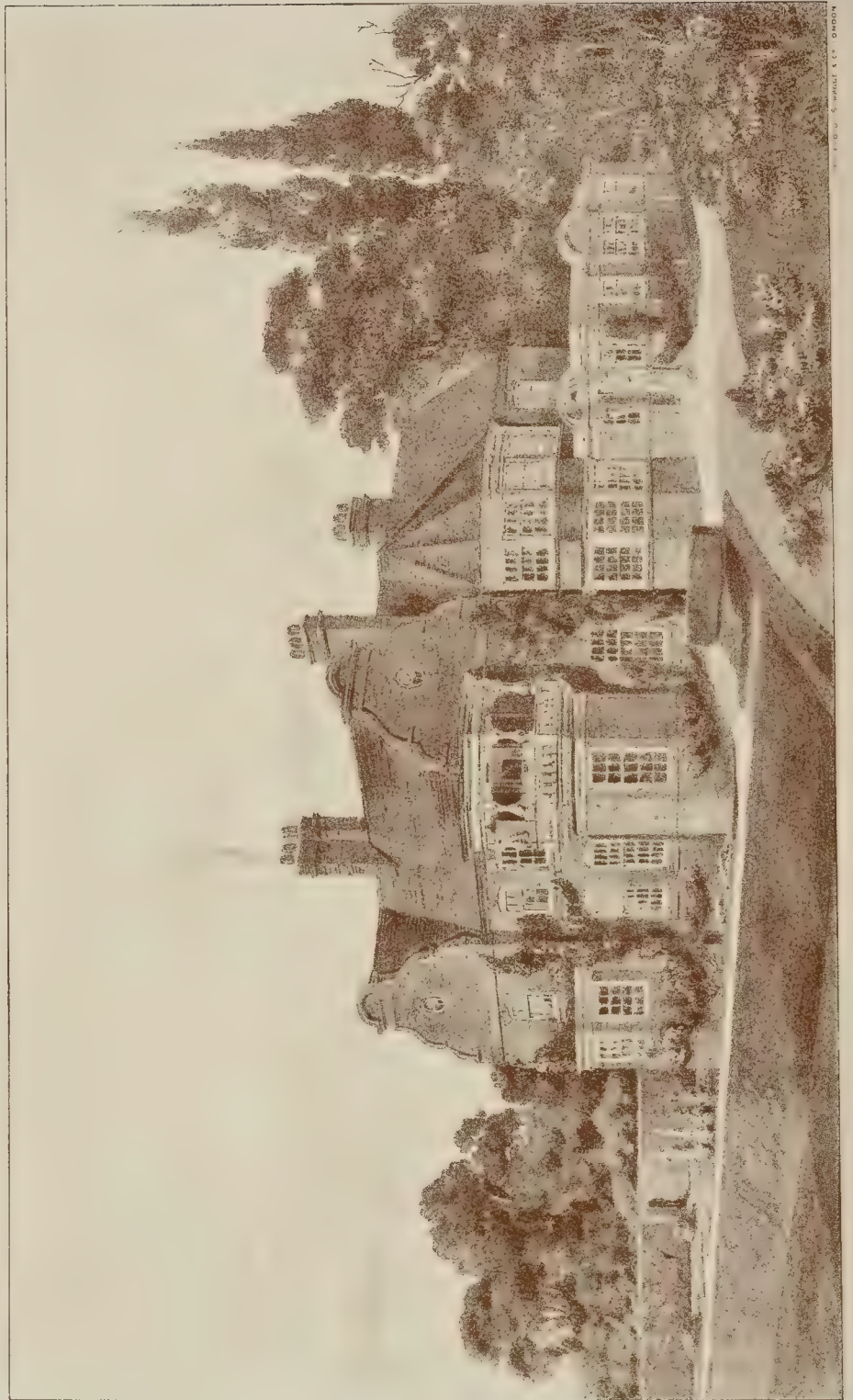


Northborough Manor House

Young, May 2, 1884.







A HOUSE AT SCARBORO'. — MESSRS. W. SUGDEN & SON, ARCHITECTS





DAVID PLAYING BEFORE SAUL — MISS ELLEN M. ROBE, SCULPTOR

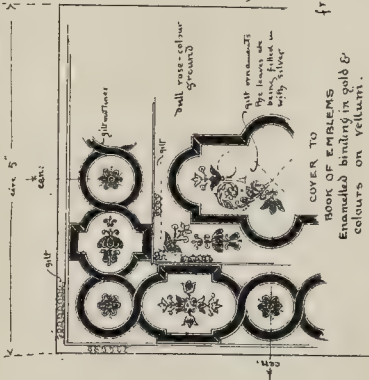




# NOTES FROM THE ECCLESIASTICAL ART EXHIBITION, PORTSMOUTH.



Sketch of Congress Hall from South.



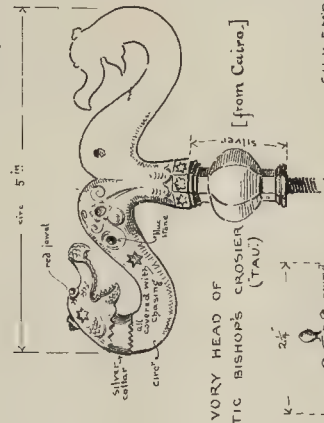
COVER TO BOOK OF EMBLEMS. Embossed shading in gold & colours on yellow.



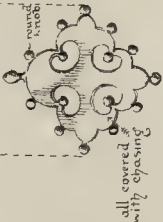
SHIELD from Biblia Sacra Hond. Title page 1560. (German) painted.

CH. 3. RICH. PINK. Arch. D.M. OCT. 1887.

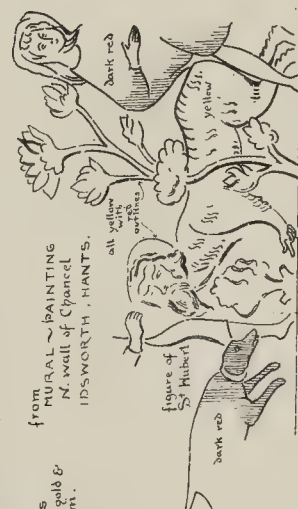
Photo. S. S. Photo. Lib. G.



IVORY HEAD OF COPTIC BISHOP'S CROZIER (TAU) [from Cairo]



SMALL SILVER CROSS [RUSSIAN]



FROM MURAL PAINTING N. wall of Chancel IDS WORTH, HANTS.



SILVER CUP dated 1676.

said to have been used as a Communion Cup by the Rev. Philip Henry.



ELIZABETHAN CHALICE from East-Clondont.



COVER or PATEN 1570 Date on top of cup.

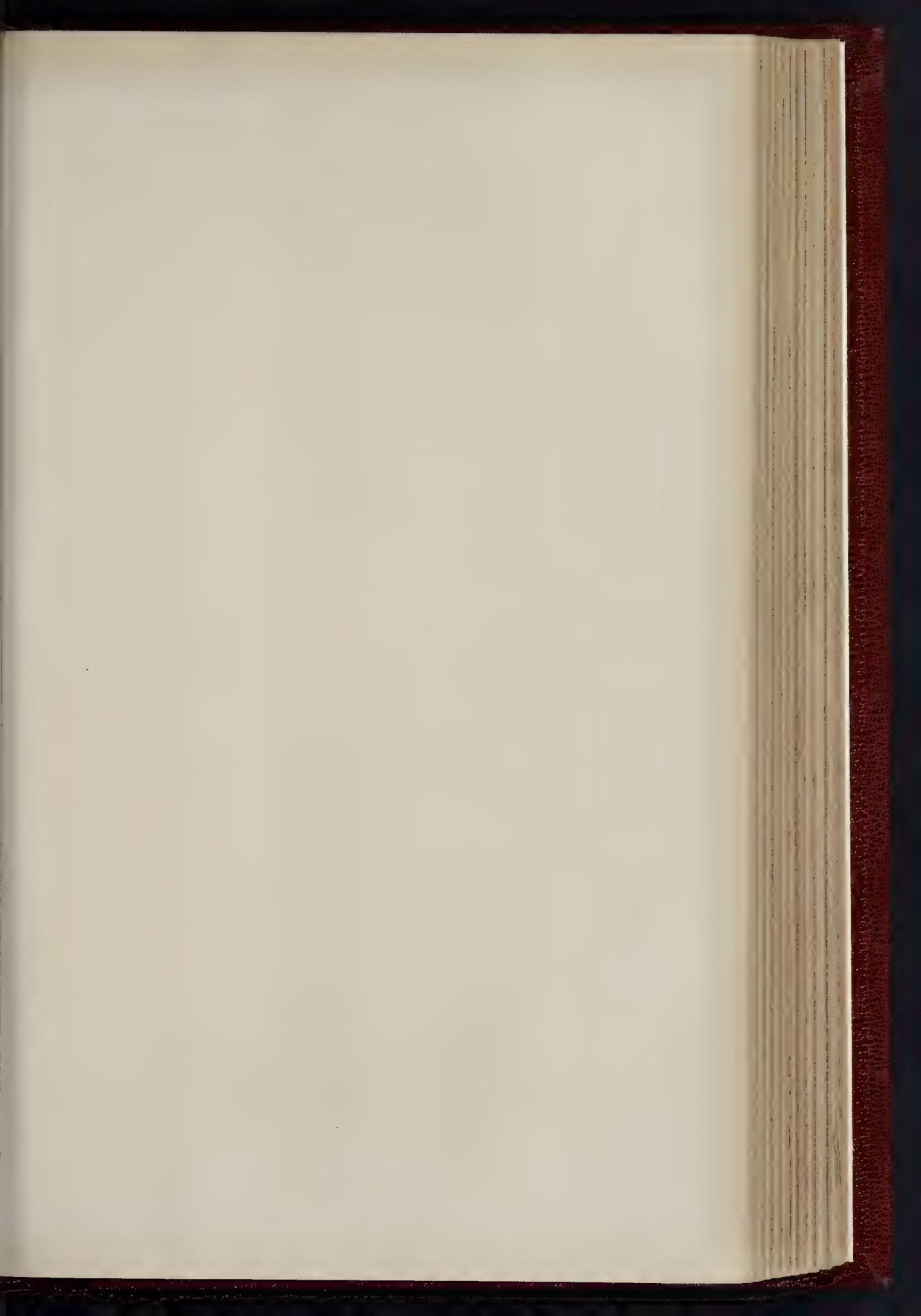
MEMOIR Chalices of Challen Hants same pattern and Dated 1568

## SKETCHES AT THE ECCLESIASTICAL ART EXHIBITION, PORTSMOUTH (CHURCH CONGRESS).

Queen St. London W.C.









INK PHOTO SPRAGUE & CO LONDON

DESIGN FOR AN EXTERIOR TO THE

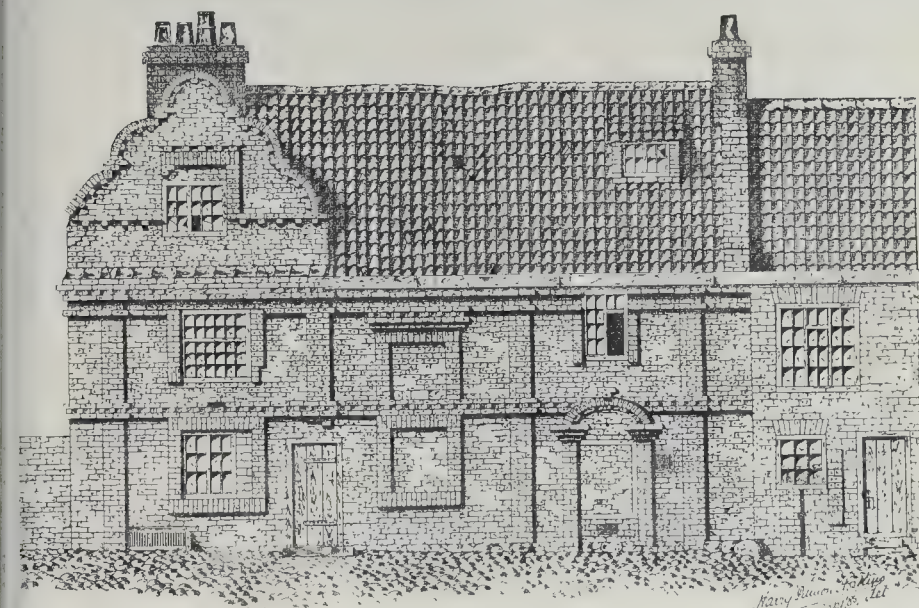




OF ST. STEPHEN'S, WALBROOK







Old Elizabethan House, Darlington.—Measured and Drawn by H. P. Hoskins.

#### OLD ELIZABETHAN HOUSE, DARLINGTON.

Little or nothing is known of the history of interesting example of early brickwork. Only allusion made to it by Longstaffe, in "History of Darlington," is that "John (A.D. 1712) lived in the old Elizabethan house between Tubwell-row and the churchyard, now the 'Nag's Head.'" It must, however, have been built long anterior to this date. The building is now divided into the churchyard by a narrow passage with cobble stones, called Church-lane, owing to the fact that the house at one stood absolutely in the Churchyard of St. Peter's, it may fairly be assumed that it was early the residence of some ecclesiastic. The general size of the bricks, which are of pink red and somewhat roughly made, is 4 by 5 in. by 2 in. Some, however, are 12 in. long, but no difference exists in width or thickness.

The building has been measured and drawn by Harry Pilmore Hoskins, of Darlington.

#### ARCHITECTURAL ASSOCIATION CONVERSAZIONE.

The Architectural Association conversazione held on Friday, the 9th inst., in the Galleries of the Institute of Painters in Water Colours, 15, Pall Mall, under the presidency of Mr. C. R. Cresswell.

The work of the various classes was displayed on the walls of the central gallery, together with the drawings sent in in competition for the various prizes offered by the Association and the Architectural Union Committee. The sketches made by the Travelling Students, Mr. H. D. Walton, were also exhibited. The following is a list of the prizes:

**Architectural Association Travelling Studentship.—**First Prize, Medal, to Mr. H. D. Walton; Second Prize, awarded to Mr. R. W. Paul.  
**Architectural Association Medal (with 5l. 5s.).—**awarded to Mr. A. B. Mitchell.  
**Architectural Union Company's Prizes.—**First (5s.), awarded to Mr. Alfred Hart. Second (10s.), awarded to Mr. A. B. Mitchell.  
**Travel Studentship.—**No award made by judges as yet.  
**Elementary Class of Design Prize.—**First (3l. 3s.), Mr. Alfred G. Hall. For the second and third (2l. 2s. and 1l. 1s.), Mr. R. A. Rix and J. M. Rix were bracketed as equal, the prizes to be equally divided.  
**Class of Design Prizes.—**First (3l. 3s.), to Mr.

A. S. Haynes. Second (2l. 2s.), Mr. F. Ward. Third (1l. 1s.), Mr. W. H. Raffles. Honourable Mention of the work done by Messrs. F. S. Grainger and F. Haigh.

**Lecture on History of Architecture.—**Prize awarded to R. A. Rix.

**Class of Colour Decoration Prize (3l. 3s.).—**Awarded to Mr. W. G. B. Lewis. Honourable Mention of the work of Messrs. H. Wilson, E. Herbert, and G. G. Woodward.

**Class of Construction Prize.—**First (3l. 3s.), to Mr. W. B. Gwyther. Second (2l. 2s.), to Mr. E. A. Jolly. Third (1l. 1s.), to Mr. F. S. Grainger.

**Lectures in connexion with Class of Construction.—**First (3l. 3s.), Walter Dewes. Second (2l. 2s.), A. J. White. Third (1l. 1s.), W. Shean, jun.

**Class for the Study of Planning and Specification Writing.—**First Prize (2l. 12s. 6d.), to Mr. H. Hutchings. Second (1l. 11s. 6d.), to Mr. A. Sykes. Sketch-book Prize.—Awards postponed.

In addition to the work done by the students there was an interesting collection of water-colour drawings by members of the Association, including Messrs. R. Phené Spiers, W. J. N. Millard, W. H. Atkin Berry, Thos. E. Pryce, and others. The band of the 2nd Life Guards played a selection of music in the east gallery. In the galleries there was an interesting exhibition of objects of interest kindly lent by the firms named. Messrs. Morris sent some fine specimens of tapestry and other hangings, Messrs. Woolmans sent some good wall papers and Messrs. Jeffrey's exhibits included a new "nursery" wall decoration illustrating the story of the "Pied Piper of Hamelin." Messrs. Doulton & Co. sent some of their art pottery, and Messrs. Longden stoves and chimney-pieces. Mr. Alfred Newman contributed some admirable specimens of wrought-iron work, consisting of lamps and other ornamental fittings and two interesting panels of various specimens, one of the most noteworthy objects being a large iron sign for the insurance office at the corner of St. James's-street. This will project some 14 ft. from the wall, and will certainly be a conspicuous object. Messrs. Hart, Son, Peard, & Co. exhibited bronze and wrought-iron objects of various design, some in the earlier Renaissance style, for which there is a growing demand. The bronze is found to be a better material than brass, as when it oxidises it becomes a warm mahogany colour. The wrought-iron is finished a steely blue, which is stated to be very permanent. The same firm also exhibited a ewer designed by the late W. Burges, and photographs of the enamel shields designed by him for Lord Bute. The Coalbrookdale Company exhibited two stoves designed by the late Alfred Stevens,—the only

two stoves said to have been designed by him. Messrs. Salviati, Burke, & Co. exhibited Venetian glass and mosaics. Messrs. Knowles exhibited some wall papers.

#### CIRCULAR HOSPITAL WARDS.

We have been requested to publish the following report of the discussion\* which ensued on the reading of Mr. Saxon Snell's paper on "Circular Hospital Wards," read before the Architectural Section of the Sanitary Congress at Leicester, and published in our issue of the 26th ult. (p. 443):—

Captain Douglas Galton said,—I had the opportunity about six weeks ago to visit the Antwerp Hospital. That hospital is a very magnificent one, and it has been completed for about six or eight months. But it is not yet full; in fact, only about four pavilions, I think, have been fully occupied since its opening. Therefore, it is impossible to arrive at any decided opinion at present as to the hygienic value or otherwise of these circular wards from the persons who are in charge of the hospital or from the nurses. The hospital consists, I believe, of eight large circular pavilions of two stories each, and these are about 61 ft. internal diameter. They have a large number of windows arranged for placing a bed between each two windows. At least, it was so intended, but the beds are in reality arranged promiscuously, and without reference to the windows, and what struck me certainly very strongly was the radiation of the beds. Even in these large wards (61 ft. in diameter) the comparative distance between the heads and the feet of the beds was very marked, and it struck me that the distance between the feet of two adjacent beds was very small. Of course, in respect of nursing, it is very undesirable that you should not have the beds parallel to each other,—although, as far as the emanations from the patients are concerned, I suppose it would be better to have the heads far apart. In this Antwerp Hospital the central space (which Mr. Saxon Snell says is the nurses' room) is a very great impediment both to the cheerfulness and to the circulation of air from the windows in the wards. It is also a most unfit place for a nurse to live in permanently, for she can get no fresh air into it at all. What air she does get is from the ward itself or that forced in to some extent by the ventilating fans. The Antwerp Hospital has been designed

\* Postponed from last week for want of space.



to be, in a very large extent, artificially ventilated. They have a system of warming the air by means of hot-water pipes in the basement, so as to admit warm air into the wards when required. They also profess to have an exhaust system for drawing off the impure air from the wards and also a hot-water system (or a steam pipe system, I think it is, but I was not able to get into that part of the building and see the apparatus on the occasion I was there) for warming the incoming fresh air which is carried up through the columns supporting the floors and ceilings of the upper wards. This system of exhaust ventilation is supplemented by a system of fans. These fans are intended to drive in air from towers placed at two points in the enclosure at a height of about 20 or 25 ft. above the ground, and to force this air into the wards either through the heating apparatus or otherwise according to whether the time of year is winter or summer. Now I found in this hospital exactly the same thing prevailing as I have always found in hospitals ventilated by artificial means. I have visited several of such hospitals. There are several in New York which are intended entirely to depend on artificial ventilation; and I had an opportunity of visiting those hospitals three or four times, but it so happened (and I invariably found it to be the case) that this artificial ventilation was never at work when I happened to pay my visits. It was not at work when I was in Antwerp; and it was never at work at any of the places I visited in New York. They all said, "The machinery is a little out of repair, and will not be in working order for a day or two." At Antwerp, the man told me the same thing: "The apparatus is not at work to-day." I am most unfortunate in my visits to these places. I have always wanted to examine these special arrangements, but it always happens that the apparatus is "out of repair," or that it has stopped working for I day or two, or something of that sort. But a thing it would be quite impossible to imagine that these large circular wards could be properly ventilated without artificial ventilation where the wards are arranged as they are in Antwerp. I am only now speaking of Antwerp, of course, and I certainly shall take an opportunity of visiting that hospital again, as soon as I can, in order to try and study the matter further. But I agree most entirely with the arguments which Mr. Snell has adduced. I think he has put the matter in the clearest possible light, and I only wish the various hospital authorities who are looking out to construct hospitals, and who have taken up the idea that a circular hospital ward would be very nice, would read Mr. Saxon Snell's paper, for I am quite certain that not only will they find the circular system of hospitals to be much more expensive, but I am equally convinced that it will not be found satisfactory in practice.

Professor De Chaumont.—This subject is one of extreme importance, because, for some years past, the attractions of this system seems to be increasing. I confess that at first it struck me the idea was rather a pleasing one, and when Mr. John Marshall wrote a pamphlet on the subject some time ago in London the system was hailed with a great deal of welcome. I must confess that, although I visited the Antwerp Hospital when it was just completed, and before it was furnished or occupied, and having since seen the plans of other hospitals, I had really not given the subject sufficient attention to appreciate the difficulties which Mr. Saxon Snell has so excellently brought forward. After reading his paper, I must say that the arguments he has adduced seem to me to be at present very difficult indeed to answer. I quite agree with Captain Douglas Galton in what he has said with regard to the construction of the Antwerp Hospital. The wards are by no means attractive in appearance, and the erection in the centre is one that takes away very much from the cheerfulness of the ward, and as to putting an unfortunate nurse into this central cage, I look upon the thing as perfectly monstrous. In one place I have seen the system tried with some apparent success, but in this example (the West Kent Dispensary at Greenwich) there are, I think, only ten beds in the ward. There I thought it had rather a cheerful aspect, and I was rather pleased with its appearance, but when one comes to consider the question in the exhaustive way in which Mr. Snell has considered it, I confess my views are very much changed in the matter. I see

that the additional expense is enormous, and, as Mr. Snell has said, it would be very difficult to point out any additional advantages there would be to the patients. The point that has always been contended for by the advocates of the circular system has been, as Mr. Snell has shown, that a greater amount of wall-space is given per patient, but when we come to take away the entrance lobbies and the openings necessary for the closet vestibule we find the wall-space reduced below that obtained in the rectangular system, and there is such a very large space in the centre which is really superfluous that the expense seems to be increased in a most inordinate way. The adoption of this system will not I am afraid, as Captain Galton has said, answer the expectations of those who are proposing it. But the matter is one of very great importance, seeing that it is now strongly advocated by the Director of Works at the War Office (Sir Andrew Clarke), and that the proposal to build a hospital on this principle and on a large scale at Malta is now seriously entertained. Plans and elevations have now been before the public for some time and have been exhibited at the Royal Academy all this summer. When we come to consider how many beds would be required for the hospital of a large military station like Malta it will be at once seen that a very large expense will have to be incurred which will not be in any way commensurate with the advantages to the patient.

Mr. H. H. Collins coincided generally with the views expressed by Mr. Snell, and regretted that the system of building circular hospital wards had proceeded so far as it had. This was not the first time he had found it necessary to express himself adversely to this circular system. The last time was at a meeting in London of the Hospitals Organisation Society, where he was pretty well set upon, and he was therefore gratified to find that on this occasion his opinions were being supported. He thought Mr. Snell had treated the matter very tenderly, and that he could have scored many more points had he chosen. A circular-shaped building would be enormously more expensive than one of rectangular form, but Mr. Snell had not apparently gone much into that part of the question.

Mr. E. C. Robins also concurred in the views expressed by Mr. Snell, and he was pleased to find that such high authorities as Professor De Chaumont and Captain Douglas Galton were in accord with him.

Mr. P. Gordon Smith (President of the Section).—At this late hour of the day, and with so much more work yet to get through, it will not do for me to go into a long dissertation on the subject of circular wards. I may, however, say that I do not fall in with all that has been said upon the subject. On the occasion referred to by Mr. Collins when the matter was discussed at a meeting in London, he was the odd man on the wrong side, while I was opposed to him and in the majority. On this occasion I am afraid I am very much in the minority. I think Mr. Snell has rather exaggerated his case, very much so in some particulars; but it is difficult to go through all the points he has raised. However, there are a few features about the circular ward system that, I think, deserve more attention than has been paid to them. There is the question of shape of site. If you have a site on which you cannot build a long ward, you may be pretty well able to build a circular one. In fact, it often happens that if a ward is to be built there at all it must be circular. There is another feature. A circular ward will stand less chance of interfering with a neighbour's rights of light and air, and will be a better shape for the admission and full circulation of air than if of rectangular form. There are in many towns sites where it would be difficult, if not impossible, to put up a ward-block of the ordinary oblong shape, and, of course, on these sites it will be admitted that a circular ward would be the right thing to adopt if a hospital is to be there at all. For my own part, I should like to see hospitals outside the towns altogether. Then as to aspect, you can very often do better with regard to a circle than an oblong. As regards the question of cost, Mr. Snell's figures are estimates, and, as I am inclined to think, they are exaggerated. But I have got here papers from two architects who have actually built circular hospitals, and they say that they are cheaper. At any rate, they show that there is positive reduction in quantity of brickwork used.

Mr. Snell.—Pardon me, I have not entered into the question of cost of construction at all. I have ignored it.

Mr. Gordon Smith.—There is an incidental reference to it. I do not wish to push this question, but I wish to say that there are two sides to the question even of cost. I have also a long letter from Mr. Burdett, who is at Amsterdam, and in it he advocates the system, and he points out that a great deal of the fault found with the Antwerp hospital is due to faulty administration. Then, as regards ventilation, I have heard men (whose opinion is, at any rate, worth listening to) express a very strong conviction that the facilities of ventilation are at least as great, and probably much greater, in a circular than in a rectangular ward. So much so, indeed, that it is considered possible to admit of a diminished amount of cubic space in the case of a circular ward, whereas such a thing would not be at all permissible in the case of a rectangular ward. In this way the cost of the circular ward would be largely diminished. As to administration, there is much better control, less running about, and less fatigue, in a circular ward than in a rectangular ward. I think that is beyond question. Bearing in mind these points, I still think that the subject deserves careful consideration. I will not say any more upon the matter at present, but will leave it for hospital authorities to judge for themselves.

Mr. Saxon Snell, in reply, expressed himself gratified at finding that, with but one exception, his opinion upon the question of circular hospitals had been unanimously endorsed by the meeting. He could not at that late hour reply in detail to all Mr. Gordon Smith's arguments, for most of them were expressed in very general terms; as, for example, his assertion that the figures and estimates dealt with in the paper were exaggerated. Mr. Snell could only assure the meeting that all the items in his estimates were most carefully gone into, and that the results of the calculations were rather understated than excessive. As for the question of difference of cost between a building of circular and one of rectangular form, there was no doubt in his mind that the circular one would on calculation be found very much the most expensive, but he had expressly omitted this large item from consideration in order to avoid opening up the question. With regard to the statement that sites might exist upon which parallelogram-shaped wards could not be placed without interfering with the neighbours' rights of light and air, all he could say was that if such sites did exist no hospital ward ought to be built upon them at all. But he only knew of two instances where circular wards had been erected upon this plea, and in both these cases it was quite clear to him that parallelogram-shaped wards would have been much more suitable, and would not have interfered in any greater degree with the rights of neighbours. He was quite at a loss to understand how a circular ward could possibly be thought to give greater facilities for ventilation. In the rectangular wards it was usual to get rid of the foul emanations of the patients by providing outlets into flues situated in the side walls directly over the heads of the patients. Surely that was a better plan than carrying the deleterious matter across the ward, a distance, of from 30 ft. to 35 ft. into the central ventilation shaft, as recommended by the advocates of the circular system.

#### THE RESISTANCE OF BUILDING MATERIALS TO FROST.

This subject has from time to time engaged the careful attention of scientific men, and amongst others Brard, Braun, and Tetmajer have published in various Continental journals (as well as in special treatises) the results of their detailed investigations. Brard's test consists in the saturation of the material to be tested with a solution of Glauber's or other salt of a given strength, and in then permitting the expulsion of the salt by crystallisation, it being supposed that the salt would produce an effect similar to that of the congelation of water. Braun\* institutes a comparison between the strength of extension of the material and the force of the solidifying water, assuming that the material is not capable of resisting frost when the former is less than the latter. Tetmajer

\* See the Builder, July 12, 1884 (p. 51).



employs a number expressing the proportion between the resistance to pressure in a dry and a wet state. In addition to the above, Hempel's st with muriatic acid deserves mention.

In reviewing these processes, Herr A. Blümcke writes in the *Thonindustrie Zeitung* that all them subject the material to conditions which are not to be found in practice, while their more or less complicated nature forms an obstacle to their adoption. On the other hand, the process of Bauschinger is more practical, consisting in the exposure of the material twenty-five times to frost in the open air, the strength before and after the test serving as a guide to the resisting power. The production by artificial means of a useful degree of cold suggests itself, but hitherto this process has only been accomplished by the aid of chemicals, which affect the substances treated in such a way as to prevent the ready appreciation of the effects produced by frost. Hence a proposal of Hericat de Thury is being carefully studied by Herr Blümcke, with the result of his perfecting the following method.

The stones to be tested are placed two at a time in a wire framework suspended from a stand. These are placed in a cylindrical metal vessel sloped off at the foot in funnel form and with a cover. This is enclosed in a larger vessel of the same shape, and held in position by supports. There is a space of 2 in. around the smaller vessel, which space is filled with a refrigerating mixture. A vessel, 2 in. in height, is also placed above, which is filled with the same mixture. At one time an escape-pipe had been in use at the lower part of the apparatus, but it was found more practicable to empty it after each operation by a syphon. The cold mixture used consists of three parts of ice in small pieces and one part of powdered black salt, its cheapness being a considerable advantage. The lowest temperature obtained in the interior of the apparatus was below 10° Fahr., although a still lower temperature could have been arrived at. Small thermometers are inserted in the stones, and although two are sufficed to bring these to the temperature of the surrounding air, the stones were subjected to the process during a period of three hours. Felt or sawdust was used to procure insulation from the outer air, the former being the effectual, but the latter preferable on account of its cheapness.

In the selection of the stones, as well as in the general conduct of the experiments, Herr Blümcke had the advantage of the advice of Professor Gottgetreu, the trials being conducted in the laboratory of Professor Von Metz. The stones were in cube form, the length of the sides being about 3½ in., and the surfaces roughly dressed. Two specimens were tested in each case, and one of them was completely saturated with distilled water. Boiling was, however, avoided, so as not to expose the material to a degree of heat which it is not in practice called to endure. When a material is very porous it is impossible to freeze it when thoroughly saturated. After removal from the refrigerating apparatus the cubes were placed in a small trough covered with water, and left for three hours, so as to be again brought to the temperature of the room. When taken out the stones were covered with a coating of hoar frost, and if then left for some time in water a seeping of small particles was perceptible in the portions not capable of resisting frost. Before the next subjection of the stones to the refrigerating process the surfaces were gently rubbed with a feather. Herr Blümcke repeated the process until distinct traces of injury were visible, such as cracks, peeling, loosening of grains, &c. If a stone had been ten times subjected to the frost, with such traces appearing, the quantity of the mass separated after evaporation of the water was ascertained, and the process continued until destruction commenced. A second cube was subjected to a stream of water during one hour upon three sides. In this case there was no attempt made to ascertain the loss of volume, but the application of the water was continued until injury became apparent. These external appearances were quite the same as if the stone had been injured, but were considerably later in manifesting themselves.

From these experiments Herr Blümcke has deduced the theory that a material has higher properties of resistance to frost, according to the restriction of the loss in weight caused by repeated application of the freezing process. Trials made upon sandstone the following

results were obtained. In all cases cracks were finally visible which ran close to each other (parallel to one or several edges), and produced crumbling when the operations were persevered with.

| Name.                                       | Specific gravity. | Water taken up to per-cent. of volume. | Number of freezings. | Loss in weight, Grammes. |
|---------------------------------------------|-------------------|----------------------------------------|----------------------|--------------------------|
| 1. White, Langenzenn .....                  | 1.97              | 22.6                                   | 2                    | 5.0089                   |
| 2. Green, Ellingen .....                    | 2.00              | 24.1                                   | 3                    | 0.7446                   |
| 3. Grey, Oberdachstetten ..                 | 2.08              | 21.1                                   | 3                    | 0.6910                   |
| 4. Yellow, Lengau .....                     | 1.83              | 32.6                                   | 3                    | 0.4562                   |
| 5. Red and white striped, Waldaschaff ..... | 2.22              | 11.0                                   | 3                    | 0.4267                   |
| 6. Green sandstone, Albech ..               | 2.14              | 18.1                                   | 4                    | 0.2835                   |
| 7. Yellow, origin unknown ..                | 2.24              | 14.6                                   | 6                    | 0.2641                   |
| 8. Yellow, Zell .....                       | 2.19              | 13.9                                   | 8                    | 0.1088                   |
| 9. Grey, Gröden .....                       | 2.44              | 13.7                                   | 13                   | 0.0835                   |
| 10. Red, Rothenfels, A.M. ....              | 2.31              | 11.3                                   | 24                   | 0.0620                   |

Large pieces were detached from No. 1, and cracks appeared all over Nos. 2 and 3. On No. 4 there were two kinds of coatings, a darker one, which broke off more than the other, and a lighter one which showed cracks. Nos. 6 and 8 peeled on the surface, and No. 7 was much cracked. After the thirteenth freezing of the ninth type a splinter became detached from one corner, but cracks parallel to the edge were not visible till after the forty-third freezing.

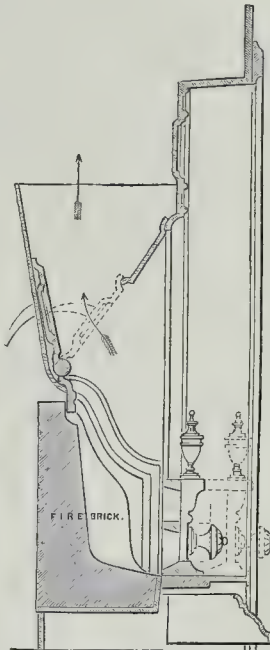
By proceeding in this way it is not necessary to wait for the visible destruction of the material. Coupled with the definition of the degree of resistance to frost is an approximate estimate of the period a stone will last, as it is not difficult to arrive at the number of alternations during an average winter between frost and thaw. When thoroughly saturated stones are tested, the results are applicable to the most unfavourable circumstances, and are consequently the more reliable. Should a material not show injury at the temperature applied, this fact does not establish its power of resisting frost, but renders advisable the trial of a still lower temperature; in no case, however, below the range to which, in practice, the stone would be subjected. Finally, Herr Blümcke does not claim that he has solved all the questions connected with this interesting subject, but considers that his illustration of what may be done with simple means by skilful and capable hands may not be devoid of value to the cause of science.

#### The Bessbrook and Newry Electrical Tramway.

This tramway has been completed and inspected by Major-General Hutchinson and Major Armstrong, R.E., on behalf of the Board of Trade. The Bessbrook Spinning Company, who own very extensive mills and granite quarries at Bessbrook, have hitherto been obliged to cart all their coals, goods, and stores from the wharves and railway stations at Newry, a distance of three miles. The directors of the company have for some time had in contemplation the establishment of a tramway between Newry and Bessbrook, but the great obstacle to the carrying out of this has been the difficulty which would be encountered at both ends by the transhipment of the goods being necessary, as there were difficulties in carrying the tramway at the one end to the railway stations, and at the other to the various departments of the mills. These difficulties have, it is stated, now been entirely overcome by a modification of the usual wagon. The wagons are constructed with wheels having no flanges, and of sufficient width of tyre, 2½ in., to allow them to run upon the ordinary roads of the country. The front part of the wagon is carried on a bogie which can either be pinned so as to make a fixed wheel base, or can be allowed freedom of movement as in any ordinary road vehicle. To the fore bogie horse shafts can be attached for use on the roads. On the outside of the ordinary tramway rails second rails have been laid of a lighter section to which the ordinary rails act as a guard. The flangeless wheels run upon these outside rails, and their motion is restricted by the inside rails. This plan, suggested by Mr. Henry Barcroft, director of the Bessbrook Spinning Company, is stated to have been entirely successful. The whole of the electrical details and all matters connected with the electrical equipment have been designed and carried out by Dr. Edward Hopkinson, of Manchester. The permanent way has been constructed under the direction of Mr. J. L. D. Meares, C.E., of Newry, assisted by Mr. F. S. Thomas, C.E.

#### THE "AS YOU LIKE IT" GRATE.

This is the title given to a new grate just introduced by Messrs. George Wright & Sons, of 113, Queen Victoria-street. The title is appropriate, for the grate is fitted with a shell or firebox, which can be drawn out or pushed in as desired. When the shell is drawn out a powerful draught is created, and the fire burns under the conditions of free combustion. If during mild weather it is desired to reduce the fire, the grate can be converted into a slow-combustion stove by pushing in the shell which holds the fire. The invention appears to provide an excellent arrangement for a sluggish



draught, as when a small slow-combustion fire is wanted, which in an ordinary grate might be liable to smoke,—it is pushed well in under the hood or canopy. The grate is the subject of a patent recently taken out by Mr. George Wright. The annexed diagram shows the firebox pushed in to form a small fire with a solid brick bottom, thus providing a "slow-combustion" grate. The dotted lines indicate the position of the range of fire-bars when drawn out to afford a large fire, with an open-bottom or quick combustion grate. The arrows show the direction of the smoke, the inner valve being open. The dotted lines by the lower arrow show the inner valve closed when the grate is not in use.

#### BUILDINGS IN EARTHQUAKE COUNTRIES.

The fifth report of the Committee, consisting of Mr. R. Etheredge, Mr. Thomas Gray, and Professor John Milne (secretary), appointed by the British Association for the purpose of investigating the earthquake phenomena of Japan (drawn up by the Secretary), was published in a recent number of *Nature*. The following extracts are of interest:—

*Buildings in Earthquake Countries.*—As during the last few years so much destruction both to life and property has taken place in various parts of Europe, it seems that an epitome of the results of observations and experiments carried on in Japan relative to construction in seismic districts might not only be interesting, but possibly it might also be of practical value. When erecting a building it appears that we ought first to reduce as far as possible the quantity of motion which ordinary buildings receive; and, second, to construct a building so that it will resist that portion of the momentum which we are unable to keep out.



To reduce the momentum which usually reaches a building the following may be done:—

(1) Institute a seismic survey of the district or area in which it is intended to build, and select a site where experiment shows that the motion is relatively small. (2) For heavy buildings adopt deep foundations (perhaps with lateral freedom), or at least let the building be founded on the hardest and most solid ground. It is, perhaps, because the tops of the hills in Tokio are harder than the plains that they have relatively the least motion. A building only partially isolated may be exceedingly dangerous from the fact that motion entering in the unprotected side will make the excavations (cuttings, valleys, &c.) upon the opposite side into free surfaces which will swing forward through a range greater than they would have swung had the excavations not existed. (3) For light buildings, especially if erected on soft ground, where the range of motion is always great, if the structure rests on layers of fine cast-iron shot, it cannot possibly receive the same momentum as a building attached to the moving ground. To resist the effects of momentum which cannot be cut off a building: (1) Bear in mind the fact that it is chiefly stresses and strains which are applied horizontally to a building which have to be encountered. A vertical line of openings like doors or windows in a building constitute a vertical line of weakness to horizontally-applied forces. (2) Avoid coupling together two portions of a building which have different vibrational periods, or which from their position are not likely to synchronise in their motion. If such parts of a building must of necessity be joined, let them be so joined that the connecting link will force them to vibrate as a whole, and yet resist fracture. Brick chimneys in contact with the framing of a wooden roof are apt to be shorn off at the point where they pass through the roof. Light archways connecting heavy piers will be cracked at the crown. To obviate destruction due to these causes a system of construction similar to that to be seen in several of the buildings of San Francisco, Tokio, and Yokohama may be adopted. This essentially consists of tying the building together at each floor with iron and steel tie-rods crossing each other from back to front and from side to side. (3) Keep the centre of inertia of a building or its parts as low as possible. Heavy tops to chimneys, heavy copings, and balustrades on walls and towers, heavy roofs and the like are all of serious danger to the portion of the structure by which they are supported. When the lower part of a building is moved, the upper part by its inertia tending to remain behind often results in serious fractures. All the chimneys in Tokio and Yokohama which have fallen in consequence of their ornamental heads have been replaced by shorter and thicker chimneys without the usual coping. The roof of a portion of the Engineering College rests loosely on its walls, and has, therefore, a certain freedom. In Manila many heavy roofs have been replaced by roofs of sheet iron. Walls may be lightened in their upper parts by the use of hollow bricks. Such vertical motion as may exist is also partly obviated by light superstructures. Vertically-placed iron tie-rods give additional security. If these and other rules, which are the result of experiment and observation, could be adopted in earthquake countries, it is certain that the loss of life and property might be greatly diminished.

#### DUST AND REFUSE.

SIR,—Many have been the remarks from time to time as to house or home dust and refuse, but there is one side of the subject which, as far as I am aware, no one seems to have touched upon, viz., the workers who have to sort it.

But a few days back a deputation from St. Mary's Hospital visited the authorities at Paddington Vestry-hall, stating that the impure particles from a neighbouring dust-yard (wharf) were very injurious to many of their patients. A great deal of the offensive smell in burning bricks is said to be (and correctly so) caused by rotten matter among the ashes used (tea leaves, &c.).

Now, sir, of any of this refuse it may be said that not so very many days ago it was sweet and clean within our homes, every sort of material being separate from the other. Therefore, is it not a strange proceeding to mix them all together, when no longer wanted, in one dust-bin, to be kept till putrid, then to be carted

away into heaps, and there sifted and sorted back again into each separate kind by human hands? Why should all kinds of refuse be thus first mixed together, necessitating its being thus sorted or unmixed when half putrid?

The paper and rags are much lessened in value by getting rotten.

Suppose the refuse were divided into three lots:—1st, ashes from fires, which if kept dry, might be emptied every two months or oftener; 2nd, tea-leaves, vegetable, and all wet refuse, to be emptied daily; 3rd, all other kinds of refuse for sorting, &c., which might be emptied three times a week. A couple of buckets hung up inside most dust-bins would answer the purpose.

Thus, neither the burning brick-kilns nor the dust-bins in our homes would be so offensive, nor yet the yards where the workers have now to sort back from among putrid matter what their fellow creatures have needlessly mixed together whilst sweet.

R. FELIX CAMPBELL.

#### THE SUPPOSED PORTRAIT OF SHAKESPEARE.

SIR,—In the *Builder*, October 3rd, 1885, p. 433, you say a new portrait of Shakespeare has been discovered by Mr. E. Walford in a shop at the West End. Not having seen the paragraph before, I now beg to correct it. The portrait belonged to a Mr. Kinton, of Paddington, who died in 1865, aged ninety-one. Mr. Kinton bequeathed it to his medical attendant, from whom I received it several years ago, and still have it in my possession.

W. GRISBROOK.

6, Pantion-street, Haymarket.

#### R.I.B.A. CHARTER.

SIR,—I hear there were but few Associates present at the meeting called for last Monday.

As an absentee myself, I should be glad to explain that I had fully intended putting off my engagements so as to be present, and, if necessary, to call attention to the desirability of Associates having a voice in the forming of the new by-laws. But, on reading the circular issued by the Associates' Committee, as well as the resolution proposed to be put to the meeting by Mr. Mark H. Judge, I felt there was nothing more to be done, that the debateable ground was well covered by the proposed alterations of the draft charter, and that the resolutions would be carried unanimously; and therefore I considered it was not so necessary to attend as I had at first thought.

Probably many others were absent from similar reasons.

R. STARK WILKINSON, A.R.I.B.A.

#### PROVINCIAL NEWS.

Ilkeston.—At a meeting of the Ilkeston Local Board last week a report was presented from Mr. W. H. Radford, Assoc. M. Inst. C.E., Nottingham, recommending the Board to utilise for the supply of this town the water now being pumped from the old workings by the Manners Colliery Company. The owners of the colliery are obliged to pump the water out of the workings in any case, and at present it has been entirely wasted. Ilkeston is at present insufficiently supplied with water from several small pumping stations at different parts of the district, whence the greater part of the water is pumped to a small open reservoir situated in the centre of the town at an elevation which does not command the whole of the district. The remainder of the water is pumped to a good covered reservoir at Shipley at an adequate elevation. Mr. Radford recommends the disuse of the small pumping stations (except in case of emergency) and suggests that a 12-in. main should be laid from the Manners Colliery pump to the Shipley reservoir at a cost of about 2,000l. The Manners pump is a very large beam condensing engine, and is sufficiently powerful to lift the water to the height required, and an ample supply for the whole district of about 276,000 gallons a day could be supplied at a saving of some hundreds a year on the present pumping expenses, in consequence of the lift being less and the pump more economical. The Manners water has been analysed by Dr. Truman, who pronounces it suitable for drinking purposes. Mr. Radford's report was referred to the Highway and Water Committee.

St. Helen's.—The Town Council of St. Helen's have instructed their Engineer, Mr. George J. C. Broom, Assoc. M. Inst. C.E., to prepare

plans for the main drainage of the borough, and report as to the utilisation of the sewage.

Bromsgrove.—Two new blocks of almshouses, containing three houses each, have just been built by the Trustees of the Consolidated Charities. Each house comprises a porch, a comfortable living-room and bedroom, pantry, coal place, and small scullery, &c., while in an isolated building at the rear of the premises are arranged two wash-houses, with other necessary out-offices. Each house is intended to accommodate two persons, either an aged married couple or two single persons. The new houses are built in red brick and roofed in with purple tiles, the porches and gables being framed in oak, and having oak barge-boards. The cost of building the two new blocks was about 1,020l., while an expenditure of about 366l. has been involved by the additions, improvements, and repairs to the three old adjoining blocks. The work has been carried out by Messrs. Brazier & Weaver, contractors, from the plans and specifications, and under the direct supervision of the architect to the trustees, Mr. John Cotton, of Birmingham.

Ipswich.—The *East Anglian Daily Times* says: that the exigencies of business have caused great alterations in that old by-way of Ipswich known as the Thoroughfare. The premises of Messrs. Alston & Moir, tailors, have just undergone an entire remodelling. The two-storied house, with yard attached, which occupied the northern end of the site, has been pulled down, and the area thus acquired thrown into the shop, which is now 74 ft. long, with a depth at the north end of 30 ft. Mr. E. F. Bishopp, architect and diocesan surveyor, Ipswich, designed the alteration; Mr. F. Dupont, Colchester, was the contractor; and Messrs. Stearn & Sons executed the plumbers' and decorators' work.

Manchester.—Under the direction of the Markets Committee of the Corporation of Manchester, a few months ago alterations and improvements were made on the Shudehill side of Smithfield Market; and now a large extension is approaching completion on the opposite side, the portion abutting on Oak-street and Copperas-street. This latest extension, covering an area of nearly 7,100 square yards, exclusive of roadways, is designed mainly for the advantage of local farmers, gardeners, and cottagers, who have hitherto been compelled in the height of the season to stand in the streets adjacent to the market, thus blocking up to some extent the thoroughfares and being subject to much personal discomfort in the event of bad weather. To provide the requisite space for this extension of the fruit and vegetable market, the Markets Committee transferred the dealers in old clothes, and second-hand articles from what was known as the Old Clothes Market to a new building specially constructed for their use on the opposite side of Oak-street. Messrs. Mangual & Littlewoods, of Manchester, prepared the plans for the extension, and the execution of the works has been entrusted to Messrs. W. Southern & Sons, builders, Salford.

#### CHURCH-BUILDING NEWS.

Marylebone.—Christ Church, Marylebone, which was re-opened on Sunday, October 4th, has been re-decorated by Messrs. Campbell Smith, & Campbell, under the superintendence of Mr. A. W. Blomfield.

Devizes.—Special services have been held in St. Peter's Church, Devizes, to "dedicate" the new choir-stalls which have been placed in this church in memory of the late Vicar (Rev. E. A. L. Grindle), by his clerical friends. The stalls (four in number) are of massive English oak, and are in the Early English style, in their immediate surroundings. They have been executed by Mr. Harry Hems, of Exeter.

Merevale.—Further progress has been made in the restoration of Merevale Church, under the direction of Mr. Alfred Bickerdike, of Adar street, Adelphi. The east end of the South aisle has been partially rebuilt, and a fine flowing Decorated window restored and glazed with painted glass, — executed by Messrs. Burlison & Grylls, — in memory of the late Stratford Dugdale. The church is interesting having been part of the conventual buildings, in connexion with Merevale Abbey, the ruins of which stand near the church.

Ridge (Herts).—The interesting old church at Ridge, situate about two miles and a half



London Colney, and four from Barnet, re-opened on the 3rd inst., after restoration. The church, which dates from the 15th century, and is dedicated to St. Margaret, had been for some time fast falling in a condition giving cause for anxiety. The plan of restoring the chancel and providing a organ-chamber having been borne by the late Dowager of Caledon (in whose gift the church is), the parishioners took in hand the project of repairing the roof and the body of the church, at an estimated expense of 800*l*. The work has been carried out by Mr. C. Miskin, of Alban's, under the direction and superintendence of Mr. Arthur Billing, architect, of London. The roof and body of the church have been substantially repaired. New oak benches have been provided in the nave, and a screen added to the tower archway. A new porch has been provided on the south side of the church, and the works include an entirely new chancel arch and windows of similar character to those originally existing. The accommodation in the nave is for about 200 persons, and in the chancel for twenty-five. *St. Martin's.*—The foundation stone of the church for the large congregation collected by Marlborough College Mission, in a populous newly-built artisan neighbourhood at Marlborough, is to be laid by the Duchess of Devonshire on the next Easter. The site has cost 1,899*l*, the church, designed by Mr. J. E. K. Cuts, will hold 730 persons, will cost upwards of 3,000*l*. *St. Mary's.*—On the 25th ult. the ancient church of St. Mary and St. Martin, Blyth, was re-opened by the Bishop of Southwell, after restoration at the hands of Mr. C. Hodgson Fowler, architect, of London. The work is stated to have been carried out "on the most conservative lines," the south aisle, or "parish nave and chancel," walls, where of ashlar, have been cleaned of wash, and where plastered have been repaired, the plaster being kept thin as in the work. The floors have been taken up and a new floor of concrete laid down, with solid wood floors for the seats, and the old graves and flagging relaid in the passage-ways. The fine fifteenth-century oak roof of the parish nave has been carefully repaired, bay by bay. The parish chancel the plaster ceiling has been taken away to an entirely new oak roof on the same plan as that of the nave, but panelled underneath and enriched with carved bosses. The parish nave, which, before the restoration, was of all sorts and sizes, together with a large west gallery, is now cleared from the nave and seated with oak benches, half being of the seventeenth-century oak pews. The chancel has yet to receive its oak choir stalls, but has been re-floored in stone and plaster, and has a new altar. The old east window and north aisle have both been fully cleaned from colour wash, bringing to light many interesting remains of colour, and the marks of screens, &c., all of which have been carefully preserved, no cuts, holes, or any injury to the stonework being repaired, but all to tell their own tale. The pews and galleries with which this part of the church was furnished have also been removed, and the old nave is once more well seen. During the progress of the works several fragments of wood from the destroyed parts of the church have been discovered, as well as several early stones, one of the thirteenth century of Purbeck marble. The church has been repaired by one of Grundy's hot-air apparatus. The works have been carried out by the sole contractor, Mr. Thomas Woolston, of Stamford, at a cost of from about 2,500*l* to 3,000*l*. *St. Mary's (Salop).*—The parish church of St. Mary, Salop, was re-opened on the 22nd ult. after restoration under the superintendence of Mr. Norton, the contractor for the work being Mr. Muirhead, of Newport. The structural works comprise the taking down of the north and south nave, arcades, and clearstory walls, and the same. The old columns were much out of the upright, and had been sadly weakened by being cut into to support the aisle galleries. In the clearstory walls were bulged outwards in a alarming extent, and the ten couplet windows were in a ruinous condition, the weathering disintegrated the soft sandstone with which they were built. These have been replaced in hard red Coddal stone, as well as the decorated parapets and pinnacles of both the nave and chancel. The columns and arches of arcades have been rebuilt, using all the old stones, and the cement capitals replaced with moulded ones. The floor of the church has been

lowered some 1 ft. 6 in. to the original level, bases added to the columns, the old vaults filled in, and the entire area concreted over, the spaces under seats floored with pine blocks, and the old inscribed flag-stones relaid in the passages. The fine old oak roof over nave has been carefully preserved, repaired where decayed, re-boarded with oak, and re-covered with new lead, and the principal trusses well bolted to walls to prevent any future damage. The walls internally have been stripped of plaster, and the old facing exposed to view,—the rebuilt walls faced with coarse sandstone. The old south aisle wall, of brick, with five circular-headed windows and a bull's-eye, has been taken down to the foundation, and rebuilt in the late Gothic style to correspond with the nave work. Five handsome traceried triplet windows, ten lofty pinnacled buttresses, a battlemented parapet, moulded plinth, and dressed red sandstone facing to the walls generally, replace the old debased wall. It is proposed, when funds admit, to treat the north aisle wall in a similar manner. The second bay of south aisle is left rough to receive a handsome porch, delayed for want of funds. The old chancel-arch, which had lost all its ancient features, has been replaced by a bold and well-moulded arch. The tower has been opened to the church by the removal of the west gallery and organ. This has brought into view the fine fourteenth-century window and the lofty tower arch. The interior of the church had been entirely blocked up with galleries in the reseating of 1837, the galleries filling the aisles, the tower and chancel necessitating the well-known three-decker arrangement of pulpit, desk, and clerk. The deal pewing has been removed, the galleries swept away, the font removed to the tower. Mr. Hughes (of the firm of Hughes & Owen), Wrexham, carried out all the stonework and masonry generally. The heating is effected by Grundy's apparatus.

# RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

5,888, Window-sashes. R. A. Lowe.

The stile of bottom sash are in two parts,—(1) the inner, which, with the rest of the sash, is pivoted at the lower part of the window-frame; and (2) the outer, which slides in beads as usual, and is connected with sash-lines. A strip of metal, hinged to two short pieces, and acting like a parallel ruler, works in grooves in the adjacent edges of two parts of stiles forming a tight joint; or it may be completely moved into groove or inner piece, so as not to prevent rotation of sash. The upper sash is raised and lowered by cords, and a spring catch, actuated by cords, provides the fastening.

9,200, Fireproof Building. P. Franquin (Paris).

The walls are built of hollow bricks forming continuous passages for air-circulation, with the object of keeping them cool in case of fire. The iron floor-joists are enclosed in fire-clay casings, leaving air-passages between the casing and the joists. Openings are made in the roof, to be opened in case of fire in order to localise it. The doors and all other woodwork are encased in iron, and the windows are provided with iron Venetians. In theatres, the openings in the partition-walls around the stage may be provided with double curtains, composed of beams of wood encased in iron, and sliding in iron grooves coated with fire-clay.

11,276, Casting Sash-weights. W. Ayres.

The weight is cast in a chill, which has a projection on one or both halves. A plug at the end meets these projections, and together they form a hole for the cord.

11,624, Spanners and Wrenches. E. Barnes.

The lower jaw is moved up and down on a rectangular stem by means of a screw, which takes into a threaded recess upon it. The screw is partly recessed in a smooth groove in the stem, and is held in place by projecting pieces, which close over the milled head. The milled head is kept from moving longitudinally by the recesses into which it fits.

12,425, Asphalte. H. Kettmann.

The limestone is pulverised and its impurities extracted and destroyed by treating with suitable acids. The mass, after treatment, is cast or moulded into blocks.

12,466, Wood Sawing Machines. F. W. Hofmann.

The object is (in reciprocating sawing-machines) to disengage the point of the teeth from the wood during the back stroke. Guides are fitted so that they can be moved laterally to engage or disengage the saws as required.

12,599, Shovel. J. G. Dreyfus.

The blade is stamped or otherwise formed in one

piece, with corrugations in the side for strength. The part into which the handle fits is formed by bending.

13,148, Bridges. W. H. Lindsay.

The flooring of the bridge is constructed of pieces bent into a trough-like form. The floor is trussed by rods arranged to form parabolic girders, of which the upper members are composed of the flooring-troughs; or, the lower members of the girders may be parallel to the floor, transverse ties being provided in both cases where the inclined struts meet the floor.

14,989, Cement for Wood Pavements. R. L. Lowe.

Consists of resinous matters, grease, or fatty matters, heavy anthracene or other coal, or tar, oil, &c. Wooden blocks for paving, flooring, or the like, are dipped in the melted cement, and laid close together.

## NEW APPLICATIONS FOR PATENTS.

Oct. 2.—11,734, G. Brodie and J. Prior, Safety Catches for Window-sash Fastenings.—11,751, W. Clarke, Improvements in Venetian Blinds.—11,759, O. Inray, Improvements in Water Motors.—11,762, E. Hutton, Improvements in Ventilators.—11,771, J. Knott, Machines for Dovetailing, Mortising, Tenoning, Tongueing, Grooving, and Moulding.

Oct. 3.—11,790, J. Lewthwaite, Improvements in Paving and Preparation of Blocks.—11,793, W. Beck, Producing Letters or Designs in Relief or in Groove in Marble, Stone, &c.—11,805, E. Phillips, Flushing Cisterns for Water-closets, Drains, Baths, &c.—11,806, W. Timewell, Manufacture of Cement.

Oct. 5.—11,810, J. Neild, Portland Extension Ladders.—11,811, J. Gurr, Joiner's Bench Knife for Securing Work to Bench.—11,817, W. Sanderson and T. Moffitt, Sash, Casement, Door, and other Fasteners.—11,819, W. Sanderson and T. Moffitt, Boring Tools for Wood.—11,821, M. Bousfield, Perforated Fireclay Bottom for Ranges and Stoves.—11,829, W. McGinnis, Improved Screw-threaded Nail.—11,833, W. Scott Moncrieff, Syphon Cisterns for Flushing Water-closets.—11,843, R. Bailie and L. Chapman, Improvements in Planing Machines.

Oct. 6.—11,852, W. Black, Self-acting Fire Ring-gusher.—11,877, A. Clark, Nailmaking Machines.—11,890, H. Haddon, Improvements in the Treatment of Venereal.—11,901, Sir G. Chubb and G. Exton, Improvements in Latch Locks.

Oct. 7.—11,909, W. H. and B. Jones, Folding Table and Wash-hand Combined.—11,934, J. Gillespie and J. Pennycook, Apparatus for Opening or Closing Fanlights or other Glazed Frames, and securing same in any position.—11,939, S. Chandler and Others, Chimney-top or Ventilator.—11,940, H. Petty, Improved Means for Opening the Doors of Public Buildings, &c., in cases of Alarm or Panic.

Oct. 8.—11,949, J. Starling, Spindles for Knobs and other Handles.—11,953, R. Anderson, Apparatus for Ascending Chimneys.—11,974, C. Jackson, Floor-coverings and Stair Treads.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

9,621, J. K. Macmeikan, Chimney Tops and Ventilators.—11,128, C. Heywood, Construction of Water-closets.—11,141, J. Dickson, Chimney Tops for the Prevention of Down Draught.—9,810, J. Jeffrey, Ventilating Greenhouses and similar Structures.—10,048, M. Shirland, Securing Sliding Sashes of Windows.—10,161, E. Brinkmann, Producing Decorating Fillets.—10,332, H. Thomas, Joints of Sanitary and other Pipes.—11,114, G. Greig, Diffusing Air supplied for Ventilation.—11,133, H. Dawson, Ventilation of Street or other Drains.—11,160, W. Carr, Water-waste Preventing Cisterns.—11,232, J. Howie, Manufacture of Bricks, Tiles, and Slabs.—11,235, J. Ludlam and S. Harvey, Fire and Sound proof Flooring.—9,885, S. Emmens, Earth Boring Apparatus.—10,292, L. Groth, Fixing Ornamental Ironwork.—10,695, F. Guillaume, Packing for Pipe and other Joints.—10,863, R. Oates, Water-waste Preventer Cistern for Water-closets.—10,960, D. Law and Others, Fasteners for Rain-water Pipes, &c., and for Pipe Heads and Connexions.

## COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

13,338, H. Smith and D. Smith, Window Fasteners.—13,636, F. Howcroft, Automatic Sash Lock.—14,393, J. Stansfield, Manufacture of Asphalt Pavements.—15,570, A. Ward, Drainage Paving for Stables and Cattle Stalls.—16,485, H. Lake, Improvements in Quay, Piers, Docks, and similar Structures.—16,792, G. Ross, Laying and Securing Slates.—4,733, J. Key, Getting or Mining Clay.—13,442, A. Caspar, Imitating Stained Glass.—15,976, E. Hollands, Improvements in Open Stoves or Fire Grates.—16,431, A. Myell, Improvements in Grates and Stoves.—16,862, G. Pepper, Improvements in Lavatories or Wash-hand Basins.—17,052, P. Jensen, Improvements in Thermo Ventilating Stoves, &c.—5,913, H. Waldron, Attaching Door Latch and Lock Knobs to their Spindles.—9,412, W. Macrone, Machinery for Varnishing, Sizing, and Applying Colours to Paper, &c.—3,413, W. Macrone, Improved Varnish or Size.—3,414, W. Macrone, Manufacture of Dry Colours.—10,686, R. Ewered, Flushing Apparatus for Water-closets, Urinals, &c.

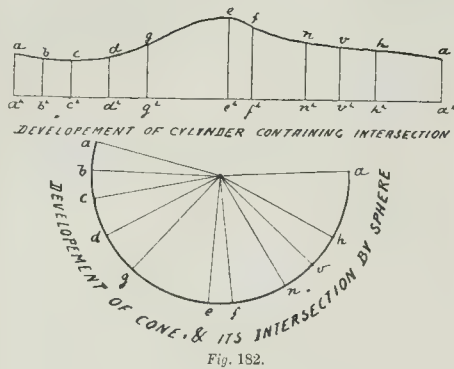


Fig. 182.

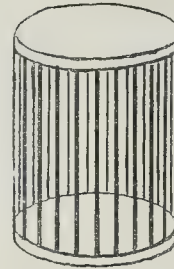


Fig. 183.

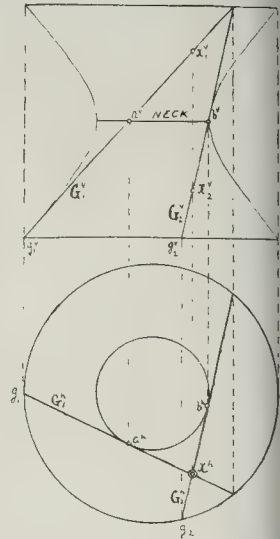


Fig. 186.

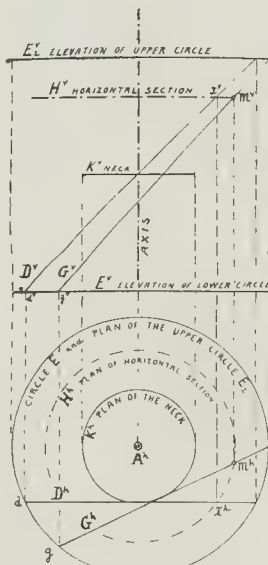


Fig. 184.

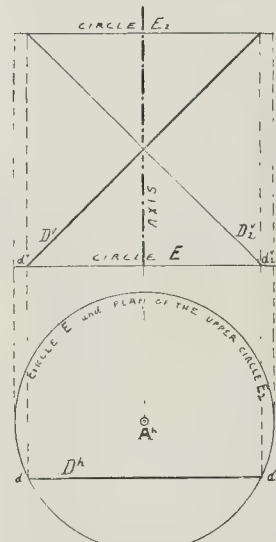


Fig. 185.

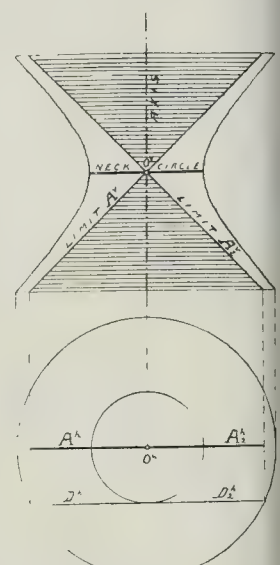


Fig. 187.

## The Student's Column.

### DESCRIPTIVE GEOMETRY.—PART II.

DEVELOPE ANY CONE (see figs. 173 and 182).

WE can use the intersection of the cone by a sphere, for we know that the intersection will develop in the shape of part of a circle of the same radius as the sphere (see fig. 182). To get in the development the generators  $G$  of the cone we shall have to measure exactly on the intersection the distance of the points  $m$  to the generator along which the cone has been slit. We must, therefore, first develop the intersection as if it were a curve drawn on a cylinder standing over its plan, and on that auxiliary development we can measure the real distances of the points  $m$  to carry them on the arc of circle belonging to the development of the cone. The reader sees thereby that there is really no practical advantage in using this method of

development, although it seems theoretically simple.

### The Hyperboloid of Revolution.

This is the surface described by a straight line as generator revolving round an axis not in the same plane as itself. It is called a hyperboloid, for its meridian, or section by a plane containing the axis, is a hyperbola, and the same surface could be formed by the revolution of that hyperbola. We shall not attempt to prove this, for, although very simple, it has to be done by the application of algebra to conic sections.

The reader can obtain a hyperboloid by the following very simple construction:—Cut out of card-board two circles of equal diameter, then connect the two discs obtained by threads, so as to form a cylinder, as in sketch (see fig. 183). If now you fix the lower disc on the table, and give a twist to the upper disc, you will have formed a hyperboloid. This surface can be seen in the ordinary circular waste-paper

basket, for it is naturally produced by the process of basket-making. The scotia or *triglypha* of the Greek Ionic base is a hyperboloid. With the Greeks the scotia was the essential feature of the base, probably because wicker-ware of that shape had been traditionally used as supports to vases and other objects from time immemorial; and also, because the Greeks, with their keen feeling of form, saw that the hyperboloid of revolution expresses eminently the elastic reactions which a base is submitted to, as transmitter of the weight of a burden to the ground. The Romans misunderstood the artistic meaning of the scotia, and saw in the feature only a means of getting a shadow, as expressed by the very name they give it. In the Roman columns the scotia plays, therefore, but a subordinate part, and was drawn by means of compasses, as formed of two arcs of circles. The hyperboloid is the easiest of all surfaces to produce on the turning-lathe, and for this reason is often used for vases and other earthenware.



raw the surface of the hyperboloid (see p. 17), first draw the generator D parallel to the plane, then when D rotates round A it will always touch the circle K, we call the neck of the hyperboloid. Any line G<sup>1</sup> tangent to the circle K<sup>1</sup> plan of a generator of the hyperboloid, G will be on the circle E, and its upper tip will be on the circle E<sub>2</sub> placed at a distance above the circle E. The plane neck or the circle K will be at an equal distance between the planes of the circles E and

the plane n<sup>1</sup> of a point m belonging to the surface of the hyperboloid be given, we find the projection of the point as follows:—through m<sup>1</sup> the plan of the generator G<sup>1</sup>, G<sup>2</sup>, and carry thereon m<sup>2</sup>. On the contrary, the elevation m<sup>2</sup> of a belonging to the surface of the hyperboloid be given, we shall find m<sup>1</sup> as follows: at level of m<sup>2</sup> we cut the hyperboloid by a plane plane H, and its intersection x with generator D, is a point of the circular section. We draw the circle H<sup>1</sup> through the point x<sup>1</sup>, and carry on that circle n of the point m.

see in fig. 185 that D<sup>1</sup> is the plan of two D and D<sub>2</sub> of which the elevations D<sup>2</sup> and D<sub>2</sub> in contrary directions. It is evident when lines D and D<sub>2</sub> revolve round the A they will generate the very same surface their extremities will describe the same circles E and E<sub>2</sub>. We can conclude, therefore, through every point of the hyperboloid two generators opposed to one another in direction.

It follows also that any generator of the one surface meets all the generators of the other surface, for through any point of that generator will pass a generator of the second surface. This will be plain to any reader examining an ordinary waste-paper basket. Hence this is only true if we consider the surface of the hyperboloid as infinitely extended, also the generators which are parallel as being at an infinite distance.

On the other hand, generators belonging to one system never meet and are never parallel. Let us take (see fig. 186) two generators G<sub>1</sub> and G<sub>2</sub> of the same system of generators. If these generators meet in space, it will be some point above x<sup>1</sup>; now we shall find a vertical line from x<sup>1</sup> will meet the generator G<sub>1</sub> above the neck in x<sub>1</sub><sup>2</sup>, and the generator G<sub>2</sub> below the neck in x<sub>2</sub><sup>2</sup>. We conclude, therefore, that the generators G<sub>1</sub> and G<sub>2</sub> do not meet. It is easy to see in our figure that will necessarily be true of any two generators we may select, for we shall always find the one generator get to x<sub>1</sub><sup>2</sup> after reaching the neck in the point x<sub>1</sub><sup>1</sup>, whereas the other generator will get to x<sub>2</sub><sup>2</sup> before reaching the neck in the point x<sub>2</sub><sup>1</sup>.

If the two generators of the same system are inclined in contrary directions, through the centre O of the neck circle (see fig. 187) we draw two lines A<sub>1</sub> and A<sub>2</sub> parallel to the generators D and D<sub>2</sub> of the hyperboloid, the lines A<sub>1</sub> and A<sub>2</sub> will be the asymptotes (prop. asymptotes) of the hyperbolas which form the outline of the figure in elevation. If the lines A<sub>1</sub> and A<sub>2</sub> are made to revolve about the axis of the hyperboloid, they will generate a cone which we will call the limiting (prop. asymptotic cone) of the hyperboloid; for the surface of the hyperboloid and the cone will never meet one another infinitely without touching.

# STAINED GLASS.

**Stained Glass.**—The three-light east window of the St. James Church, Bedford, has just been filled with Munich stained glass representing "Sermon on the Mount." The window is dedicated in memory of the Rev. the Hon. Edmund St. John, who died 30th September, 1884. The artists are Messrs. Mayer & Co.

**Stained Glass.**—The second of two memorial windows erected to Messrs. R. W. Winfield & Co., successors to Camm Brothers, of Cambridge-street, Birmingham, has just been fixed in Elstow St. James Church. The first illustrates "The Progress of the Second," "The Holy Spirit." In the centre light is represented the figure of Mansoul, and on the right-hand side a banner with his officers and army, and on opposite Diabolus and his chiefs and army, banners, &c. In the tracery are indicated officers of Immanuel's army, with their

varied ensigns. The window was designed by Mr. T. W. Camm.

**Stained Glass.**—The four-light south transept window of St. James's Church, Swansea, has just been filled with Munich stained glass in memory of the late Mr. J. C. Richardson. The subjects selected are the Acts of Mercy, in recognition of his well-known charity. The work has been executed by Messrs. Mayer & Co.

**Dalton-in-Furness.**—A stained-glass window has been placed in the west end of Dalton Parish Church by the mineral tenants in the manor of Plain Furness, to the memory of the late Duke of Buccleuch and Queensberry, K.G. The window is by Messrs. Burlison & Grylls (who provided the east window) of Newman-street, Oxford-street. The canopy contains angels with scrolls, the tracery being filled in with glass of good design. The centre compartment has a figure of the Baptist, and beneath is a representation of the Deluge and Moses dividing the Red Sea. The right-hand compartment contains the baptism of the Ethiopian eunuch by St. Philip, and the baptism of Cornelius by St. Peter, the lowest figure being Moses, with the two tables of stone. The left hand contains the figures of St. John the Baptist and his two disciples, to whom he points out Jesus as the Lamb of God; also the figures of St. Paul and St. Barnabas baptising Lydia and her family, the lowest figure being that of Noah with scroll.

## RECENT SALES OF PROPERTY.

### ESTATE EXCHANGE REPORT.

Oct. 3.  
By J. G. ROBINSON & SON.  
Saffron Walden.—Freehold house and nursery grounds, 1a, 3r, 6p. £750

Oct. 5.  
By WAGSTAFF & WARMAN.  
Barnsbury.—125, 195, and 197, Liverpool-road, 14 years, ground-rent 201. 0s. 675  
7, 9, and 10, Stonedfield-terrace, 20 years, ground-rent 182. 14s. 930  
10, Cloudey-square, 16 years, ground-rent 71. 230

Oct. 6.  
By C. & H. WHITE.  
Walworth.—113, Lorrimer-road, 68 years, ground-rent 61. 375  
Keonington.—102, Upper Keonington-lane, freehold 700

By H. C. SYMON.  
Lambeth.—134, Belvedere-road, and 24, Tennis-street, 38 years, ground-rent 101. 610  
25 and 26, Tennis-street, 38 years, ground-rent 141. 950

By H. W. RAFFELL.  
Southend.—A plot of cypress land 200  
By DRYDEN & CO.  
Kew Green.—The residence known as "Beaconsfield" 1,200  
Soho.—6, Rupert-street, freehold. 2,075

Sussex, near Pulborough.—Freehold woodland, 8a, 1r, 2p. 270  
The reversion to a majority of 2,9107, life aged 73 years 675

By SALTER, REX, & CO.  
Chalk Farm.—10, 12, 16, and 17, Hartland-road, 45 years, ground-rent 172. 905  
Camden Town.—225 and 227, Arlington-road, 27 years, ground-rent 101. 335

By H. C. T.  
Haverstock Hill.—28 and 29, Duke's-terrace 64 years, ground-rent 122. 680  
By Messrs. WILLMOTT.  
Uxbridge-road.—5, Blomfield-road, 80 years, ground-rent 81. 605

By T. G. WILKINSON & SHERKIN.  
Wimbledon.—13, Spencer-hill, 84 years, ground-rent 201. 750  
Finchley.—1 and 2, Leicester-villas, 90 years, ground-rent 51. 10s. 250

By HOBSON, RICHARDS, & CO.  
Battersea.—25 to 29, Francis-street, 66 years, ground-rent 161. 595  
Brixton.—38, 39, and 40, Poplar-walk-road, 80 years, ground-rent 161. 750  
20, Poplar-walk-road, 80 years, ground-rent 41. 10s. 250

By A. & A. FIELD.  
Hackney, Amhurst-road.—"Grafton House," 73 years, ground-rent 131. 1,530  
Spitalfields.—17, Princes-street, freehold 1,430

By BAKER, PAYNE, & LEPPE.  
Bromley, Kent.—Somerton Lodge, and a plot of land, freehold. 1,800  
Knockholt.—Twenty-five plots of freehold land 1,070

By E. STIMSON.  
Bermundsey.—38 to 39, Ernest-street, 33 years, ground-rent 111. 8s. 845  
1 to 9, Nelson-street, and 15 and 16, West-street, 72 years, ground-rent 94. 1,400  
17 to 23 and 30 to 36, West-street, 72 years, ground-rent 731. 1,005

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17 to 23 and 30 to 36, West-street, 72 years, ground-rent 731. 1,005

By BAKER, PAYNE, & LEPPE.  
Bromley, Kent.—Somerton Lodge, and a plot of land, freehold. 1,800  
Knockholt.—Twenty-five plots of freehold land 1,070

West Dulwich.—18 and 20, Chancellor-road, freehold 2,600  
Lower Norwood.—25, High-street, 80 years, ground-rent 61. 300

By A. WARREN.  
Bermundsey.—9 to 13, Melior-street, freehold. 865  
15, 19, and 35, Kinnross-street, 23 years, ground-rent 81. 13s. 280

By C. C. & T. MOORE.  
Bethnal Green.—241, Globe-road, 59 years, ground-rent 12. 300  
Bow.—12, Malmesbury-road, 87 years, ground-rent 41. 345

By F. HARRIS.  
Lee.—33, 35, and 42, Boone-street, freehold. 1,095  
East Greenwich.—24, Calvert-road, freehold. 295  
Woolwich-road.—A plot of freehold land 220

## MEETINGS.

SATURDAY, OCTOBER 17.  
Association of Municipal and Sanitary Engineers.—Horse County District Meeting at Bournemouth, 11 a.m.  
WEDNESDAY, OCTOBER 21.  
Builders' Foremen and Clerks of Works Institution.—Quarterly Meeting of Members. 8.30 p.m.

FRIDAY, OCTOBER 23.  
Architectural Association.—Mr. C. R. Pink, President, will deliver his opening Address. 7.30 p.m.  
University College.—Professor C. T. Newton on "Greek Inscriptions." 11. 4 p.m.

## Miscellaneous.

**Technical Education in Manchester.**—The thirtieth session of the Manchester Association of Employers, Foremen, and Draughtsmen was opened at the Technical School, Princess-street, on Saturday evening last, with an address by Mr. William Mather, C.E., of Salford, on "The relation of technical instruction to the progress of engineering and kindred trades in the future." Mr. W. H. Bailey, President of the Association, occupied the chair, and, in the course of his remarks he said that although technical education was now taking a prominent place, this Association had for over a quarter of a century been providing such education to members at its own expense. Mr. Mather said the subject of his address had not received the attention it deserved in England. How was it we were still talking about holding our own, about still keeping the lead, when a few years ago we were not conscious of competitors, and scarcely descended to notice the changes that were reducing the distance between us and those who entered the field long afterwards, heavily handicapped by many disadvantages? He was aware that there was a "Jingoism" in the mechanical and engineering trades just as well as in politics, but we were bound to admit that our neighbours were greatly superior to us in technical knowledge, in order to account for the inequality that now existed. He firmly believed that a larger interest on the part of employers and the middle classes generally was all we needed in this country, in order to develop more rapidly the necessary changes required in our elementary schools. We required more ample provision for secondary education in which sciences should have the most prominent place, leading up to high-class technical schools, each having its special character and purpose.

**Inland Navigation.**—At the ordinary monthly meeting of the Council of the Railway and Canal Traders' Association, held at the Offices, Eastcheap-buildings, E.C., on the 7th inst., the necessity of improving our inland navigation and the vital importance of cheaper transit to the Midland districts were considered, when it was resolved:—That a letter be written to the Corporation of Peterborough urging the necessity of improving the River Nene navigation to that town, apart from the necessity of preventing the flooding of the Fens; and, that a similar letter be sent to the Severn Commissioners urging that the proposed deepening of the latter navigation (at very small cost) between Gloucester, Worcester, and Stourport be proceeded with; and further, that a memorial be sent to the Royal Commissioners appointed to inquire into the Depression in Trade, expressing the opinion of this Council that trade in England is most unfavourably affected by the inadequate and restricted condition of our inland navigations.

**Registering Turnstiles.**—Messrs. Isler & Co. have secured the contract from the Australian Government for their improved patent registering turnstiles, for the race-courses.



**Leeds and Yorkshire Architectural Society.**—The opening address in connexion with the Leeds Architectural Society was given on Monday evening by the President (Mr. J. W. Connon, F.R.I.B.A.). He said that in meeting again for the commencement of another year's work, and for a comparison of the past year's experience, they found little upon which they could congratulate themselves in the condition of the trades upon whose prosperity their profession depended. Building operations had been of an unimportant character and limited in number, providing mostly only for immediate needs, seldom for future wants. The quiescent condition of the building industries for the past few years left little to be recorded concerning new erections in Leeds. The following prizes were presented during the evening:—1. A silver medal, given annually by the society, and 5l. 5s. by the President, was awarded to Joseph Rhodes for the best set of drawings illustrating Skelton Church; and a similar medal in bronze to Joseph Hall, for drawings of the same subject. 2. A prize of 3l. 3s., awarded to Charles Barker Howdill, for the best drawings illustrating roof construction. 3. A prize of 2l. 2s. for a design for a monument to a statesman, and a prize of 2l. 2s. for a set of drawings at the evening class of design. These two prizes were awarded to Fred Mitchell. 4. A prize of 1l. 1s., given by Major R. W. Moore, was awarded to Francis William Bedford, for the best set of drawings done by an Associate of the Society at any Art School in the town. 5. A prize of 2l. 2s., offered by Mr. J. W. Connon, for the best work done by members of the Associates' Sketching Club, was awarded to Alfred Whitehead.

**The Strand Ratepayers and their Assessments.**—A public meeting of the ratepayers of the parish of St. Martin-in-the-Fields, in the Strand Union, was held on Tuesday afternoon, at Exeter Hall, for the purpose of protesting against the recent heavy increase in their rating. Mr. E. J. Watherston occupied the chair. Mr. Robert Walker, architect and surveyor, moved the following resolution:—"This meeting protests against the action of the Assessment Committee in issuing nearly nine hundred fresh notices of largely-increased assessments, after the assessment appeals on the list prepared by the overseers have been heard and settled, and after the time fixed by law for the revision of the Valuation List, and calls upon them to withdraw such notices, there being no substantial grounds for the increase, as the value of property has lately decreased in the parish, on account of the continued depression in trade and the incomplete state of the new streets now being slowly carried out at Charing-cross." This and other resolutions were agreed to.

**The Proposed Tower Bridge.**—At the last meeting of the Court of Common Council, Mr. T. Beard, Chairman of the Bridge House Estates Committee, had secured a place on the agenda for a report, recommending that Mr. Horace Jones, City Architect, should be appointed the architect for the erection and construction of the Tower Bridge; that Mr. J. Wolfe Barry, civil engineer, should be associated with him in carrying out the work; and that the sum of 30,000l. should be paid to them, in such proportions as they might mutually agree upon, for their services in respect thereof, such sum to include the salaries and expenses of all superintendents and clerks of works. Mr. Beard was anxious that consideration of the report should be proceeded with, but the majority of the Court held that the matter was of such importance that the report should be printed and considered at the next meeting.

**Temple Bar.**—We are glad to see that at the last meeting of the Common Council the absurd proposal of the City Lands Committee to erect Temple Bar as an entrance to the Albert Palace at Battersea was withdrawn. In the course of the discussion, Mr. H. H. Bridgman named the Embankment end of Middle Temple-lane as a suitable site, and Major Joseph expressed the hope that the remains of the Bar would not be taken outside the City.

**Technical Education.**—The preliminary lecture of a course on science of construction was delivered gratis at Exeter Hall on the 9th inst. by Mr. T. G. Gribble, A.-M.I.C.E., of the Metropolitan Board of Works. The lecture was well attended. The course itself commences this Friday, October 16th. Particulars may be obtained from the Secretary, Exeter Hall.

**The American Forestry Congress.**—The proceedings at the meeting of the American Forestry Congress, at Boston, on the 22nd of last month, show that the Americans are fully alive to the importance of husbanding the splendid supply of timber still at the disposal of the United States. The invitation to the meeting stated that the natural source of a yearly product of \$700,000,000, which the American forests at present represent, deserves careful husbanding with the view to its continuity, and calls for due consideration of its interests by the Legislature as well as by the people at large. Without indulging in the cries of alarmists, the conveners of the Congress have good reasons and sufficient data for asserting that the present policy, if continued, must seriously affect this factor of wealth at no distant time. They are equally justified in stating that, in view of the far-reaching influences exerted by the forests, wastefulness in the methods of lumbering and reckless destruction by fires have become criminal. The American Government has therefore been requested to pursue a wise and conservative policy in regard to its own forest lands, consisting still, at the present time, of 85,000,000 acres. The questions which have been discussed by the Congress, including the importance of forests in climatic and hydraulic respects; the duties and rights of the State to protect its forest resources; the causes of forest fires, and the way to restrict them; education and research in forestry matters; practical forestry, all prove that its work was thoroughly practical, and may lead to some good results.—*Iron.*

**Belgian Rolled Iron Girders.**—"A Looker On," in a letter to the editor of the *Liverpool Courier*, asks whose fault it is that at the present day it should be necessary to go to Belgium for this particular kind of manufactured iron. He answers the question thus:—"In my opinion the blame must be divided between our ironmasters and their workmen. The former have shown a lamentable want of skill and enterprise in failing to provide themselves with improved machinery and plant to meet the requirements of the day, and have allowed their competitors in Belgium to outstrip them in the production and manipulation of novel forms of rolled iron. Twenty-three years ago I warned them publicly through the *Times* that it was high time they roused themselves from their apathy, but to vary little purpose, if it be true, as you state, that Belgian girders can still be delivered into the heart of England at a cheaper price than British rolling mills are willing to accept. Then, as to the workmen, it is within my own knowledge in former years that whenever the masters desired to introduce any improvements, or to vary the old routine in any way, they were met by the greatest obstruction and claims made for 'extra' wages, compelling the masters to increase the price beyond all reason. In Belgium and France it is just the reverse; and hence, by our own pig-headedness, we have been stimulating the manufactures of our continental rivals."

**Insanitary Condition of a School-keeper's House.**—At the last meeting of the Shoreditch Vestry, Mr. Hugh Alexander, the Chief Sanitary Inspector, presented a report describing the insanitary condition of a house belonging to the School Board for London, and occupied by the caretaker of the Hammond-square Board School. It seems that the house was built some eight or nine years ago on the site of some old cottages and their water-closets, and over an old drain which was not removed. There had been much sickness in the house, and one child had died of typhoid fever. The Vestry resolved to make an order on the School Board to completely overhaul the basement of the house.

**The Josiah Mason College, Birmingham.** Messrs. J. L. Bacon & Co. request permission to state that the allusion to the defective result of the heating of the Josiah Mason College, in our report of the lecture of Mr. E. C. Robins, F.S.A., on p. 453, ante, is, by the context, calculated to lead to the impression that the work was done by their firm, whereas such was not the case.

**District Surveyorship.**—Mr. A. O. Collard, who has been for some time in Mr. Villiamy's department at the Board of Works, and was formerly a pupil of Mr. Blashill, is a candidate for the office of Surveyor to the parishes of Lee and Kidbrook, which is in the hands of the Plumstead District Board of Works.

**Royal Cornwall Polytechnic Society Exhibition.**—At this exhibition, lately open at Falmouth, Mr. Harry Hems, of Exeter, exhibited some 300 photographs of work he has carried out from time to time during the past three years. Conspicuous amongst them was an interesting series of life-size statues which Mr. Hems is commissioned to execute at St. Alban's Abbey. Others illustrated some of the work at the new church of St. Peter's Fisherman, which Lord Revelstoke has recently built in the village from which he takes his title. Besides the photographs, Mr. Hems exhibited a font cover of English oak, particularly noticeable for the ornaments of the hammered ironwork upon it. The cover is intended for the church of the Holy Cross at Newt, Falmouth, now under restoration from the design of Mr. G. H. Fellowes-Prynn, A.R.I.B.A., London. Mr. Hems has been awarded (for the third time) the silver medal of the Society.

**Sanitary Assurance Association.**—The monthly meeting of the Council of the Association on Monday last, Sir Joseph Payne, K.C.S.I., F.R.S., in the chair, it was resolved, on the motion of Mr. Mark H. Judge, A.R.I.B.A., seconded by Mr. Andrew Stirling, to arrange for another series of free lectures on sanitary subjects during the coming winter. Professor Roger Smith, F.R.I.B.A., will deliver one of the series.

**Bromley.**—The Bromley Local Board, at their meeting on the 13th inst., unanimously resolved to make an addition of 50l. per annum to the salary of their Surveyor, Mr. Hugh Crogeen.

#### PRICES CURRENT OF MATERIALS.

| TIMBER.                                    |             | £. | s. | d. | £. | s. | d. |
|--------------------------------------------|-------------|----|----|----|----|----|----|
| Greenheart, B.G.                           | .....ton    | 8  | 10 | 0  | 7  | 10 | 0  |
| Teak, B.L.                                 | .....load   | 12 | 10 | 0  | 15 | 10 | 0  |
| Sesuvium, U.S.                             | .....cub    | 0  | 2  | 6  | 0  | 3  | 0  |
| Ash, Canada                                | .....load   | 3  | 0  | 0  | 5  | 0  | 0  |
| Birch                                      | .....       | 3  | 0  | 0  | 4  | 10 | 0  |
| Elm                                        | .....       | 3  | 10 | 0  | 5  | 0  | 0  |
| Fir, Dantisc                               | .....       | 1  | 10 | 0  | 4  | 10 | 0  |
| Oak                                        | .....       | 3  | 0  | 0  | 5  | 0  | 0  |
| Canada                                     | .....       | 6  | 0  | 0  | 7  | 0  | 0  |
| Pine                                       | .....       | 3  | 0  | 0  | 4  | 0  | 0  |
| Lath, Dantisc                              | .....fathom | 5  | 0  | 0  | 0  | 0  | 0  |
| St. Petersburg                             | .....       | 5  | 0  | 0  | 7  | 0  | 0  |
| Wasscott, Riga                             | .....       | 3  | 0  | 0  | 17 | 0  | 0  |
| Deals, Finland, 2nd and 1st, std. 100      | .....       | 6  | 10 | 0  | 7  | 10 | 0  |
| " 4th and 3rd                              | .....       | 7  | 0  | 0  | 8  | 10 | 0  |
| Riga                                       | .....       | 6  | 10 | 0  | 7  | 10 | 0  |
| St. Petersburg                             | .....       | 8  | 0  | 0  | 9  | 15 | 0  |
| " 2nd                                      | .....       | 6  | 10 | 0  | 11 | 0  | 0  |
| " white                                    | .....       | 7  | 0  | 0  | 17 | 0  | 0  |
| White Sea                                  | .....       | 6  | 10 | 0  | 17 | 0  | 0  |
| Canada, Pine 1st                           | .....       | 18 | 0  | 0  | 32 | 10 | 0  |
| " 2nd                                      | .....       | 12 | 0  | 0  | 18 | 10 | 0  |
| " 3rd                                      | .....       | 7  | 0  | 0  | 10 | 10 | 0  |
| " Spruce 1st                               | .....       | 9  | 0  | 0  | 13 | 0  | 0  |
| " 3rd and 2nd                              | .....       | 6  | 10 | 0  | 8  | 0  | 0  |
| New Brunswick, &c.                         | .....       | 5  | 0  | 0  | 7  | 10 | 0  |
| Battens, all kinds                         | .....       | 4  | 0  | 0  | 13 | 0  | 0  |
| Flooring Boards, sq. 1 in.—Prepared, first | .....       | 0  | 9  | 0  | 0  | 15 | 0  |
| Second                                     | .....       | 0  | 7  | 8  | 0  | 8  | 0  |
| Other qualities                            | .....       | 0  | 5  | 0  | 0  | 0  | 0  |
| Cedar, Cuba                                | .....foot   | 0  | 9  | 3  | 0  | 0  | 0  |
| Honduras, &c.                              | .....       | 0  | 0  | 3  | 0  | 0  | 0  |
| Australian                                 | .....       | 0  | 0  | 3  | 0  | 0  | 0  |
| Mahogany, Cuba                             | .....       | 0  | 0  | 5  | 0  | 0  | 0  |
| St. Domingo cargo av.                      | .....       | 0  | 0  | 4  | 0  | 0  | 0  |
| Mexican                                    | .....       | 0  | 0  | 4  | 0  | 0  | 0  |
| Tobacco                                    | .....       | 0  | 0  | 4  | 0  | 0  | 0  |
| Honduras                                   | .....       | 0  | 0  | 4  | 0  | 0  | 0  |
| Rose, Rio                                  | .....ton    | 7  | 0  | 0  | 17 | 0  | 0  |
| Bahia                                      | .....       | 0  | 0  | 15 | 0  | 0  | 0  |
| Satin, St. Domingo                         | .....R.     | 0  | 0  | 8  | 0  | 0  | 0  |
| Porto Rico                                 | .....       | 0  | 0  | 8  | 0  | 0  | 0  |
| Walnut, Italian                            | .....       | 0  | 0  | 4  | 0  | 0  | 0  |
| METALS.                                    |             |    |    |    |    |    |    |
| Iron—Pig in Scotland                       | .....ton    | 2  | 2  | 6  | 0  | 0  | 0  |
| Bar, Welsh, in London                      | .....       | 4  | 15 | 0  | 5  | 3  | 0  |
| " " in Wales                               | .....       | 4  | 7  | 6  | 4  | 12 | 0  |
| " " Staffordshire, London                  | .....       | 4  | 0  | 0  | 7  | 0  | 0  |
| Sheets, single, in London                  | .....       | 7  | 10 | 0  | 9  | 0  | 0  |
| Hoops                                      | .....       | 6  | 10 | 0  | 7  | 10 | 0  |
| Nail-roads                                 | .....       | 8  | 0  | 0  | 7  | 0  | 0  |
| COPIES.                                    |             |    |    |    |    |    |    |
| British, cke. and ingt.                    | .....ton    | 43 | 10 | 0  | 44 | 10 | 0  |
| Best selected                              | .....       | 45 | 0  | 0  | 46 | 0  | 0  |
| Sheets, strong                             | .....       | 52 | 0  | 0  | 0  | 0  | 0  |
| " " India                                  | .....       | 0  | 0  | 0  | 0  | 0  | 0  |
| Australian, fine cash.                     | .....       | 0  | 0  | 0  | 0  | 0  | 0  |
| Chili, bars                                | .....       | 39 | 7  | 6  | 60 | 0  | 0  |
| YELLOW METAL.                              |             |    |    |    |    |    |    |
| Lead—Pig, Spanish                          | .....lb.    | 0  | 0  | 4  | 0  | 0  | 0  |
| English, com. brands                       | .....       | 11 | 5  | 0  | 0  | 0  | 0  |
| Spanish                                    | .....       | 11 | 10 | 0  | 0  | 0  | 0  |
| SPALTS.                                    |             |    |    |    |    |    |    |
| Silesian, special                          | .....ton    | 14 | 7  | 6  | 14 | 10 | 0  |
| Ordinary brands                            | .....       | 14 | 2  | 6  | 14 | 5  | 0  |
| TIN.                                       |             |    |    |    |    |    |    |
| Straits                                    | .....       | 61 | 10 | 0  | 62 | 0  | 0  |
| Australian                                 | .....       | 60 | 10 | 0  | 61 | 0  | 0  |
| English ingots                             | .....       | 63 | 0  | 0  | 0  | 0  | 0  |
| TINPLATES.                                 |             |    |    |    |    |    |    |
| IC coke                                    | .....box    | 14 | 8  | 0  | 16 | 8  | 0  |
| IX ditto                                   | .....       | 21 | 5  | 0  | 0  | 0  | 0  |
| IC charcoal                                | .....       | 6  | 0  | 0  | 20 | 0  | 0  |
| IX ditto                                   | .....       | 26 | 8  | 0  | 27 | 0  | 0  |



| OILS.                 | £. s. d. | 2 s. d. |
|-----------------------|----------|---------|
| at, Cochlin .....     | 31 0 0   | 24 0 0  |
| at .....              | 27 15 0  | 32 0 0  |
| at .....              | 28 10 0  | 32 0 0  |
| at .....              | 30 0 0   | 32 0 0  |
| at Kernel .....       | 28 6 0   | 0 0 0   |
| at English pale ..... | 25 15 0  | 0 0 0   |
| at brown .....        | 23 5 0   | 0 0 0   |

| OILS (continued).         | £. s. d. | 2 s. d. |
|---------------------------|----------|---------|
| Cottonseed, refined ..... | 21 5 0   | 23 0 0  |
| Tallow and Oleine .....   | 25 0 0   | 45 0 0  |
| Lubricating, U.S. ....    | 7 0 0    | 10 0 0  |
| Refined .....             | 8 0 0    | 15 0 0  |
| TRANSPORT .....           |          |         |
| American, in cwt. ....    | 1 6 8    | 1 6 8   |
| Tar-Stockholm .....       | 0 11 6   | 1 0 0   |
| Archangel .....           | 0 11 6   | 1 0 0   |

|                                                                                                                                                                                                                |            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| HULL.—For the erection of a Board school in South Parade, Hull, for the Kingston-upon-Hull School Board. Mr. William Botterill, architect to the Board, Parliament-street, Hull. Quantities by the architect:— |            |
| J. Drury .....                                                                                                                                                                                                 | 29,681 0 0 |
| R. Sergeant .....                                                                                                                                                                                              | 6,622 0 0  |
| J. T. Skinner .....                                                                                                                                                                                            | 6,380 0 0  |
| Danceley & Son .....                                                                                                                                                                                           | 6,307 0 0  |
| Dalby & Son .....                                                                                                                                                                                              | 6,289 0 0  |
| J. Ward .....                                                                                                                                                                                                  | 6,241 0 0  |
| J. F. Freeman .....                                                                                                                                                                                            | 6,199 16 2 |
| W. Lison .....                                                                                                                                                                                                 | 6,194 8 0  |
| Hockney & Liggins .....                                                                                                                                                                                        | 6,135 0 0  |
| B. Muegrave .....                                                                                                                                                                                              | 5,098 0 0  |
| P. Peilby .....                                                                                                                                                                                                | 6,068 0 0  |
| M. Harper .....                                                                                                                                                                                                | 6,027 10 0 |
| G. W. Stephenson .....                                                                                                                                                                                         | 5,946 11 6 |
| Executors of T. Southern .....                                                                                                                                                                                 | 5,932 10 0 |
| Jackson & Son (accepted) .....                                                                                                                                                                                 | 5,900 0 0  |

# COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Extrane of Advertisements in this Number.

## COMPETITIONS.

| Nature of Work. | By whom required.       | Premium.      | Designs to be delivered. | Page. |
|-----------------|-------------------------|---------------|--------------------------|-------|
| to Scheme ..... | Walton-le-Dale Lcl. Bd. | 50Z. and 30Z. | Jan. 31st                | ii.   |

## CONTRACTS.

| Nature of Work, or Materials.         | By whom required.              | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---------------------------------------|--------------------------------|-----------------------------------|--------------------------|-------|
| eam Flour-Mill, Warehouse, &c. ....   | The Proprietors, Silloth       | J. Taylor Scott .....             | October 20th             | ii.   |
| oring .....                           | Tottenham Local Board          | Do. Do. ....                      | do.                      | ii.   |
| Valuing, Receiving House, &c. ....    | Met. Asylums Board             | J. W. Peggs .....                 | October 26th             | xiv.  |
| Chapel, Workington .....              | Willenden Local Board          | Banks & Townsend .....            | do.                      | ii.   |
| Johnsons, Steam Roller, &c. ....      | Great Western Ry. Co.          | O. Claude Robson .....            | October 27th             | ii.   |
| Shed and Office, Carmarthen .....     | Hartlepool Corporation         | H. Hair .....                     | do.                      | ii.   |
| to Sea-Wall and Promenade .....       | Richmond (Surrey) U.S.A.       | W. Brooke .....                   | October 28th             | xiv.  |
| Drainage Works .....                  | Cardiff Corporation            | J. A. H. Williams .....           | do.                      | ii.   |
| Reservoir .....                       | Westry St. Mary, Isle of Wight | Official .....                    | October 31st             | ii.   |
| to Iron Railing and Stonework .....   | Ernmouth Local Board           | E. Cousins & Son .....            | do.                      | ii.   |
| ing Step Approaches & Erecting others | Paddington Vestry              | do. ....                          | Nov. 2nd                 | xiv.  |
| ost-Office, Windsor .....             | Com. of H.M. Works             | do. ....                          | do.                      | ii.   |
| ing Railway and Re-modelling Station  | Joint Railway                  | do. ....                          | Nov. 3rd                 | ii.   |
| Buildings and other Works .....       | Brentford Local Board          | — Lacey .....                     | do.                      | ii.   |
| ment, Strood .....                    | Rochester Corporation          | W. Backs .....                    | do.                      | ii.   |
| or Waterworks .....                   | Acton Local Board              | C. W. Lisle .....                 | do.                      | ii.   |
| uct, Thirlmere .....                  | Northwich Local Board          | H. Bancroft .....                 | Nov. 7th                 | ii.   |
| on of Villa Residence .....           | Manchester Corporat            | G. H. Hill .....                  | Nov. 17th                | ii.   |
|                                       |                                | J. H. Hillam .....                | Not stated               | xv.   |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised.     | Salary.    | Applications to be in. | Page.  |
|------------------------|-------------------------|------------|------------------------|--------|
| stant Clerk .....      | Civil Service Com. .... | Not stated | October 30th           | xviii. |

## TENDERS.

BROMPTON.—For additions and alterations to Bryn th, the residence of Mr. J. A. McInnes. Mr. Thos. St. architect.  
 Jones, Dolgeley .....

DEPTFORD.—For the erection of boiler-house, engine-house, chimney-shaft, stables, and other works, at Sun Wharf, Deptford, for the Val de Travers Asphaltic Paving Company, Limited. Mr. A. J. Bolton, surveyor:—  
 Sargeant .....

Weeks.  
 therton & Latta .....

DEPTFORD.—For erecting new additions and alterations to the Congregational Church, High-street, Deptford. Mr. Henry Cowell Boyes, architect. Quantities by Mr. L. C. Riddett, Bedford-row:—  
 H. L. Holloway (reduced estimate) \* 21,072 0 0  
 Accepted.

LATHAM.—For new music-hall, tavern, and premises, street, for the trustees of Watts's Charity. Mr. W. Nash, architect, Rochester. Quantities by the architect:—  
 Gates .....

GOSFORTH (Northumberland).—For detached villa residence at Gosforth, Northumberland, for Mr. John Morrison. Mr. Benjamin P. Simpson, architect, Jesmond, Newcastle-on-Tyne. Quantities by the architect:—  
 J. Elliot, North Shields .....

OYDON.—For alterations to the Gun Tavern, Rochester, Croydon, for Mr. C. Beaumont. Mr. H. J. architect, Queen Anne's-gate, Westminster:—  
 Walker .....

HORNSEY.—For new boundary-wall adjoining pumping station, Buryhead-road, Horney, for the Hornsey Local Board. Mr. T. de Courcy Mesde, engineer and surveyor:—  
 Barber, Highgate .....

LONDON.—For new wing and alterations to Queen Charlotte's Lying-in Hospital, Marylebone-road. Quantities by Messrs. Vinal & Kennedy, Guildford-street, Russell-square:—  
 Haylock .....

LONDON.—For sanitary arrangements and improvements at No. 20, Lowndes-square, for the Right Hon. Viscount Newport. Mr. Mark H. Judge, architect, Parkville, W.:—  
 Bartram & Son (accepted) .....

LONDON.—For the completion of two shops in the Gray's Inn-road, for Mr. Hollington. Mr. A. W. Crawley, architect:—  
 Spencer & Co. ....

LONDON.—For alterations and fittings at the Blue Posts Tavern, 2, Great Portland-street, for Mr. J. T. Smith:—  
 Williams & Son .....

NEW BROMPTON (Kent).—For the erection of the Printing-room and Assembly-room doors of the Temple of the New and Latter House of Israel. Messrs. Margetts, Son, & Co., architects, Chatham, Kent. Quantities by the architects:—  
 Contract No. 1. Contract No. 2.  
 Building. Ironwork.

NEW CROSS.—For erecting billiard-room and additions to Fairlawn, New Cross-road, for Col. Kirby. Mr. J. B. Wall, architect:—  
 M. Redman .....

NEW CROSS.—For erecting billiard-room and additions to Fairlawn, New Cross-road, for Col. Kirby. Mr. J. B. Wall, architect:—  
 M. Redman .....

**NEWPORT (Mon.).**—For the erection of two houses, Merchant, for Mr. H. E. Prosser. Mr. Geo. Rosser, architect.—  
J. Williams, Victoria-avenue, Maidens,  
Newport, Mon. (accepted). £460 0 0

**NORFOLK.**—For new wing and offices, &c., Pinkney Hall, Norfolk. Mr. Ewan Christian, architect, Whitehall-place. Quantities by Messrs. Vinal & Kennedy.—  
Bardell ..... £4,475 5 0  
Chapman ..... 4,335 0 0  
Corrish & Gaymer ..... 4,523 0 0

**PECKHAM.**—For erecting new mortuary in St. George's Churchyard, St. George's-road Peckham, for the Vestry of Camberwell. Mr. J. C. Reynolds, surveyor.—  
H. L. Holloway (reduced estimate) ... £792 0 0  
\* Accepted.

**PORTSMOUTH.**—For the erection of a sanatorium at the Portsmouth Lunatic Asylum (exclusive of heating apparatus), for the Corporation of the borough of Portsmouth. Mr. James W. Stroud, architect, Southsea. Quantities supplied by Mr. George Rake, Portsea.—  
T. Roberts ..... £3,302 3 3  
W. Ward ..... 2,290 0 0  
J. Cookerell ..... 2,176 0 0  
C. & W. R. Light ..... 2,098 0 0  
D. W. Lewis ..... 2,092 0 0  
F. White ..... 2,043 0 0  
H. Farmanier ..... 1,900 0 0  
T. Quick ..... 1,898 0 0  
T. P. Hall, Buckland, Portsmouth (accepted) ..... 1,888 14 11  
[All of Portsmouth.]

**ROCHESTER (Kent).**—For the erection of new school-room for choristers and master's residence, for the Dean and Chapter of Rochester Cathedral. Mr. J. A. Rees, architect, Great James-street, Bedford-row. Quantities by Messrs. Stonor & Son, 8, Blomfield-street, City.—  
Nightingale, London ..... £3,511 0 0  
Garrod, London ..... 3,430 0 0  
Holliday, London ..... 3,423 0 0  
Ford & Sons, Rochester ..... 3,397 0 0  
Calland & Son, Rochester ..... 3,040 0 0  
Naylor & Son, Rochester ..... 2,978 0 0

**ST. MARY CRAY (Kent).**—For the erection of a new house for Mr. Sydney Pitt, on the Waldenhurst Estate, for Mr. Heckstall Smith. Mr. A. S. Haynes, architect.—  
Knight ..... £1,549 0 0  
Crosley ..... 1,540 0 0  
Jones ..... 1,500 0 0  
Lynn & Duncan ..... 1,500 0 0  
Holliday & Greenwood ..... 1,474 0 0  
Lay (accepted) ..... 1,355 0 0  
Stebbins (withdrawn) ..... 1,236 0 0

**STEPNEY.**—For alterations and additions to the Carpenters' Arms, Ben Jonson-road, Stepney, for Mr. Clifton. Messrs. Massina, Roper, & Mead, Surveyors, Mile End-road, E.—  
Howlett ..... £231 0 0  
Lusk ..... 260 0 0  
Hale & Twiss (accepted) ..... 260 0 0

**STRATFORD (Essex).**—For new boiler-house and chimney-shaft, Marsh Gate-lane, Stratford, Essex, for Messrs. T. H. Harris & Son. Mr. J. T. Newman, architect, Fen-court, E.C. Quantities by Mr. C. Stanger, Finsbury-pavement, E.C.—  
Hack ..... £1,557 0 0  
Lawrence & Sons ..... 1,532 0 0  
Hoskings ..... 1,487 0 0  
Lase ..... 1,360 0 0  
Higgs & Hill ..... 1,344 0 0  
Reed ..... 1,283 0 0  
Hearle & Son ..... 1,283 0 0  
Gregar ..... 1,198 0 0

**WANDSWORTH.**—For fittings at the new workhouse, Garratt-lane, Wandsworth, for the Guardians of the Wandsworth and Clapham Union. Mr. T. W. Aldwinckle, architect, East India-avenue, Leadenhall-street.—  
Holloway ..... £3,600 0 0  
Spencer & Co. .... 2,508 0 0  
Gibbs & Frew ..... 2,355 0 0  
Butler ..... 2,325 0 0  
Midland Joinery Company ..... 2,198 0 0  
Kirk & Randall (accepted) ..... 2,144 0 0

**WANDSWORTH.**—For the construction of roads, sewers, and boundary walls, at the new Workhouse, Garratt-lane, for the Guardians of the Wandsworth and Clapham Union. Mr. Theo. W. Aldwinckle, architect, East India-avenue, Leadenhall-street. Quantities by Mr. Clement Dowling:—

|                        | Estimate No. 1. | Estimate No. 2. | Estimate No. 3. |
|------------------------|-----------------|-----------------|-----------------|
| Trehearne & Co.        | £3,881          | £2,696          | £2,719          |
| Bell                   | 3,623           | 698             | 729             |
| Wilson                 | 3,574           | 549             | 536             |
| Chafen                 | 3,250           | 625             | 650             |
| Bath & Blackmore       | 3,219           | 614             | 601             |
| Nowell & Robson        | 3,173           | 630             | 625             |
| Howard                 | 3,005           | 647             | 671             |
| Neal                   | 2,995           | 642             | 666             |
| Kirk & Randall         | 2,778           | 670             | 695             |
| Perill & Sons          | 2,830           | 493             | 528             |
| Marshall               | 2,787           | 603             | 625             |
| Kirk Bros.             | 2,650           | 494             | 510             |
| Mayo                   | 2,670           | 445             | 480             |
| Killingback (accepted) | 2,518           | 463             | 486             |
| Harris                 | 1,719           | 642             | 654             |

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#### TO CORRESPONDENTS.

W. M.—G. C. & F. H. (we have long ago declined answering inquiries of that kind, as noticed in our issue of 11th inst.). H. D. & Co.—G. I. & Co.—R. F. C.—W. (it is purely legal question, and we can only advise you to consult a lawyer. We never take the responsibility of advising in such cases. A. (last week). T. W. A.—H. A.—H. S. C.—S. & Co.—R. E. and H. B. S. (shall appear).—W. & E. (out of date, the exhibition having closed last week).

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We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

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# The Builder.

Vol. XLIX. No 2269

SATURDAY, OCTOBER 24, 1885.

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### Glasgow Underground Railway.

**T**HE City of Glasgow is about to be partly freed from a long-standing disability on the score of intra-mural railway accommodation. Works in progress since the spring of 1883, and now almost completed, will provide it with a cut of double-track railway, clear from eastern to western outskirts, through portions of the oldest and most densely-built-upon sections of the town. Recent and existing conditions of railway enterprise in Glasgow may, in some sort, be likened to those which in London, twenty years ago, stimulated in the construction of the Metropolitan Railway from the Great Western metals. Farringdon-street, and subsequently led a piercing of the Metropolis in other directions. Glasgow, in form and situation, and its railway history so far, bears a striking resemblance to London. The greater part of it lies on the north bank of the river, which it is intersected. The nucleus, that is to say, the city proper, is contiguous to Glasgow Bridge, which, like London Bridge, the highest crossing of that kind above the open-sea navigation. Its fashionable quarters read away to the west also, and to the east like manner lie the poorer settlements, with, beyond, a far-stretching suburban industrial range, which is a pretty close counterpart, in fact, if not in bulk, to the extreme eastern regions of the metropolis. In dimensions and make-up south-side Glasgow bears much the same relation to its northern *vis-à-vis* as over-ridge London does to London proper. There is one outstanding flaw in the parallel, and that is, that while the Thames flows eastward to the German Ocean, and London has its docks, wharfs, and shipping clustering in that section, the Clyde pursues a westward course to the Atlantic, and navigable Glasgow waters, with docks, quays, and shipping, are found in the westerly quarter, separated by a slight fringe of ship-building activity only from the fashionable residential burbs. For railway purposes,—that is to say, any scale worth noticing,—Glasgow, on the north side and when barely one-third of its present extent, was first partially pierced by the Edinburgh and Glasgow line (now a leading line of the North British system), which, by means of a tunnel on a steep incline from the high ground to the north, found terminal lodgment at the extremity of Queen-street, well within the city boundary, though still at some distance from the then central point of the

place. The Greenock, Paisley, and Glasgow Railway made its way in on the south side of the river, and fixed its original terminus at the southern abutment of Glasgow Bridge, in precisely the same manner as that in which London Bridge Station first came into existence. On the north side the Caledonian followed the example of the Edinburgh and Glasgow, and in constructing the chief pioneer of its now extensive system, fixed its Glasgow depot just within the then northern limit of the city, at the extremity of Buchanan-street, a point rather less well advanced than in the case of the other. A second trunk line came in also on the south side, farther to the east; and, in due time, on the north side a third pierced the outer rim direct from the east, and erected its station on the east side of the old College in High-street.

All the while no line came in direct from the west on the northern side of the river, though numerous have been the schemes propounded to this end. One, the Stobcross Harbour spur, did wriggle itself in tortuously on to the docks and quays which crowd the banks of the river as it leaves the city, but it was not designed to be anything more than a mere mineral freight feeder for the waterside. Coast traffic by rail on the right bank of the Clyde had to find entrance round to the north, by way of the Edinburgh and Glasgow tunnel, into Queen-street, a circuitous method at the best, and fatally liable to frequent blockings of traffic. These conditions rather closely paralleled those of London in pre-Metropolitan times, with this important difference, that north-side Glasgow had no passenger line coming in direct from the west. It had no Paddington Station; and in this anomalous state the western quarter has remained up to now, although at last within view of accomplished remedy. Meanwhile the two chief south-side lines, following the London example, managed to cross the river after a large outlay in money and engineering skill, taking up admirable central quarters at Gordon-street and St. Enoch's-square respectively. With it all, however, the city, in its railway equipment, remained incomplete, as yet on no section and at no point pierced through and through. Western Glasgow is still destitute of railway accommodation in a very notable degree, and traffic from east to west, and *vice-versa*, is unprovided for except in a roundabout and primitive manner.

After various delusive schemes had been fruitlessly aired, a definite project was at last determinedly pushed forward, and finally, the Glasgow, City, and District Railway Act received crowning assent in August, 1882. Active operations were commenced in the spring of 1883, and, considering the nature of

the work, it may now be said that a very high rate of progress has continued to be realised throughout. Briefly, the new enterprise undertakes to connect east and west Glasgow by a direct line from College Station on the east to a junction with the existing railway metals on the west, thus providing unimpeded entrance from either side, and through-going passage on a comparatively straight route. The track, which is a double one, with multiplied rail conveniences and platforms at the principal stations, is for the most part in tunnelling, advantage being taken of two building-clad eminences or ridges, which occupy the northern-central parts of the town, and through which the necessary passage has been pierced without greatly affecting the property aloft. A portion of it follows the line of, and is immediately beneath, the street, which had to be opened up bodily and afterwards re-made on the top of the brick arching, so that, properly speaking, the work here is in covered way rather than in tunnel. Some house property had to be taken down, but this bulked very lightly indeed, considering the length of the cutting and the essentially urban character of the area traversed. In its course westward the line catches up Queen-street terminus and passes immediately underneath it, the station for the new railway,—its principal station,—forming a kind of underground cross-section of the other, 18 ft. below it, and carrying through the intersection as near as may be at right angles. The length of the railway which thus effects the piercing of Glasgow from east to west on one of its most densely-built lines is two miles and a half, of which one and three-quarters is in tunnelling or covered way, the rest being open cutting, side-lined with retaining masonry of massive kind. From College Station to Queen-street the work is almost wholly in tunnelling, with a fall of 1 in 200. From Queen-street to Elmbank-crescent (the site of a new station, which is threatened with, for Glasgow, the ridiculously far-fetched title of "Charing-cross") the route is entirely in tunnelling, with Blythswood-hill overtop, Blythswood-square, the summit thereof, being passed at a depth of 96 ft., the greatest of any experienced. The gradient on this section is changed to a rise of 1 in 200, the summit level of the works being reached at the crescent named. On a resumed fall of 1 in 200 the line from Elmbank-crescent proceeds along Kent-road in covered way to Dumbarton-road, at which crossing is placed the second of the new stations. At this point the work emerges finally into open cutting, and ascends 1 in 88 to its junction with the old Stobcross line, by which an outlet is had into Dumbarton-shire on the west. The undertaking thus briefly described may be said to be finished



in outline at least. At the time of greatest activity 1,000 men were employed at the various points of attack, but the number now is greatly lessened, station building and some limited excavation and debris clearing being all that remains uncompleted, nearly the whole of the permanent way being already in position. The contractors experienced no little difficulty with certain subsoils of a more or less treacherous consistency, composed of mixed shifting or softly running sand and mud in combination with water. As a set-off, however, much of the solid cutting was through an excellent freestone which answered admirably for much of the heavy masonry required along the line. The record of the operations, so far, is singularly free of mishap. No life has been lost, and but few accidents have taken place. The building property passed without purchase has not been affected in any degree, except in the case of one corner block at the crossing of George-street and another at the corner of North-street and Kent-road, some underpinning having been necessary at the latter, and a somewhat protracted shoring at the other. As for the enclosure of the tract itself, the semicircular roof of the tunnel is composed, uniformly, of six rings of bricks, on these being superadded a covering of concrete wherever the excavation has been through mud or running sand. The foundation on which the rail sleepers rest is invariably of concrete except where the footing is natural rock. It is worthy of note that the old and recently enlarged Queen-street Station, with its heavy hourly burden of traffic, has been undermined, and the new subterranean station, three platforms and four pairs of rails broad, constructed within the excavation thereby won, without appreciably delaying the ordinary arrivals and departures or inflicting damage of any kind; and this although some of the pillars supporting the great glass roof of the structure overhead had to be cut and manipulated *in situ* after a somewhat free-and-easy fashion. College Station, so long a terminal, becomes an intermediate at a point a few yards to the north of the existing site. The last vestiges of the original home of Glasgow University will by that time have disappeared, the much-admired old High-street façade, which since the college area became a railway station has done duty as passenger entrance, being happily destined, however, to bodily removal for re-erection on a suitable site within the new territory of the university at Gilmore-hill. This gratifying conservation in the interests of archaeological sentiment is due to the forethought and munificence of Mr. W. Pearce, of the great Clyde firm of Elder & Co., at whose suggestion and sole cost the removal is to be carried out.

The new City railway, with the adjunct of a short connecting fork beyond the bounds (to be mentioned in more detail presently), besides furnishing uninterrupted communication westwards with Glasgow itself, will afford greatly improved access from Edinburgh and the South *via* the Bathgate and Airdrie section of the North British system, carrying the traffic right through Glasgow and down to Dumfries, Helensburgh, and the coast on the one hand, and to the Vale of Leven, Balloch, and Loch Lomond on the other, by lines which may be fairly described as straight when compared with the routes which have preceded it. The steep tunnel leading in to Queen-street, with its tedious wire rope auxiliary, already overburdened and chronically liable to congestion, will be relieved of just sufficient of the too heavy call upon it to ensure a comfortable performance of the still very large traffic from Edinburgh, the North, and elsewhere, which will remain. The new undertaking at the same time completes a local twelve-mile circle passing round the northern outskirts of the city, much in the fashion of the North London, and doing duty for a busy and a rising area. The works described form the main portion of the new railway outlet, but the design necessarily included a short fork six furlongs in length, outside of Glasgow on the west, to straighten the connexion between the North British coast system and the Stobcross Harbour line which the promoters had elected to

utilise. This fork possesses the one feature of passing under the Forth and Clyde Canal, by a tunnel 220 yards long. While excavations were going on, the canal waters burst the restraints of a temporary cofferdam, drowned the workings, and brought the navigation to a deadlock, which lasted several days. This slip was speedily remedied, and it forms the only mischance of any magnitude which has attended the operations.

The capital of the Glasgow City and District Railway stands at 550,000*l.*, but, in addition, powers have been taken to borrow to the extent of one-third of that sum should the necessity arise. The North British Railway Company, which is already in possession of the outer lines to east and west, is to work the new undertaking on a basis which will be secure to the City and District shareholders a paying dividend at the least, the basis being that of 1*½*d. per passenger for every single journey over the city section, and 2d. per ton for goods, the lessees to make up a minimum 3 per cent. dividend in the event of the receipts failing to produce that figure at the rates quoted. The connecting, or rather straightening, fork outside of the city does not admit of being dealt with in the same way, and, accordingly, an absolute 5 per cent. annuum on the cost of that section has been agreed upon. Messrs. Simpson & Wilson, Glasgow, have been throughout the engineers of the undertaking, which, for work purposes, they divided into three portions. That from College Station to West Campbell-street has been in the hands of Messrs. Charles Brand & Son; from West Campbell-street to Junction with the old line at Stobcross in those of Mr. James Young; while the short fork outside of the town was entrusted to Messrs. Hugh Kennedy & Son, Partick. The bridge and other ironwork has been supplied from the forge of Messrs. Goodwin & Co., Motherwell.

#### THE PREVENTION OF FIRE RISKS FROM ELECTRIC LIGHTING.

BY KILLINGWORTH HEDGES, M.I.C.E.,  
AND MEMBER OF THE SOCIETY OF TELEGRAPH  
ENGINEERS AND ELECTRICIANS.

IT has been customary of late when the slow progress of electric lighting has been discussed to abuse the Electric Lighting Act of 1882, and to make this measure, together with the stringent regulations of the Board of Trade, the reason for the absence of the necessary working capital which made so many of the companies, promoted to work particular systems, retire from business. Whether this was the case or not, is not my intention to discuss, but reliable authorities have often stated that, with our former knowledge of the subject, it would have been impossible to have undertaken to supply electricity to the public commercially in the same way as they are accustomed to obtain gas. That the question of supply and cost does not altogether prevent the adoption of a superior method of lighting is very clearly proved by the increasing number of proprietors of clubs, hotels, and occupants of houses who, after waiting in vain for electricity to be brought to their doors, have determined to produce it themselves, and for this purpose have set up the necessary plant.

We are accustomed to look upon electricity as that "invisible subtle fluid" which we use with impunity for ringing bells and actuating telephones, and are ready to take it, in the form of electric light, into our houses without any thought; the electric current necessary for lighting purposes, when uncontrolled, is far more dangerous, at the same time, if properly installed it is rendered as harmless as that from the galvanic battery with which every one is more or less familiar. The supply of electricity which may be furnished by any of the various systems may be either generated direct from the dynamo, or it may be stored up in secondary batteries, wrongly termed accumulators, as they do not accumulate, but store up, electrical energy; also it can be produced on a small scale

by a primary battery similar to those used for telegraphic work, but larger. Whether from either one of these three methods of supply, and whichever system is adopted, the electricity is precisely the same and only differs in that one current may be of higher pressure, or, as it is termed, of greater electro-motive force than another, according to the construction of the battery or dynamo machine. These transform the zinc or the power derived from the fuel, and furnish electricity to suit the incandescent or arc lamps, the light from which is only electrical energy in the form of heat. The source of danger is that this heat may be produced where it is not wanted, and thus cause "fire," the prevention of this electrical *bête noire* has already occupied considerable attention both in this country and abroad.

A special Fire Risk Committee appointed by the Council of Telegraph Engineers and Electricians was formed in 1882, and some excellent rules were drawn up which have been adopted, in a modified form, by some of the insurance companies, and have been added to the excellent paper read by Mr. Slater before the Royal Institute of British Architects in 1882, but neither these nor the standard requirements of the New York Board of Underwriters can be said to embrace all the changing details of electric light installations, which can only be ascertained by practical experience that already has considerably added to the knowledge possessed when the committee was sitting.

The first source of danger is in the main and branch wires which conduct the electricity about the building to be lighted, and which are run in much the same manner as gas-pipes. If these conducting-wires are of sufficient area, and of a material whose resistance is uniform, the current in its passage will develop no injurious heat, and there will be little risk from this cause. Whatever resistance the conductors possess will cause heat, which will vary with the amount of electricity passing, and inversely as the sectional area of the conductor. This term "resistance," which is used by electricians, must not be confounded with the ordinary meaning of resistance to tension or to rupture. It is a misfortune that the term has been too fully introduced, as it would have been better to speak of the conductivity of a wire. The energy needed to cause the supply of electricity to pass through the conductor has been compared to the difference in the head of water necessary to cause a quantity of fluid to overcome the resistance of a pipe, but its action is totally different. It more resembles water soaking through sand, in that the whole of the cross-section of the wire interposes a resistance, which in large conductors doubtless varies proportionately to the temperature of each section according to its distance from the outside radiating surface.

In order to avoid any tendency to heat the branch mains and leads which conduct the electricity to the lamps should be of ample area. The following table may be taken as a guide in estimating the gauge for wires used in the interior of buildings, but where the electric current has to be distributed over a large district the sectional area must be calculated in a more accurate manner in order to have the most economical proportion.

Table of Sizes of Main and Branch Wires or Leads for Swan 16-candle-power Lamps (nominal 2 candles) and Edison 16-candle-power Lamps.

| Number of Lights to be Worked. | For 45 to 65 Volts.<br>Lamps, taking 1½ to 1½ Amperes. |                 | For 80 to 110 Volt Lamps, taking 0.8 to 0.625 Amperes. |                 |
|--------------------------------|--------------------------------------------------------|-----------------|--------------------------------------------------------|-----------------|
|                                | Wire diam.                                             | No. of Strands. | Wire diam.                                             | No. of Strands. |
| 1 or 2                         | .048 inches.                                           | 7               | .048 inches.                                           | 7               |
| 3                              | .072 "                                                 | 9               | .064 "                                                 | 7               |
| 10                             | .128 "                                                 | 19              | .104 "                                                 | 19              |
| 20                             |                                                        |                 |                                                        |                 |
| 25                             |                                                        |                 |                                                        |                 |
| 40                             |                                                        |                 |                                                        |                 |
| 48                             |                                                        |                 |                                                        |                 |
| 65 to 75                       |                                                        |                 |                                                        |                 |

\* The Volt is the term used by electricians to express the practical unit of E.M.F., electro-motive force, or difference of potential. It is about 1/976 of a single-cell Daniell Battery.

† The Ampere expresses the strength or intensity of current. If an electro-motive force of one Volt is used and a current through a wire having the resistance one Ohm (the unit of *R*, resistance), the strength of current, if measured, will be one Ampere.



Silver has the highest conductivity of all the metals, and, if the price continues to decline, it is within the bounds of possibility that it may be used for winding dynamos, but copper will always be used for electric light cables; why, because it can be obtained in a purer state than any other available metal, and, secondly, because next to silver it is the best conductor of electricity. It may be interesting to note how much the use of copper is extending for telegraphic purposes from the fact that the Post-office have recently ordered a copper wire, .080 in diameter, from London to Newcastle, 278 miles in length, and its use have been able to increase the number of words sent per minute from 345, the best result with iron, to 414. The resistance of all metals is greatly increased by any impurity, therefore it is particularly necessary in purchasing copper wire to see that its conductivity is never less than 96 or 98 per cent. of the pure material.

#### The Running of Wires.

From the familiar way in which electric wires are laid about a house one is apt to imagine that electric light conductors can be laid in the same manner. To do this would only be committing a great error, which at any time cause the breakdown of the system, but also might occasion a very dangerous

position of all wires should be carefully noted and they should be led in such directions that they can be got at for the purpose of testing and verifying the soundness of the system. To do this the main wires in a building should be carried under the floor above the rooms to be lighted. Having selected well-insulated cable it may be run along or across joists, being kept from touching the wood by some good insulating material, such as asbestos millboard. The position of each wire or branch should be marked on the movable floorboard which rests over the joists, and this is especially necessary if the joints or fusible safety junctions are fixed, so that they may be quickly got at to renew the fuses when melted. The branch wires can by this plan be easily led to descend to the rooms below at points where each is required; if taken down the walls they should not be bricked in, but inserted in a wooden groove which has a removable cover with the side of the walls, that can be painted or papered over to match the decorations, or, if mouldings are already used, grooving can be covered with a false moulding or beading to match the other. Wires thus protected are not only safe from being injured by settlement or by the gnawing of rats or mice, but being in a known position can be avoided when structural alterations are made. In wiring a house, the connections to switches or contact breakers, which are used to shut off the current, must not be forgotten. It is as well to provide for a switch to turn out the lights on each landing independently of the main switches, which should be fixed on a board also containing the cut-outs for the engine or battery room, or where the current is supplied to the house; near the entrance of each room a small switch should be placed that one or more lamps can be turned on when entering; this is especially useful in bedrooms, obviating the use of the tumbler candlestick. In the living-rooms the lamps may be grouped; that is, the wires of several lamps can be connected to one switch, or one or two lamps only be united to another; these lamps can thus be kept alight in the room is unoccupied.

#### Electrical Connectors and Joints.

Special attention should be paid to these, especially to those connections made with binding screws, which must be firmly screwed as bad contact between a wire and a terminal will produce heat and loss of current. A wire should fit the hole in the binding-screw, which should be tightened while the current is passing if found to be loosened by expansion of the metal due to heating.

All electrical joints, such as those between the two main cables or where a branch lead is taken off, must be carefully made, otherwise the calculations as to the efficiency of the cable may be upset and an efficient installation be spoiled by a faulty junction. Solder alone should never be relied on for electric light joints. If ever so little heating takes place the solder may be softened by the action of the current, which tends to reduce the alloy to its component parts, thus allowing the copper wires to separate, when a dangerous arc will be formed which will speedily destroy the cable. A joint must be made mechanically perfect, and considerable pressure used to bring the surfaces together; the solder may be then applied to keep the whole air-tight, but in no case should any joints be made except by workmen accustomed to electric light work.

#### Short Circuit.

The term explains itself, and means that the electric current, instead of going the circuitous course allotted to it, takes the shortest path, where, having no work to do, it causes fire. Accidents from short circuit may be divided into three heads:—

1. One of the conducting wires may either come directly in contact with the return conductor, or something metallic, such as a staple carelessly fixed, may cause an electrical connection.
2. Some good conductor may momentarily touch the unprotected surfaces of two wires and cause an arc to be formed between them, or either one of them may be "grounded"; that is, put in circuit with the earth.
3. The same result may be accomplished by water dripping from one wire to the other, or by a badly-insulated cable being laid in a damp place or on a wet beam.

Accidents have occurred from each of these forms of short circuits, which, however, will never happen if the wire is thoroughly insulated and the protective covering is not damaged. There is one exception, and that is, where water is the cause of the trouble, when only an impervious material, such as gutta-percha, will be a sure preventive. The so-called fireproof insulation is useless if not waterproof; even the lead-tube covering for cables, which has been so highly recommended, appears to be an element of danger. In the mines of La Peronnière, France, a fire was produced by the electric current short-circuiting through the insulation on to the lead envelope, which, being in contact with the damp ground, led away the electricity and speedily burned up the cable.

#### Cut-out, or Safety Fuses.

This important fitting is, in fact, the "safety-valve" of an electric-light installation, and may be compared to the weak link in the chain which gives way before any damage can be brought about, by excess of current liable to render the conductors and their branches red hot, and also prevents the evil effect of a short circuit. The Fire Risks Committee's rules describe a cut-out as "a piece of easily fusible metal which would be melted if the current attains any due magnitude, and would thus cause the circuit to be broken."

The Board of Trade regulations state "that this fuse shall be of such a nature as to cut off the supply of electricity when the current exceeds by 50 per cent. the maximum current which the service line is intended to supply." It is true that a smaller margin than 50 per cent. may be used, but this is not compulsory, and I think should be so, unless the fuse may be absolutely relied on to melt with that excess of current. The plan introduced by Edison of inserting a lead or copper wire into the circuit is particularly bad, as a dangerous arc may be formed before a lead wire, designed to melt with a 50 per cent. margin, is ruptured. Anyhow, the cut-out should be rapid in its action, and of a material quickly melting at a lower temperature than lead or copper, so that molten particles could not set anything inflammable on fire. In order to ascertain which was the most suitable material, I tried a variety of metals, and found that if their area was much

more than a fine wire of two or three millimetres, they were absolutely unreliable, and even then, when melted, threw portions of the hot metal about the room. Lead wire, which is often used by ignorant people, is far the worst, as it oxidises after a length of time, and gives trouble on account of its expansion and contraction; and the alloys of tin and lead, which conduct the electricity in the same ratio as would separate wires made of their component parts, gradually become altered in resistance by the passage of the current. This is noticeable in whatever form the alloy is used, so that safety fuses, which have been tested to melt with 100 amperes, have, after a month's work, melted with 75 amperes. Another great disadvantage attending the use of a fuse of large sectional area is the disruptive effect which takes place at the time of fusion. This only applies to the very large fuses, such as are used to protect the dynamos in the Edison system, and so violent is their action that the top of an iron box laid in the streets of New York was displaced by the rupture of a safety fuse underneath. The difficulty is overcome either by using rods of fine tin wire, or, better still, by making the fuse of strips of metallic foil, the particles of which, when melted, do not take a globular form, and are almost oxidised by contact with the air. After experimenting with numerous foils, I obtained a special alloy of aluminium,—a metal which has a great future for electrical purposes, and has the advantage of great tenacity, so that very thin foil can be used. Strips of this foil are placed between layers of mica, due care being taken to allow for the expansion of the foil; the strips are thus built up like the leaves of a book, according to the melting value required. For small currents, the foil is fastened by means of two eyelets to a single strip of mica, which can be easily removed and replaced, even when the current is passing, owing to the high insulating character of the mica.

The use of cut-outs to protect an installation appears to be a crude remedy, in that the lamps are generally extinguished when the fuse melts; this, although a small matter where the question of fire is at point, need not be the case if a simple arrangement of "bye pass" circuit be employed, so that the supply of electricity may be automatically reduced by a resistance until a new safety-fuse is inserted. A still simpler plan, and one almost universally adopted in the best installations, is to fix a double cut-out, termed "the duplex pattern," which contains two mica foils, one of which only is used to protect the circuit, but directly it fuses the second foil, having a much higher melting value, can be inserted by turning a small lever. The object of causing the second fuse to carry more current is to prevent the extinction of the lights while the first is being replaced; however, if the trouble is due to a bad short circuit, both foils will be melted, which is the safest plan and one that should not cause more than half the lights in any room to be extinguished if the system of wiring the lamps from two separate dynamos be employed.

#### Automatic Cut-outs.

This class of instrument cannot be recommended in preference to the fusible cut-out in the first place because it encourages carelessness on the part of the attendant, who may allow the current to increase, and, consequently, extinguish the lights without having the necessity to renew a fuse, which would betray the circumstance of the extinction. Secondly, an automatic cut-out may fail if it has been left for a long time unworked, and this mishap is especially to be guarded against with those in which mercury is used to make contact, for the reason that the mercury might be deflagrated, when the fuses would produce very dangerous results.

#### Saving of Lamps.

The percentage of losses of incandescent lamps is not high, if breakages and similar accidents only are taken into account, but the



average total is swelled enormously by the number of lamps which are prematurely burned out by too much current being allowed to pass. It was recently stated, at a paper on the "Electric Lighting of Steamships," read at the Institution of Civil Engineers, that "out of 200 Swan lamps on board a large passenger steamer, fifty were suddenly broken through a failure of the governor." In this case, all these lamps were fitted with cut-outs made of lead wire on the Edison plan, none of which were melted, although the current was probably 100 per cent. in excess of its proper strength. If sensitive fuses had been adopted, the lamps would have been uninjured, and the consequent loss of 4s. x 50, or 10l. would have been saved at the cost of the fuses which could have been replaced for as many pence. The interesting report of the life of the electric lamps at the Royal Courts of Justice shows that the average life of lamps burned out, which was 1,631 hours, was reduced to an actual average, after deducting losses, of 1,370, nearly the whole of which must be put down to the weakening of the filament due to an excess current having been passed, as the authorities, to guard against the extinction of a lamp here and there, have replaced the original sensitive fuses by others which only act in the event of a short circuit.

Before concluding this article, it may be interesting to note how some of the fires have occurred in America, where the insurance authorities have reported the electric light to be the cause. In one district of sixty-one miles there were fifteen fires due to some form of "short circuit," generally due to leaking water or washing floors, all of which would have been prevented by proper insulation and reliable fusible cut-outs. Three fires occurred by short circuits termed "cross arcs" of one wire to another, where uninsulated wires were fastened against conductors. In one instance, the conductor was formed by dust settling upon uninsulated wires, and one damp day it absorbed enough moisture to form the path for the formation of a cross arc, which started a fire. In another instance, the wires were fastened to a damp beam, which was decayed, and burned nearly in two by a smouldering fire. In a third instance, damp brickwork in a tunnel was a sufficient conductor to establish an arc, which did not do any material damage there, but injured the dynamo. These fires were not necessarily destructive ones, as they generally occurred during working hours, and were soon discovered. Electricity, having no smell like gas to betray a leak, shows when it is escaping by the diminished appearance of the lights caused by the diversion of the system.

The chief element of safety of electric light lies not only in the employment of experienced men to supervise the work of running the wires and arranging the installation, but in having the whole installation carefully tested and reported on by an expert who is independent both of the system employed and the contractor. When thus arranged, it is, in every situation, far safer than gas or any other known illuminant, especially when laid on to our houses from a central station, where any possible danger will be localised, and the whole of the machinery be under constant supervision.

In conclusion, no better proof can be stated as to the increased value put upon electric light by those who have had it installed than by quoting a recent case which came under my special notice, where an action was brought by the Corporation of a large town against the contractor for lighting the municipal buildings, who had refused to continue the supply of electricity. The pleadings stated that "the buildings in which the installation has been placed have been expensively decorated with a view of their being used with the electric light only, and these decorations, and also the books in the library are suffering from the use of gas,"—for the absence of the electric light the Corporation claimed heavy damages.

The following draft form of specification of electrical conductors, leads, fittings, and safety appliances, is published with a view of showing some of the salient features of an installation

which require especial attention; the motive power, whether gas or steam, the dynamos, and the incandescent lamps should also each be the subject of a detailed specification:—

#### SPECIFICATION FOR CONDUCTORS, SWITCHES, AND APPARATUS FOR PROTECTION FROM FIRE.

Cables, leads, and wires are to be furnished capable of supplying current to — arc lamps and — incandescent lamps.

These conductors are to be laid and erected in the manner herein specified:—

**Conductivity.**—The specified conductivity of the copper employed in the whole system of conductors is to be not less than ninety-six per cent. of pure copper.

**Covering.**—The wires to be covered in such a manner that the covering does not become frayed or loose.

**Joints.**—All joints are to be made of resin only, and not with killed spirits or any other glue. All wire ends, before joining, are to be properly cleaned, and the strands spliced in a thorough manner and well soldered together.

The joints, when made, are to be covered with a layer of Chatterton's compound, and properly and neatly wrapped with indiarubber tape, so as to leave a smooth surface. But no joints are to be used where solid conductors are joined together and are under tension.

**Distance apart.**—When conductors are run along walls or other exposed supports, their distance apart, from inside edge to inside edge, is not to be less than 2 in.

**Coverings.**—When conductors are placed in mouldings or grooved casings, the thickness of the material between each conductor is to be not less than  $\frac{1}{4}$  in., and no screws or nails to be driven into this central rib.

**Staples.**—When conductors are stapled to a wall or other support no one staple is ever to embrace both conductors, nor are two staples to be placed side by side, but are to be placed alternately.

**Walls.**—When conductors are carried through walls, or other partitions of a like nature, they are to be encased in asbestos or wooden (varnished inside) tubes of such diameter as to fit easily, but not too loosely. If carried on iron, such as rolled joists, they are to be rest on asbestos, millboard, or varnished wood. No wires to be carried through existing gas-pipes.

**Insulation.**—The total insulation of the whole system of conductors, when placed in position, is to be not less than 500 ohms resistance per volt of current.

**Insulators.**—When insulators are used they are to be of a type previously approved of by the consulting engineers.

**Cleats.**—Cleats are to be used for holding up the conductors in place when the size of such conductors are greater than a quarter of an inch diameter outside covering.

**Capacity.**—The capacity of the whole system of conductors is to be such that the area of the conductor shall be equal to the area of one square inch for each 1,000 amperes to be carried, or approximately one square millimetre for every ampere and a half of current passing through it.

**Dielectric.**—No covering shall alone be employed for conductors that is capable of absorption of moisture, but indiarubber, gutta percha, or some approved bituminous compound must always be used in conjunction therewith, and they shall be guaranteed to have an insulation resistance of — megohms per 1,000 yards.

**Samples.**—Samples of all cables, leads, and wires — type are to be submitted to the Consulting Engineer near for approval before commencing the execution of the contract, as well as all switches, cut-outs, and other materials.

#### SWITCHES.

**Main Switch Board.**—A main switch board, with insulated back to be provided, with switches of the — type and main cut-outs, which will allow of fusible mica foils being inserted, and arranged to control each separate circuit, and all connections to be made between them and the dynamos. A plan of this switch-board to be submitted.

**Branch Switches.**—Switches which cannot be left partly on, and which on breaking the circuit show no spark on the working contacts, are to be provided, and all connections made thereto. They are to be firmly fixed to the walls or supports by screws upon a plug of wood driven into the wall, and are to be of ample size, and best material and workmanship. Rubbing contacts are to be used, and no switch is to contain a cut-out or safety plug.

#### MAIN CUT-OUTS, OR FUSIBLE SAFETY JUNCTIONS.

These are to be of the duplex fusible type, to carry mica foils, which shall give way whenever the current passing through them exceeds the normal working current by 50 per cent. Each cut-out shall be fitted with a spare mica foil, through which a portion of the current always passes, and of sufficient strength to pass the whole of the current on the melting of the ordinary working fuse, but shall give way in the event of a short circuit.

**Branch Cut-outs.**—Branch cut-outs of a type, with protected terminals and eyelet mica foils, are to be provided and fixed firmly to the walls or supports where shown, and in no case are they to be

placed between the switch and its lamps, but always as close to the main cable as possible.

**Melting-point.**—Every branch cut-out shall be so proportioned as to melt with an excess of current not more than 25 per cent. above its nominal value.

**Switch and Cut-out Bases and Covers.**—Where required, the beds of all switches and cut-outs to be made of slate or other non-combustible material. If mica foils are not used, the cut-out to be suitably covered to prevent any metal being scattered when fused.

**Testing.**—Samples of all the various sizes of cut-outs to be submitted to the Consulting Engineer for test purposes.

**Damages.**—Every care is to be taken to avoid all damage to existing fittings, and to all walls, ceilings, floorings, woodwork, &c., and the contractor is to make good all cutting away necessary for the fixing of the above cables, leads, wires, switches, cut-outs, &c., and shall leave the whole work in a neat, workmanlike condition.

#### NOTES.

ON Wednesday the nave of St. Alban's Cathedral was reopened for service, when the Archbishop of York preached a sermon, in the course of which he commented on the circumstances under which the restoration had been effected in words which we cannot pass without comment of our own:—

"That great abbey church had long been ruined and than that building none could be found more splendid or more suitable; but to restore it would be costly; a large subscription was made and was soon exhausted. A layman, attracted there by his interest in the church, adopted the work, and was completing, portion by portion, a cathedral which when it was completed, would rank with the noblest of those structures of which England was so justly proud. In that case the generosity shown was not reduced to the simple terms of chivalry drawn upon a well-satisfied banker; it took the form of care and thought and wise contrivance by one whose taste and education had long been ripening for a task such as that. In an age when division of labour and subdivision became imperative, it might seem impossible that an eminent lawyer and ecclesiastical judge should be qualified to be the architect of such a work as that; but there was enough before them that day to dispel any apprehension of that kind."

The fact is that if the "eminent lawyer and ecclesiastical judge" had confined himself to giving the cheques (and, perhaps, aiding by his advice in the practical portion of the work) he would have deserved far more gratitude than he does. The gentleman alluded to is a man of remarkable abilities, and he is really an authority on various matters,—such as clocks and bells,—out of his professional calling; but he is not an authority on art in any shape, and no society of persons educated in artistic matters would attach the slightest value to his opinion or taste on any matter of that kind. The assistant he has chosen on the work was not as stated in an evening paper, a former draughtsman of Sir Gilbert Scott's, but a clerk of works under that architect, and a man of no artistic training at all. The responsible custodians of St. Alban's Cathedral, therefore, handed over the task of adding to the great Mediaeval building, a task requiring above all others the most refined perception and training in regard to artistic style and detail, to a non-professional man who has notoriously no training or perception of that kind, assisted by an ex-clerk of works who had picked up a smattering of Gothic; how much, may be judged by the front for which he presumably made the drawings. As we have before said, we doubt if there is any country but England in which a great historic building, a national property, would thus be handed over to a private person to do what he liked with, merely because he has offered to find the money on those conditions. We are quite certain, at all events, that such a proceeding would be impossible in France.

THE letter which we published a fortnight ago (p. 478), from the pen of Mr. George Godwin, headed "Planning for Evil," was brought to the attention of the St. Luke Vestry at the meeting of that body on Tuesday last, by Mr. Haskins, jun., who, after reading the letter, and bearing testimony



accuracy of the statements therein made, and,—

That, having read the astounding facts relative to the buildings now in course of erection in the gardens, we, the Vestry of St. Luke, beg inquiry as to why all Acts of Parliament have been ignored with respect to width of roadway and of open space at back of each dwelling, and suggest, to mitigate the evil, an opening be made at the north end; also one dwelling on each in the centre of east and west blocks be pulled up and approaches made thereto."

Though this resolution is not faultless as a matter of composition, having been hurriedly framed in response to cries of "Move, move," we are glad to say that it was unanimously adopted, with a rider to the effect that a copy should be sent to the Metropolitan Board of Works. The "astounding facts" are, in fact, that two parallel blocks of dwellings, 509 ft. long without a break, and 35 ft. to the eaves, have been built only 24 ft. apart from each other, and with no outlet at further end, so that the space between them is long and,—considering the height of the buildings,—narrow *cul-de-sac*. In addition to the new buildings are very closely packed in at the back by old and dilapidated property. It will be seen that the remedial measures proposed in the resolution are identical with those suggested by Mr. Godwin in the view of mitigating the evil at the least possible cost now that matters have gone so far (the buildings are now roofed in). It is said that the buildings in question are erected with trust funds belonging to the Joint Charities of St. Luke's and St. John's, Cripplegate. The Trustees (consisting of twenty-four persons, twelve from each charity) promulgated this scheme, and, strange to say, obtained for it the sanction of the Charity Commissioners.

ALTHOUGH some members of the St. Luke's Vestry opposed the scheme on the ground that they objected to speculate with the charity, the Vestry appears to have left the matter to the judgment of the Charity Commissioners and to the trustees, one of whom (a member of the Vestry), while admitting Mr. Win's statements to be true, deprecatingly of them that they were "somewhat sensational." If by this expression the speaker meant to say that they were exaggerated, he is not condescending to particulars. "Sensational" in one sense, no doubt, Mr. Godwin's remarks are, because it is difficult to understand, not merely how sanitary conditions can be so far ignored, but how Acts of Parliament can have been contravened as they are to have been. The same gentleman attempted to excuse the trustees for not making an opening at the north end of the buildings by saying that the owners of the one or two houses in Murray-street which would be required for this purpose were so exorbitant in their demands that the trustees had been obliged, for the present at least, to forego an opening at the north end of the buildings! To this is puerile, as any one may see who visits the *locus in quo*. The cost of pulling down and pulling down one or two small houses for the purpose of making a northern approach to these large blocks of buildings would bear an exceedingly small proportion to outlay on the buildings themselves. But, if it otherwise, would such an excuse be possible if made by an impecunious speculating builder under similar circumstances? Naturally, we must say, in justice to the architect (Mr. Woodthorpe) and the builders (Messrs. E. Lawrance & Sons), that the blocks of dwellings in question appear to be soundly constructed, of good materials, and therefore were not properly described by one member of the Vestry, who, in the course of a discussion, referred to them as "jerry-built little dwellings."—a curious contradiction of terms. It should be borne in mind that the materials and excellence of craftsmanship of not of themselves make houses fit to live in; regard must be paid to planning as to give to each inhabited room a due amount of light and air.

THE Home Secretary has intimated to the Metropolitan Board of Works that he would be prepared to support a Bill in Parliament empowering the Board to inspect and certify annually all theatres and places of public amusement in the metropolis, and that no licence should be granted either by the Lord Chamberlain or the Justices of the Peace without the production of a certificate that the premises are in a proper condition for the reception of the public.

SUCH questionable comfort as may be derived from the reflection that our neighbours are worse off than ourselves may be extracted from the Report of the Grand Trunk Railway of Canada by the English railway proprietor. Despite the fact that no new line has been opened during the year, there is a decrease on the gross earnings of this line of 188,491l., or 11.69 per cent. as compared with the corresponding half of 1885, and of 410,331l., or 22.37 per cent. as compared with 1883. Working expenses have decreased in total amount, but have increased in proportion to revenue, from 73.06 per cent. in 1884 to 76.60 per cent. in 1885. The loss in receipts is attributed to the excessive competition with each other, and consequent low rates, of the various American railways that are more or less parallel with the Grand Trunk. Indeed, the chairman of the latter speaks of being "compelled to carry the great bulk of its traffic at rates and fares but little above the cost of carrying it, and other portions of its traffic at less than cost price." It is bad enough for railway proprietors to suffer from a contest of their own choice, but it is still worse to pay the penalty of the quarrels of their neighbours. It is only fair to the Grand Trunk directors to say that they seem to have done the best they could under such disadvantageous circumstances. The cost and earning per train mile (although giving but little direct information, unless the average weight moved is stated) is, at all events, a good comparative test of administrative skill. In 1884 we find that the earnings came to 6.65 shillings and the expenditure to 4.66 shillings per train mile; while, for 1885, the corresponding figures were 6.0 shillings and 4.59 shillings per train mile. In face of a fall both of volume of rate of charge, this comparison indicates not only the enormous size of the trains, but great care in filling the vehicles. The English receipts in 1879-80 were 5s. 5½d. per train mile, the costs 2s. 10½d. per train mile; but freight in the United States in 1883 was 0.618 per ton per mile against 1.28d. in the United Kingdom; and passenger fares, from New York to Chicago, have been reduced to 4s. 2d. for 912 miles.

THE opening address of Mr. Wreghitt Cannon, the President of the Leeds and Yorkshire Architectural Society, delivered on the 12th, is a vigorous and able one, touching upon a good many subjects of professional interest, metropolitan as well as local. Mr. Cannon objects strongly to the Institute, while recommending architects to demand the intervention of a professional assessor in architectural competitions, mixing up with this question the recommendation of the principle of a double competition, sketches first and finished designs afterwards, and complains that promoters of competitions are, practically, led to believe that the manifesto in favour of assessors refers also to the principle of double competitions. We do not see that this is the case; we have not found it to be so practically. As to the question of double competitions, it is one, no doubt, about which much may be said on both sides. We can hardly recommend it except in those cases where it is intended to select a limited number of competitors and pay them for their work. In the case of large competitions this is the fairest procedure, on the whole, for the joint interests of the profession and their clients. In smaller competitions the fact is that the "sketches" contemplated in the double competition theory are really all that is necessary for the purpose of deciding which scheme is the best for the purpose; and we

would rather join in a recommendation that sketch-drawings only should be submitted in such cases. In referring to the proposed new Charter, Mr. Cannon expresses the hope that when the time comes for the question of the adoption of this Charter to be submitted to the will of the Fellows, no question of expense or personal inconvenience will deter any one of them from journeying from far and near to strengthen the hands of the Council and "ensure the success of the great project which they have at last seriously taken in hand. I can answer," he adds, "for the earnestness with which the Leeds Fellows are prepared to support the Council."

ON Tuesday last a large block of artisans' dwellings was opened in Liverpool by Sir Richard Cross. They have been erected by the Corporation of Liverpool, under the Artisans' Dwellings Act, on a site formerly known as Nash-grove, but which now takes the name of Victoria-square. The area was cleared under the provisions of the Act, the population dis-housed being 1,310 in number, of whom 1,100 belonged to the working classes. After the site was cleared and levelled, it was offered for sale by auction, but no bid could be obtained for it, and as private enterprise was not forthcoming, the Corporation of Liverpool undertook the erection of dwellings capable of being let at rents of 1s. to 1s. 3d. per room per week. The buildings have been designed by Mr. Clement Duncombe, the City Engineer of Liverpool, with every attention to ensuring the best sanitary conditions, and with the endeavour to render them as pleasing in appearance as economical considerations would permit. We shall give illustrations, and a full description of them, shortly.

THE exigencies of electioneering are now calling attention to the utility of village halls. Candidates for divisions of counties for the first time are beginning to address the voters in most of the villages of the division. In some a village hall is to be found, in others only the schoolroom is available. But apart from its usefulness for the purposes of politics, a village hall is constantly of use for many social purposes. Where the halls exist they are found to be of very great benefit to the district, and unquestionably one should be found in every village. If they are constructed without pretension, but with good taste, and in harmony with their surroundings, they may be made a very pleasing feature of the villages, and we look to the present election, and those which may follow it, as likely to give an impetus to their construction.

THE monument to the late Archbishop of Canterbury, of which the architectural portion was designed by Mr. J. Oldrid Scott and the figure executed by Mr. Boehm, R.A., was unveiled in Canterbury Cathedral on Tuesday last in the presence of a large assembly. The present Archbishop, and the Bishop of Dover, spoke on the occasion. The Archbishop expressed himself in terms of high praise of the memorial, as "not unworthy of so great a shrine."

THE *Gazette des Architectes* announces, in its last number, the death of M. Claude Sauvageot, the well-known author of "Palais, Châteaux, Hôtels, et Maisons de France," and various other works bearing on art and architecture. M. Sauvageot was for a good many years the editor of *L'Art pour Tous*, and also brought out a volume on "Viollet-le-Duc et son Œuvre dessiné." He had only recently been created a Chevalier of the Legion of Honour.

THE late Professor Fleeming Jenkins's idea of an automatic electric railway running on, or rather hung below, a wire rope, and called by him the "Telpherage Railway," has been carried into practical working at the estate of Lord Hampden, at Glynde, near Lewes. The line was opened by Lady Hampden on Saturday last. The model of the system, which has been exhibited in action at the Inventions Exhibition, we have before referred to.



THE "Strand Improvement Association" have presented to the Metropolitan Board of Works this week a memorial praying the Board to take into its serious consideration the present unsatisfactory condition of the Strand, especially between the churches of St. Clement Danes and St. Mary-le-Strand, in regard to the insufficiency of the roadway for the continually-increasing traffic. The Association was formed in 1882 with the object of obtaining the improvement and widening of this portion of the Strand. The Association do not definitely recommend any special scheme, but they have issued a bird's-eye view of a suggested method of effecting the object in view by clearing away property north of the two churches mentioned, leaving a double roadway to north and south of the two churches, partly along the present line of Holywell-street, part of the site between the two roads being raised in as a garden, with shrubs and a fountain. This suggestion, which will leave the two churches intact, appears a very good one, and will fulfil both practical and aesthetic conditions. The time has certainly arrived when something should be done to open up and enlarge the space for traffic here, an improvement still more necessary since the erection of the Law Courts; and we hope the Board of Works will give it their early and serious consideration.

THE Vestry of St. Anne, Westminster, have memorialised the Metropolitan Board of Works that the new street from Piccadilly-circus to New Oxford-street may be named Piccadilly East, New Piccadilly, Quadrant Avenue, or St. Anne's-street, and the new street from Charing-cross to Tottenham-court-road either Trafalgar-street or Whitehall-street. The names suggested indicate a singular deficiency of originality on the part of the Vestry, and the duplication of existing names, if carried out, will still further increase the existing confusion in the metropolis. The selection of an appropriate name for a street is a work of some difficulty, but it is to be hoped that some more appropriate appellations may be found than those proposed by the Vestry.

WE have had sent to us a description and illustration of a "perspectograph" invented by Herr H. Ritter, architect, of Frankfurt-on-the-Maine, which received a gold medal at the Inventions Exhibition, and which is intended to render the setting-out of the main lines of a perspective drawing, from a plan, absolutely and unavoidably correct. The accurate transference of the lines and points from the ground plan to the perspective appears, however, to depend upon the accurate and easy action of a great number of joints in the connecting movement; and that any saving of time would result from it we hardly think. A good many such "drawing-made-easy" instruments have been patented of late, but we doubt whether any accomplished draughtsman would ever find it to his advantage to encumber himself with them. They are of use, if at all, to people who cannot draw; and such people should not be encouraged.

#### SOUTH KENSINGTON MUSEUM. EARLY ITALIAN WOODWORK.

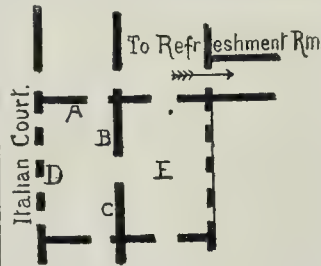
THE re-arrangement of the space which has been obtained by the removal of the Library from its old position has lately been completed, and many of the most interesting specimens of Early Italian art have here been brought together,—mostly from the Large Court,—with old friends that have been in lavender for some years. In place of these a very fine collection of majolica has been set out, the apparent intention being that the new galleries should contain the early woodwork of the Italian Section.

The chief item in this collection is the magnificent series of "Marriage Coffers," some of which are of quite extreme interest and delicacy. Unfortunately the new gallery is very dark,—having no direct light at all,—and the objects are much overcrowded, so placing them at once out of sight and out of reach, a tantalising absurdity.

Chatty old Vasari tells us, "It was the custom at that time (early fifteenth century) for all the citizens to have large coffers or chests of wood in their chambers, made in the manner of a sarcophagus, and having the covers or tops variously formed and decorated. There were none who did not cause these chests to be adorned with paintings; the stories which decorated the front of the chest were of the most part fables taken from Ovid or other poets, but occasionally they were representations of jousts, tournaments, the chase, love tales, or other similar subjects according as it best pleased the different owners of the chests, and this custom prevailed to such an extent for many years that even the most distinguished masters employed themselves in painting and gilding such things, nor were they ashamed of this occupation, as many in our days would be. Relics of them remain in all the most noble dwellings of Florence; nay, there are many of our nobles still attached to old usages who will not permit these decorations to be removed for the purpose of being replaced by ornaments of modern fashion."

Many of the painted fronts of these coffers have been removed and have become panel pictures in our galleries. There were three or four in the last Old Master exhibition at the Royal Academy. It is these things which have been bundled into a dark corner, and the ingenuity of man has devised further "discipline" for the impatient.

On wall A, are three of these panels, dim and distant; one can only report that they are there. Yet more remote is a picture we remember in better days,—a Carlo Crivelli,—an especially beautiful example, with background exquisitely damasked in gold; in pure mercy to the would-be beholder this should be turned face to the wall; below are two chests, one incised Venetian work of mid-thirteenth century, and very beautiful; the other late, dull, and debased; it is described as carved wood, but is really stucco, and bad stucco too.



On the side wall, B, are: (1) cylinder-fronted coffer, gilt and painted with heraldic devices; (2) a magnificent gilt and painted cassone, said to be by Dello Delli; and it may be so, although his is the name for all coffers, just as Robbia's are all the terracottas of the Renaissance; "early sixteenth-century," continues the inscription; only a few yards away is another Dello, but "early fifteenth century"; (3) is of beautiful fourteenth-century work, in the style of Orgagna, patterned in gesso, and wholly gilt; over these are some fronts, not of great interest; but on the other side of the archway is the finest chest of them all, a superb example (No. 7,392). This, like (2) above, is gilded and painted; on the front is Petrarch's "Triumph of Love and Chastity"; on the ends are charming designs from romance, and the top is brocaded on gold in colour; none finer can be in existence (at Dorchester House is one which perhaps approaches it), perfect alike in design, colour, and condition, we should attribute it to Vittore Pisano. Compare,—if you could only see it,—the background on the ends with that of the St. George picture in the National Gallery, the team of horses with those on one of his medals, and the Unicorns with the reverse of that of the beautiful Cecilia Gonzaga. It is woefully dark, but that is not the worst; cases are jammed up on either hand, so that two pictures for which Sir F. Burton would give a long cheque to add them to the primitives at the National Gallery, are to be seen as you see things through a chink in a door when it is dark.

A story is told how Mr. Ruskin chaffed the President for painting the lunette pictures while the finest Perugino in England was hidden

away up a dark stair; we wish he could interfere on behalf of these. Might not a little space be obtained in the daylight by making this place the chamber of horrors? The gloom would add another terror to No. 1. "Head of an Ox, carved for the insertion of a natural stone resembling a brain, seventeenth century, 60l."

Or No. 1, a Newfoundland dog, like the leopard, spotted, but more changeless in sterner marble; of this Mr. Ruskin assures us he would not accept the whole contents of the Museum if the beast were to remain before his eyes. Then there is Solomon in his glory, all in ivory, "bought, 680l."; and cheap, too, if it were only put out of its miserable existence. All the lions in silver, size of life, just acquired, too meek for sheep, leonine as an infant idi

suffering from a surfeit of candy. "But to come back to Dello," as says Master Giorgio; above this Cassone are two panels, one here stated to be by him is painted and heightened with gold similar to and possibly the same hand as that at the British Museum, the other, of processional figures, is in raised gesso, gilt, and slightly touched with paint and lacquer. It is the first of three, the most complete of which is in a case at D. The descriptive label of that tells that it is a "coffer-wood, carved, with a procession of knights and dames meeting and playing musical instruments, and with armorial shields borne by angels,—bought, 40l." Most of this information is at once verifiable by the unaided human vision, and by the help of a little arithmetic we find that seventeen of these would cost the same as one ivory Solomon. As to the method of work, it is not "carved wood," but raised gesso. If you wish to know how a thing is done, it is better to have no information than misdirection, and if an innocent spectator would form his taste, he asks if it is good or bad, there is no answer. You pay your taxes, and may take your choice. Who knows if it is good, after all?

Let us again refer to Vasari. "In particular he (Dello) painted the entire furniture of the chamber for Giovanni dei Medici, a work which was then considered of rare excellence, and very beautiful of its kind, as certain relics will still remain prove it to have been. It is said that our artist was aided in this work by Donatello, then a boy, who made him various ornaments, and even stories, in bas-relief, of stucco, chalk, gesso, and ponce, bricks, which, being gilded, served as a rich and beautiful accompaniment to the paintings. As it is desirable to preserve some memorials of these old things, I have caused many of them to be retained in the palace of my lord Duke Cosmo; they are by the hand of Dello himself, and will always be worthy of attention, consideration, were it only for the various costumes of those times,—vestments of men as well as of women, which are to be seen in them." "No trace," says the editor, in a note, "can now be found of the articles so described."

This is, doubtless, the same kind of work, and we might at first be disposed to think of Sir Dello Delli (he was a knight) who worked at these chests, "always painting in apron of brocade and living like a noble," but I think internal evidence forbids this view, for reasons which shall not now be rehearsed; we believe them to be by Pisanello; possibly, however, so were those of "my lord the Duke Cosmo," as our biographer is anything but infallible.

In the next parallel gallery are two panels in gesso, one by the same hand, equally beautiful. Here also is a polyptych picture by Dello, a replica of what exists (we think in the Louvre). These triptychs were the principal decorative subjects for early Renaissance designers. They may be to advantage on the tapestry in the Withdrawing Room at Hampton Court, and both the room hung in the new textile court of the Museum but one set of these is most unfortunately arranged. Fame is shown to precede rather than triumph over Death, and the "Triumph of Chastity" is labelled the "Triumph of Industry"—the most delightful of vict to the modern English mind. There are other pictures, but some of them are so old that it would not make much difference if they were hung upside down, like the case or some of the loggia decoration in the adjacent gallery.

If it be objected that it is hardly probable



such a comparatively small collection four works of Pisanello should be found, we will only answer (1) that, however remarkable, the three *gesso* examples are certainly by one hand, and, therefore, as likely to be his as another's; (2) the works attributed to Dello are simply legions; he lived only to the age of forty-seven, and a long term of his life was passed in Spain, where he died; (3) only five paintings in existence are authoritatively ascribed to Vittore Pisano, and he lived between seventy and eighty years; (4) his style is early, Gothic in fact, and Pisano preceded Dello by twenty-five or thirty years, being born about 1380.

We trust the authorities will be able to throw some light on the subject, physically at least.

### THE NEW BOROUGH OF WESTMINSTER.

On the evening of Tuesday, 13th October current, Lord Alington Percy and Mr. W. H. Smith, Secretary of State for War, met their electors and supporters in St. James's Hall to celebrate, in the chairman's words, the obscurities of the City of Westminster. The Redistribution Act divides this ancient borough into three separate constituencies—Westminster, St. Strand, and St. George's, Hanover-square, each to return a member to Parliament. This settlement of what at one time proved a vexed question as between the ratepayers and the boundary Commissioners,—which latter proposed to make four divisions: Hyde Park, Elgrave, Abbey, and Strand,—revives one of our historical and archaeological features of the locality and its pristine conditions, which possess some interest and significance.

When St. Augustine, as missionary of Gregory the Great, landed at Ebbw's Fleet, in what, he was Prior of the St. Andrew's monastery, which that Pontiff had himself founded above the pines of the Caelian Hill at Rome. Installed in his new abbey of St. Peter and St. Paul,—now the St. Augustine's Missionary college,—Augustine, in his capacity of first bishop of Canterbury, consecrated to the diocese two monks whom Gregory had sent hither to England. The one was Justus, bishop of St. Andrew's, Rochester; the other was Mellitus, bishop of St. Paul's, London. He, indeed, ascribes the foundation of St. Paul's to Ethelbert, who had given audience to Augustine on the banks of the Stour. That the sovereign's brother-in-law, or it may be nephew, Sæghberht, king of the East Angles, was reputedly founder of the other church, the West Minster of St. Peter, wherein he and his wife Ethelgitha lie buried, and whither, on the translation of St. Edward's day, adherents to the older faith still repair unmolested to kneel and pray round the hallowed shrine of the confessor, king, and king. Sæghberht's church replaced, it is said, an earlier temple to Apollo, in the Isle of Thorns. This is the "Torreia in loco mirabili quod dicitur at Westminster" of Offa's charter, A.D. 785. Two channels of the Aye brook separated the island from the vast tract whose remains lay adjacent. A certain part of the forest land was bounded as follows: "To the west toward the gentle West Bourne; northwards ran Heere-street, an ancient British road,—the now Uxbridge or Bayswater road,—to the settlement of the Trinobantes beyond Ebbw's Fleet; eastwards lay a later Roman highway, which, joining Chester to the southern channel port, crossed the British causeway near to the Marble-arch, and led southwards by Totle-hill and the ferry to Stanegate, Lambeth, to Dabris, Lemanis, and Rutapin. The area thus encompassed was known as the Isle. About 900 acres in extent it lay within the jurisdiction, Oswulf's town, hundred. Eia appointed an officer to the Saxon Stalro or Constable and Master of the Horse. At the Conquest, the Asgar held that post with its demesne; the latter then comprising the three manors of Eate or Neyte, Eubery or Ebury, and Hyde. To him William appointed a successor, Geoffrey de Magnavilla, ancestor of the De Mandevilles, lords of Essex. Geoffrey exchanged Eia with the monks of West Minster for their masses and prayers, at the same time endowing for them a mill at Hurley, in Berkshire. But at the Suppression the abbot was compelled to surrender the land which his predecessors had so carefully stocked and tended, receiving in lieu thereof the dissolved aforesaid Priory of

Hurley. Hyde Manor, more familiar to us as Hyde Park, became the hunting ground for the Crown's reserved use. Neate, having formed the abbot's favourite pleasure, rapidly sank in importance. A farm in 1592, it largely contributed to Kensington Gardens and the Gore estate. With this manor must not be confounded the Neate Houses in Chelsea, so often cited by Pepys. Eubery, the Eyebury farm of Queen Elizabeth's day, passed to the Grosvenors on the marriage, at St. Clement Danes, on October 10th, 1676, of Mary, daughter and heiress of Alexander Davies of Ebury with Sir Thomas Grosvenor, a Cheshire baronet; and at this day Ebury forms one of the richest properties of the ducal house to which the borough gives its titular name.

For more than 150 years Thorney, with its Minster, was at the mercy of the Danes. On Eadgar's accession, however, the reinstated monks were endowed with an estate whereof the confines are precisely set out in a charter generally attributed to that reign. That estate is identical with the original parish of St. Margaret,—whose church is supposed to have been almost co-eval with the abbey itself. The parish bounds lay along the Aye or Tyburn to the west; Oxford-street and Holborn to the north; the Fleet to the east; and the Thames to the south. The parish was subsequently enlarged to the west, as we have shown, so as to take in the manors of Neate, Ebury, and Hyde. But towards the east it was reduced in limits from time to time by the formation of various parishes. Thus, by the decretal of 1223 it was formally deprived of the parishes of St. Giles-in-the-Fields, St. Andrew, Holborn (partly), St. Paul, Covent-garden, St. Bride, St. Clement Danes, Holy Innocents (St. Mary-le-Strand), and St. Dunstan-in-the-West. In course of years, St. Margaret's underwent further disintegration. King Henry VIII. set up the separate St. Martin's-in-the-Fields (1535); and from out of this were further taken St. Anne's, Soho (1678), St. James's, Piccadilly, and St. George's, Hanover-square. The last-named parish, since subdivided, was at first co-extensive with the three component manors of Eia. St. Margaret's again has also parted with the ecclesiastical district of St. John-the-Evangelist. The new Parliamentary division of Westminster, having a population of, say, 60,000, covers the present parishes of St. Margaret and St. John. But it is to be observed that the now dead City of Westminster had long preserved the name to which it was for a brief period legitimately entitled as forming a residence and see of a bishop. It did not, strictly speaking, exceed the confines of the existing St. Margaret's parish with the district of St. John. The Liberties comprised St. George's, Hanover-square, together with the new Strand division. The Strand division has about 80,000 inhabitants, and contains the present parishes of St. Martin-in-the-Fields, St. James, Piccadilly; St. Anne, Soho; St. Paul, Covent-garden; St. Mary-le-Strand; St. Clement Danes, as well as the Liberty of the Rolls, and the Precinct of the Savoy. We may also point out that in the Royal Courts of Justice, Strand, our judges continue to sit within the Liberties of Westminster. The Courts' site yet distinguishes Westminster as the kingdom's real capital,—the place where the sovereign lives and administers justice. Moreover, all the royal palaces, and the Tower alone excepted, all the former London residences of our monarchs will be found situated within the area of the ancient parish that was dedicated to Margaret the Virgin Saint and Martyr of Antioch.

### COMMON THINGS.

A few weeks back we called attention to the advantages that may be obtained from studying the common unpretending faulight of about a hundred years, or less, ago. Proceeding on the assumption that art still led a quiet existence, even in those days, we may notice, with some profit to ourselves, a still commoner object that meets our view wherever there are forecourts to our street houses, namely, the well-known area railing,—well known, perhaps, but not so well observed as it often deserves to be.

Until within the last twenty years, it is very likely that even our beautiful specimens of rich wrought-iron railings and gates would have passed unnoticed, for they are not in the then fashionable Gothic style; but they are better appreciated now, as the pages of the Architectural Association Sketch-book and other illustrated publications will testify.

Indeed, some people have fallen into the mistake of imitating them so closely that we may see a new wrought-iron gate at Hampstead with link extinguisher complete! "What the swells put out their cigars with," as the errand-boy in *Punch* informed his friend.

While these fine works of art are being deservedly studied, it should be remarked that it is not every one who can afford wrought-iron, and it is very interesting to observe the sensible and economical manner in which wrought and cast

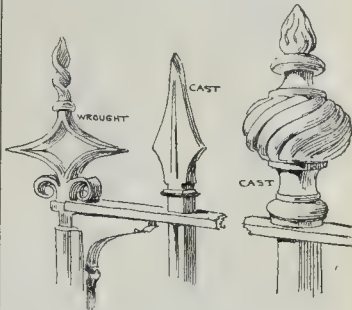


Fig. 1.

iron are combined in many examples (fig. 1); the wrought being used for the rails and for the braces of the gates, and, in light work, for the bars; while cast is used for, perhaps, a row of rosettes under the top rail, and, most commonly, for the terminals of the main bars.



Fig. 2.

It is to the design of these terminals that attention is called in the study of cast iron. As to scrolls in this material, they are hardly worth considering. Any attempt to use them, except in the stoutest sections, must result in disaster, as several quite modern instances of their use will prove. Amongst the millions of terminals that meet us at every turn there are



Fig. 3.

Fig. 4.

two or three leading patterns that are commoner than the rest. There is the pomegranate (fig. 2), of which one soon wearies, because, from its very nature, it is not capable of much variation; and there are the endless forms of urn,—some finishing with a flame at the top, but most being completed in many



other ways (figs. 3, 4, 5, 6, 7, 8). These urns may probably be traced to the study of Classical works that were in vogue at the time they were designed, and in which the Roman cinerary urn is frequently illustrated. Had an ardent revivalist "taken up" cinerary urns, his imitative nature would have led him to deplore the impossibility of producing in his day any-



Fig. 5.



Fig. 6.

thing so beautiful, and he would probably have "taken up" cremation as well, in order to deposit the remains of his friends in absolutely correct copies of Roman examples; but revivals had not arisen when these cast-iron ornaments were wanted; their designers merely seized upon the urn as a beautiful form, and made free use of that.



Fig. 7.



Fig. 8.

This beauty consists in the contrasted curves of the bowl and cover, and endless changes are rung upon the disposition of these two main lines. The example illustrated in connexion with wrought-iron rails and bars (fig. 3) is most exquisite in outline and surface, and may be seen near Kennington Park. Other forms may be found in abundance, and modern designers still need not fear that fertility in the invention of fresh terminals is by no means exhausted. The "mushroom" form is very effective for those who appreciate the delicacy of cast shadows merging into reflected light. A fine series of these may be seen surrounding the east side of the Duke of Westminster's house; but they must be seen with the sun on them for the full enjoyment of their effect.

The much-reviled "cannon-ball" is useful to a small scale (fig. 9). The light and shade on

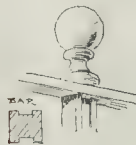


Fig. 9.

a sphere is one of the most beautiful things in nature and art, and it is a sin to cover it half-way up with ornaments in relief, that trespass upon the gradations of reflected light. In the example above given of combined wrought and cast iron construction (fig. 1), the terminals have been selected for their suggestiveness of being used as a contrast to other forms. It is sometimes necessary to use a series of forms one above another, and such a spiral ball as this is of immense value. Two other forms are given in figs. 10 and 11.

The nature of the material and the process

of casting impose certain conditions which are characteristic of cast iron, and distinguished from wrought iron. These are,—a sufficient substance to prevent breakage, and the adoption of such forms as will "deliver" easily from a mould.



Fig. 10.



Fig. 11.

Generally speaking, it will be found that square and polygonal forms are not so pleasing as circular ones: the latter are made from moulds made in a lathe, and, therefore, susceptible of the greatest delicacy that the art of turning can produce.

The lesson to be learned from these modest terminals is that a legitimate effect in metallic design may be produced without having recourse to expensive wrought-iron.

The warning to be taken from them is,—not to repeat one pattern too often, as the speculating builder is prone to do,—and also, not to fix the terminals so as to get knocked on one side, as many examples have been. The avoidance of this error will, of itself, be sufficient to introduce a new treatment and set of forms which shall be obviously modern.

Lastly, one must be prepared for the lazy painter, who adds coat after coat, and chokes up any delicate surface ornaments; a good outline is, therefore, the chief object to work for.

#### THE ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS.

MEETING AT BOURNEMOUTH.

On Saturday last a Home Counties District Meeting in connexion with this Association was held at Bournemouth.

At eleven o'clock the members assembled in the Board-room in the Town Hall-buildings, when Mr. O. C. Robson, A.M.I.C.E., was re-appointed Honorary District Secretary.

Mr. Andrews, Town Surveyor, read a paper on "The Rise and Progress of Bournemouth and the Public Works in connexion therewith." In the course of this paper, Mr. Andrews stated the extent, population, rateable value, &c., of the Commissioners' district in 1884, as compared with 1856; and, passing on to describe the sewerage system, pointed out that the whole of the sewerage works in Bournemouth are constructed on the principle of gravitation, and that the sewage is discharged into the sea by means of three outfalls. The total length of sewers within the district, including the outfalls, is (he continued) about thirty-five miles, consisting of brick sewers 3 ft. by 2 ft. and 2 ft. 6 in. by 1 ft. 8 in. for the main lines; and stoneware pipes 15 in. to 9 in. in diameter for the collateral and branch sewers, with a maximum gradient of 1 in 11 and a minimum gradient of 1 in 300, the whole of which are ventilated at about every 100 yards, by means of 6 in. and 9 in. pipes from the crown of the sewer to the surface of the public roads, with cast-iron ventilating covers. The system of venting was also described. Referring with much minuteness to the sanitary hospital, Mr. Andrews said the cost of carrying out the whole work, including the fencing to enclose the ground, was 3,900l. The roads (of which there are now thirty-nine miles within the Commissioners' district), the pleasure grounds, the Boscombe Chine gardens, and the lighting arrangements, were in turn dealt with.

After hearing Mr. Andrews' paper, the members walked up the valley, through the public pleasure-gardens, to the West Station, where a special train awaited them, and the party proceeded to Messrs. Sharp, Jones, & Co.'s

pipe works, Bourne Valley. After luncheon the Potters were visited, when the treatment of raw clay and its prompt transformation into socket-pipes was witnessed, the pipe being expressed from the machine, with the socket complete, in one homogeneous whole. A variety of moulded work, chiefly appertaining to drainage, was also inspected. The members then proceeded to view the automatic discharge of a large tank by a stoneware annular syphon (Field's patent) at the rate of 450 gallons per minute, the power recommended for flushing a 9-in. sewer. A smaller syphon, with galvanised iron tank, self-contained, was then shown in action, in conjunction with Messrs. Bowes Scott & Read's patent stoneware latrines, as used by the London School Board, the flush being very effective, and the flow was led away by a length of Mr. Boulnois' "acme" pipes, which afford certain means of ascertaining by ocular demonstration that the sewer constructed with them is truly laid and perfectly joined. Field's automatic flush-tank, for flushing by house waste, &c., having been also seen in action, the rock concrete tube manufacture was the next, and to many the chief subject of interest and attention. The care displayed in regard to the suitability of the materials employed was specially noticeable, and the process of manufacture throughout was instructive to all who, as engineers, have so often to make use in one form or another of Portland cement concrete. As a practical illustration of the tubes in use, the Bournemouth Commissioners' 10-ton steam roller was then passed and repassed, and eventually left standing, over a length of 36-in. tubes laid at a depth of 3 ft. 6 in. below the surface of the ground, having only been filled in the day previous. The President having then examined the culvert and pronounced it intact, this practical experiment closed the visit. On returning to Bournemouth the members proceeded to various parts of the town and inspected the flushing and ventilating arrangement of the sewers at various points, and afterwards visited the Sanitary Hospital. After inspecting the building and the disinfecting room, which is in two parts, and fitted with Washington Lyon's disinfectors, they returned to the Town-hall Chambers, where a discussion upon the paper and works visited ensued. Plans of the hospital, &c., were, however, first of all laid before them and inspected. Amongst the members present were Mr. R. Vawser, president, Manchester; Mr. E. Pritchard, president, Westminster; Mr. C. Jones, hon. sec., Ealing; and Messrs. Robert Godfrey, King's Norton, Birmingham; W. Thomas, Dorchester; J. Elford, Poole; J. Pollard, late of Hendon; T. de Courcy Meade, Hornsey; G. Dawson, Southgate; F. Newman, Ryde; J. Livesey, Ventnor; W. Santo Crimp, Wimbeldon; H. Percy Boulnois, Portsmouth; J. R. Andrews, Bournemouth; G. B. Laffan, Bridgewater; James Lemon, Southampton; — Lobley, Hanley; and others.

#### THE PREVENTION OF RIVER POLLUTION AND THE SEWAGE QUESTION.

We have received from the "National Society to Secure Effective Legislation against River Pollution" the report of the Executive Council, which, we observe, includes several eminent engineers and sanitarians. The report states that after various meetings and much consideration and correspondence the Council succeeded in settling a Bill to insure the effective enforcement of the law against river pollution, and in getting it, as early in the Session as the 13th of November last, introduced by Mr. G. W. Hastings, Earl Percy, and Col. Walrod. On the 21st of November the second reading of the Bill was moved, but, unfortunately, the House was counted out before the question could be put. This necessarily caused considerable delay. The Bill having been launched the Council, by numerous appeals to riparian land owners, sanitary and fishery bodies, and others specially interested in pure water endeavoured to keep alive and extend the public feeling which the Society had widely roused in favour of the movement. Notwithstanding Mr. Hastings's constant endeavours to bring on the second reading, the opposition of certain industries imagined to be prejudicially affected by the Bill made it impossible again to bring the question before the House.

\* Plans, &c., of this hospital were published in the Builder for Dec. 20, 1884.



under these circumstances, it was deemed expedient to withdraw the Bill, and introduce another, limited in its operation to England and Wales, and embodying the more important amendments that had been suggested to the Council, and it is hoped that, without materially impairing the efficiency of the measure, will render it acceptable to all parties. The original Bill was withdrawn on the 29th of April. On the 20th of May, Mr. Stings introduced the amended Bill, which, under the title of "Rivers Purification," was read a first time in the House of Commons. The measure, though not in any degree sacrificing efficiency, was in many respects an improvement on its predecessor, and calculated to remove many of the objections that had been made to that Bill, and it was sanguinely hoped that the Society would have the satisfaction of seeing it passed into a law. Unfortunately, however, having determined to defer the consideration of every contentious measure, it is imperative that the Bill, although most important, should be withdrawn.

Accompanying the report is an appeal to the electors of the United Kingdom, urging them, in view of the approaching General Election, to treat the importance of the matter upon the selection of candidates, so that a strong assurance may be passed early by the Newliament.

With the object of the Society we need not say that we have the fullest sympathy, and we trust that something effective in this direction will be done before long. That nothing (constructively speaking) has yet been done is certainly not for lack of advisers, very many of whom have their own special nostrums to recommend. Of course, every new suggestion is worthy of careful consideration by the powers that be. The Thames is a flagrant example of a river, to the state of which the Metropolitan Board of Works is mainly contributory, as the body discharges the sewage of nearly four millions of people into the river, with a result too apparent in recent summers. Various resolutions are made to the Board from time to time, and duly referred to a committee, who, after a decent interval, that "having considered Mr. —'s proposal, they are not prepared to advise its adoption." This almost stereotyped form of report is too often accepted by the Board without question. But, surely, the Board should make up its mind as to what it will do in this important matter, and not be content with a policy of negation.

In our description of the Sanitary Exhibition at Leicester recently (p. 418, ante), we mentioned the exhibit of the Patent Porous Carbon Company, whose products were shown in their applications to water supply and sewage purification. In the list of awards at the same exhibition (p. 423, ante) it was stated that the exhibits of this company were reserved by the judges for practical trials. We return to the subject now because, whatever may be the conclusions arrived at by the judges of the Leicester Exhibition with regard to these particular exhibits, the matter is one of much interest at this time. As we have already briefly mentioned, the company's product has been in use at Southampton with satisfactory results. Having been in use for some months for clarifying the water at the Platform outlet, with a marked improvement in the condition of the arm of the sea known as Southampton Water, the Special and General Works Committee recommended the extension of the patent precipitation works, at the suggestion of the Borough Surveyor (Mr. W. B. G. Bennett), who speaks highly of the efficiency and economy of the process, the precipitation effected by lime and a powdered carbon supplied by the company we have named. The recommendation of the committee was adopted. It may be mentioned here that it is proposed that the scheme thus approved of is to deal with the resultant sludge in the following manner:—The sludge is removed from the tanks and conveyed to the "destructor station," where it is mixed with ashes prior to its being incinerated,—that is, when there is not sufficient demand for it as manure, for which it is found to be peculiarly adapted, it being of a ferocious character, and readily drying with the aid of presses. In its granulated form, patent porous carbon is available for water purification and other purposes of the kind. The material, we may add, is of a mineral nature, the basis consisting of lignite.

The Patent Porous Carbon Company, Limited, has been formed to manufacture and supply this material. The offices are at 23, Wormwood-street, London, where further information may be had. The company is sanguine of success, believing (on the strength of analysts' reports, testimonials, &c.) that it is able to supply the means of effectually dealing with the sewage difficulty in many towns at a very moderate cost.

#### A SUGGESTION *re* THE SMOKE NUISANCE.

MR. THOMAS C. SORBY, whose name will be remembered by many of our readers as an architect formerly practising in London, but who has been for some time settled in Montreal, in a letter to the *Montreal Star* of the 3rd inst., writes:—

"A furnace is practically a badly-constructed apparatus for the distillation of gas: the products 'pass over,' as does whisky in a still, unconsumed; the intention is to produce heat, the result to produce smoke. The products in both cases are no sooner liberated by heat than they are brought into contact with cooler surfaces and condensed into ponderable forms. The perfect combination of combustible and comburant, known as combustion, depends upon the temperature, the hotter it is the more complete is the operation. Any foreign body brought into contact with the flames arrests perfect combustion in proportion to its difference of temperature. Mr. Siemens, as the result of his investigations of combustion of fuel in furnaces, contends that the resultant flame should never under any circumstances touch the substance it is intended to heat. Take a cold plate, hold it over a gas flame: it is at once thickly coated with soot; the plate abstracts the heat necessary to the combustion of the carbon forming the flame, and at once condenses its constituent particles from the gaseous to the solid form. On the other hand, if you protect the flame and supply to it a stream of heated air, so as to reinforce its temperature, it makes combustion more perfect and vastly increases its brilliancy. Therein lies the secret of the improved lamps. Keeping this reasoning in mind, it will be readily understood that to place such a comparatively cool substance as the shell of a boiler in direct contact with the flame must have an effect similar to that of the plate over the gas light, for no matter how hot the boiler may appear to be, it must be at least from 700 to 1,000 deg. colder than the flame itself. If you throw open the door of a furnace you can distinctly see that as the tips of the flames impinge against the cooler surface they darken and condense into smoke. This increases in density as it travels away from the source of heat until the products of non-combustion are discharged into the open air to enter our lungs, impair our health, pollute our dwellings, and damage or destroy our property.

Now that we see something of the cause of the evil, wherein lies the remedy? I will glean from the researches of the greatest living authority on the construction of furnaces, Mr. Siemens. A furnace, then, to do its work properly, must be large enough to admit of the fullest expansion of the gas liberated so that the combustible and comburant can enter into complete combination, and not impinge during the process of combustion upon any cold surface; its walls must be constructed entirely of refractory materials such as fireclay; it should be fed with comminuted fuel and supplied with heated air. Such a furnace would evolve intense heat and supply the user with the greatest possible amount of heat or power obtainable from any specified volume of fuel at the cheapest rate, and free from all appreciable smoke.

The combustion chamber should therefore not be in contact with the boiler, but be in some convenient position at each end so that the intensely heated products of combustion, and they alone can be led through and through the boiler, giving up the effective heat before finally passing into the chimney. The ash-pit should be large and enclosed, and the air for combustion led into it by fines permeating the walls to take up any spare heat so as to reinforce that evolved by combustion. The fuel should be as small as practicable, fed through a hopper so as to scatter, and also to preclude the admission of cold air, which, by its chill

would momentarily condense the combustible and cause smoke. The object is not so much to 'consume smoke,' as not to make smoke.

The *raison d'être* of the 'tall chimney' is the necessity to create sufficient draught and pull away the heavy products of imperfect combustion, and a large proportion of the heat is used and required simply to get rid of the waste of this most antiquated and unscientific apparatus. With a furnace constructed on the principles above described, a small, ordinary-sized chimney would be ample, as the main product of combustion would be pure calorific, which would be mostly absorbed by the boiler, the residuary gases, at reduced temperature, would be of small volume and forced rapidly away. Thus there would be a net saving in first cost, a great proportionate saving in fuel day by day, and one of the evils of the time removed."

#### ASHTON COURT, SOMERSETSHIRE.

SIR GREVILLE SMYTH'S mansion in Somersetshire, Ashton Court, has lately been extensively altered and restored under the superintendence and from the designs of Major Davis, the City Architect of Bath. Ashton Court, although of a much earlier date, is indebted for its architectural character to Inigo Jones, who erected the Long Gallery and the rooms above. In the commencement of this century the façade facing south was added to by the erection of stabling, so that it measures nearly 300 ft. The latter portion has now been converted into a gallery, 92 ft. long, with ceiling in oak, with handsome dado, the style adopted being that of the time of Henry VII. This apartment has freestone chimney-pieces with chimney corners emblazoned with the arms of the ancient neighbours of the house. An oriel and an organ are at the date end. The natural history collection of Sir Greville Smyth extends the whole of one side of the gallery. The garden entrance is under a central tower, opening into a lofty stone hall, the fan tracery ceiling springing from a central pillar. An arcaded winter garden takes the place of the ancient quadrangle, which stretches along one side of the old tapestried hall, the ceiling being designed by the same architect, as also that of the vestibule adjoining. The staircase was until recently most unsuitable to so large a mansion. This has been entirely remodelled in the style of the latter part of the seventeenth century, with handsome balusters and newels, with vases and festoons. The staircase is 9 ft. wide and leads out from the hall; on the second landing it turns right and left,—leading on the right to a gallery and the private apartments; and on the left to a vestibule. From the vestibule the boudoir is entered, which was the drawing-room, barely completed for a Lady Smyth just prior to the death of Charles I. The guests' chambers adjoin, whilst a corridor leads round the central quadrangle, communicating with more distant wings of the house.

**The New Chelsea Vestry Hall.**—The ceremony of laying the foundation-stone of the new Vestry Hall at Chelsea took place on Tuesday afternoon, in the presence of a large company of spectators, including Sir Charles and Lady Dilke, Mr. C. A. Whitmore, the Rev. Lawson Foster, and a large number of vestrymen. In consequence of the dangerous condition of the present building, the Vestry resolved some time since to erect a hall of a substantial description, at a cost of 20,000*l.*, which would be raised by loans, the payment to spread over a term of thirty years. Competitive plans were invited, and those of Mr. J. M. Brydon were selected. Tenders having been sent in for the erection of the buildings, that of Mr. Charles Wall, a well-known local builder, was accepted. Mr. W. Davidge, chairman of the Building Committee, mentioned that the site on which it is proposed to erect the new building is a gift from Earl Cadogan, the late Earl having also presented to the parish the land on which the old building stands. Mr. Wall having handed a silver mallet to Mr. G. W. Osborn, the acting chairman of the Vestry; the latter gentleman went through the ceremony of laying the foundation stone. On Wednesday a dinner, to celebrate the occasion, was held at the Grosvenor Hotel. Plans, sections, and elevations of the new building were given in the *Builder* for May 2 last.



## Illustrations.

THE CHURCH OF ST. DIONYSIUS,  
ESSLINGEN, WÜRTTEMBERG.

**T**HE picturesque little town of Esslingen, on the Neckar, contains three very remarkable churches,—those of St. Mary, St. Dionysius, and the Catholic Church. The two former are now Protestant, though some few years back the Church of St. Mary was used at different hours of the day by both Catholics and Protestants, but by a very wise arrangement, made between the Government of Württemberg and the Bishop of Rothenberg, the Catholics gave up their joint occupation of the Church of St. Mary on condition that the then decorated Minorite church should be repaired and handed over to them. This was accordingly done, and the fine Minorite church has thus been saved from sharing the fate of the Spital-kirche (Hospital Church), which, although one of the noblest works of Matthias Böblingen,\* erected between 1485-1495, was stupidly pulled down only a very few years back.

The Church of St. Dionysius is a beautiful building, consisting of a nave and aisles, a long and very lofty choir, and two towers at the east end of the aisles of the nave. The nave, though very simple, is remarkably well proportioned, and the window tracery excellent. It offers a good hint for London churches because of the broad and simple treatment of the wall spaces. The towers are totally different in design, though both are remarkably good. They are connected by a gallery or bridge. These galleries, once so common in Germany, have of late years nearly all disappeared. The German architects of the present day seem to have a special dislike to them, under the impression that they are modern adjuncts to the churches. If instead of theorising upon the matter, they would simply consult old pictures and books they would find them represented frequently. That they were in existence during the fifteenth century is proved by the illustrations in the Nuremberg Chronicle.

Internally, the Church of St. Dionysius is as interesting as it is externally. There is a very fine rood-screen, with all the three arches opening into the choir, and a beautiful sacrament-house, or tabernacle, 40 ft. high. Both of these were the work of Lorenz Lecher, a Heidelberg sculptor and architect. The rood-screen dates from the year 1481. There is a good font of the same period, and the original high altar still exists. We may possibly, in a future number, describe the Church of St. Mary, with its remarkable spire.

On the bridge at Esslingen is a pretty little Decorated Chapel.

H. W. B.

OAK ROOM, ORIGINALLY AT  
NUREMBERG.

The room, of late fifteenth or early sixteenth century date, of which we give an engraving, was not long since brought over bodily to London; that is to say, the oak lining of the room, which constitutes its architectural value. It was on sale at Mr. Ichenhauser's, in Bond-street, who sent us a photograph of it, from which the engraving was made.

The room was the oak-panelled *salon* of Michael Wolgemuth, artist, who was born in 1439 and died in 1519, and lived during some part of his life at least in the house, 21, Burg Strasse, of which this room formed part; and it is exceedingly likely that the design is his, and the figures, perhaps, his own carving. Albert Dürer, the pupil of Wolgemuth, has, probably, been in that room often, and there is a tradition that Gustavus Adolphus found refuge in it once in a secret bedstead which forms part of its accompaniments.

What has been the fate of this fine piece of work since our attention was first called to it we have not heard. We cannot but think it a great pity that the original house should have been dismantled in this way; we can only hope that the work is in the hands of some one who appreciates it.

## PROPOSED ROMAN CATHOLIC CHURCH.

Our illustration is a reproduction of a water-colour drawing exhibited by Messrs. Goldie, Child, & Goldie at this year's Royal Academy.

This church, being designed for one of the

\* Architect of the tower of Ulm Cathedral.

eastern counties, is in the style most prevalent and associated with the old churches of that district.

The exterior is of red brick, with stone dressings, flintwork being introduced in the east gable, the spandrels of the clearstory windows, and the upper part of the tower, &c. The roof is covered with green slate.

The interior, of stone, is richly panelled and ornamented, the fittings being Renaissance in design.

MEMORIAL TO LORD FREDERICK  
CAVENDISH.

THE memorial to the late Lord Frederick Cavendish, M.P., which we illustrate this week, has been recently erected at Bolton Abbey, on a site adjoining "Hartington's Seat," familiar to all visitors to Bolton as commanding one of the most beautiful views of the abbey, with the Wharfe winding at the foot of the cliff, and the bridge in the distance. The structure consists of a fountain or basin, hexagonal in shape, raised upon a flight of stately steps. It is arched on the six sides, and the basin is covered by a groined roof. Above the arches, under the cornice, an inscription records the date of the birth and death of Lord Frederick, and states that the structure has been erected by electors of the West Riding of Yorkshire (of which he was Parliamentary representative), as a tribute to his memory. At each angle of the main cornice are boldly-carved gargoyles, and the parapet wall is enriched by a series of armorial bearings and heraldic devices; the Cavendish arms and supporters occupy two sides, and the other four sides have the arms of Lyttelton, Boyle, Clifford, and Howard sculptured in the panels.

The upper part consists of six curved converging ribs, carried up to form a kind of open lantern, supporting an enriched pinnacle. The total height of the structure is a little more than 40 ft.

It has been executed in Bolton Wood stone by Messrs. Stephenson & Co., of Manchester, and the carving is by Messrs. Earp, Son, & Hobbs, of London and Manchester.

The memorial forms a pleasing object on its platform of greensward, with a back-ground of fine timber, as seen from the abbey yard.

The work has been designed by Messrs. Thos. Worthington and J. G. Elgodd, architects, of Manchester, under whose superintendence the whole has been carried out.

## DOUBLEBOIS, CORNWALL.

THE illustration we publish this week of the above shows the principal and garden fronts of the residence recently erected for Mr. George Hermon, at Doublebois, near Liskeard.

The house stands on a picturesque site commanding extensive views over the valley through which flows the River Fowey.

The walls are built of local stone, rock-faced, with brick linings, and hollow space in the outer walls as a protection against damp. The quoins, pilasters, &c., are of granite, and the general dressings of Hamhill stone.

All the principal rooms are panelled with specially designed chimney-pieces in teak.

The house is lighted by atmospheric gas by Messrs. Edmundson, of Great George-street, Westminster. The ornamental glazing generally is executed by Messrs. Fournace & Watson, of Plymouth; and the large staircase window by Messrs. Heaton, Butler, & Bayne.

The work has been satisfactorily carried out by Mr. Pethick, of Plymouth, who has also built the lodge, stabling, gardener's cottage, hot-houses, &c.

Messrs. Christopher & White, of London, are the architects.

INTERIOR VIEW OF BECKLEY CHURCH,  
SUSSEX: AS RESTORED.

THE parish church of Beckley dates from the early part of the fourteenth century, with later additions. At the end of the last century it was treated in the most heroic fashion. The two eastern bays of the nave arcade were bodily removed, and a single elliptical arch, struck anyhow, substituted in order to get headway for the galleries. The galleries were carried round the aisles and across the west end of the nave. The chancel arch was also knocked out of shape to make room for an immense pulpit. The results of this treatment were that the north

pier of the chancel arch was thrust over some 3 in.; the adjoining arch into the north chapel was twisted; the east wall of the chancel thrust 18 in. out of the perpendicular; and all the eastern half of the fabric reduced to such a precarious condition that it was found necessary to rebuild the east wall of the chancel, the chancel arch and adjacent arches, and the two eastern bays of the nave. A new south chapel has been added on the same plan as the existing north chapel. A new hammerbeam roof, in oak, has been constructed over the chancel, and a new roof, formed partly of the old timbers, over the nave. The old nave roof was of the common unscientific type, consisting of large tie-beams, posts in the middle, with struts of astonishing shape set against them, and a long purlin running along the tops of these posts under the collars to the rafters. The rafters were framed together on what is called in those parts an "anti-tie" roof. The old tie-beams and rafters have been used again. The wall above the tie-beams over the chancel arch appears to have been always of studwork, doubtless to minimise the thrust of the unusually broad chancel arch. In rebuilding this portion, the new studding was turned into an ornamental feature. Oak has been used throughout, except in the aisle roofs. The old galleries were lighted by cucumber-frames set in the slope of the roof. These have been removed, and four new dormer windows constructed. The work has been most satisfactorily carried out by Messrs. Compport & Sons, builders, of Northiam, Sussex, from the design and under the direction of Mr. Reginald T. Blomfield, M.A., architect. The wrought-iron work was supplied by Messrs. Hart & Peadar, the woodwork flooring by Messrs. Parmenter. There was no clerk of works.

## LESMURDIE, ELGIN.

THIS is a residence lately erected near Elgin, N.B., for Major Johnston. The walls are of local stone, laid in squared, irregular-sized blocks; the quoins, plinth, strings, &c., being finely tooled and the face of the work generally left rough. The house stands on a eminence, which commands extensive and picturesque views of the surrounding country.

"COMMERCE": A DESIGN FOR STAINED  
GLASS WINDOW, BY JAMES WEST.

THIS is from a water-colour sketch for a window suitable either for the principal window in a Chamber of Commerce, or in any other large hall, "where merchants meet to do congress." The treatment is allegorical, and is scarcely intended to suggest a modern quayside scene of bustle and confusion. "Commerce," in its two-fold aspect of importation and exportation is represented. In the background are shown warehouses and granaries into which stores are being hoisted; and in the foreground, two merchants discuss a chart, while a third superintends the work of porters in the loading of a vessel, while the seated figure checks in a book the outgoing bales. Some originality has been sought to be obtained in the treatment of canopy and surrounding ornament.

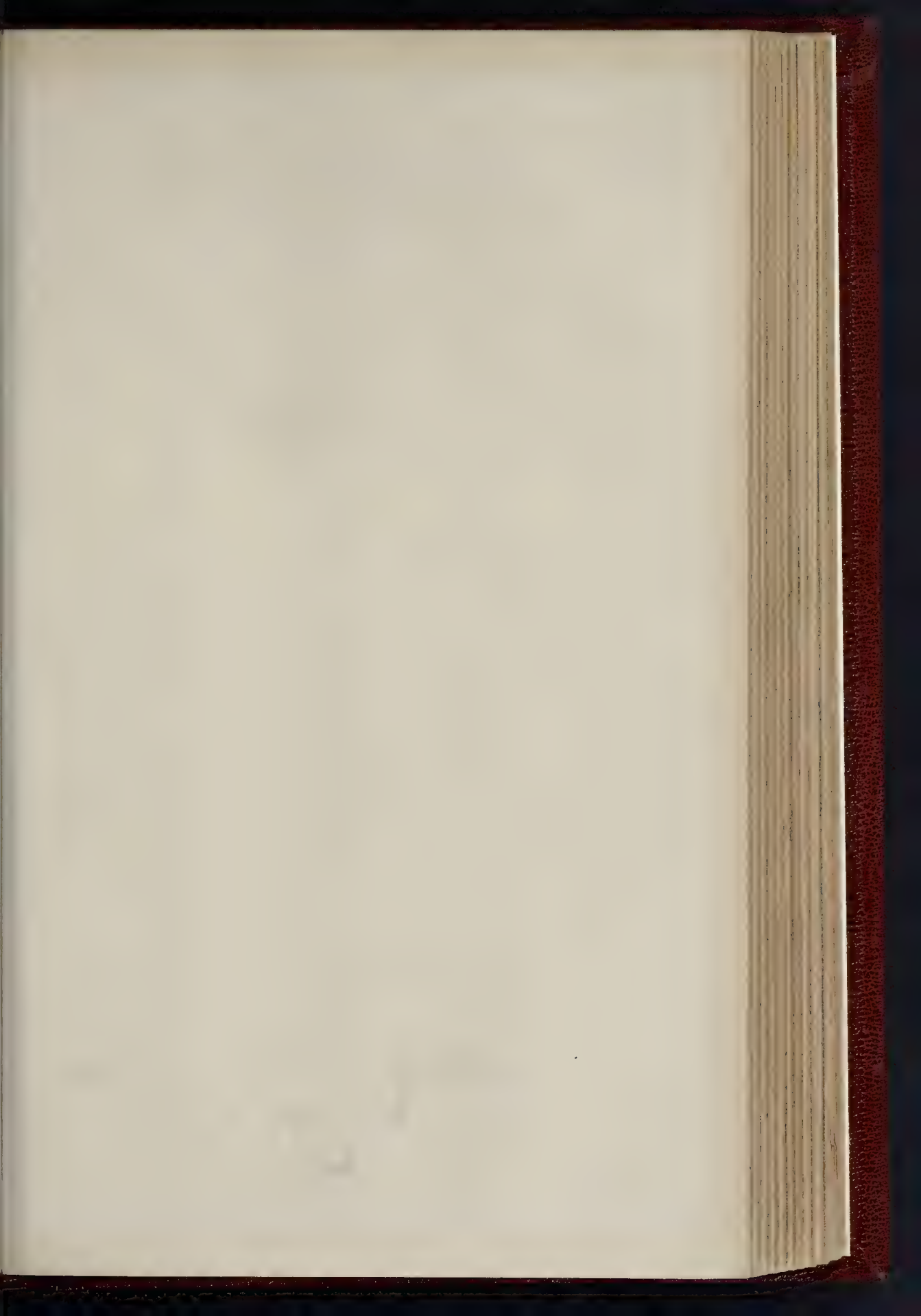
Royal Institute of the Architects of  
Ireland.

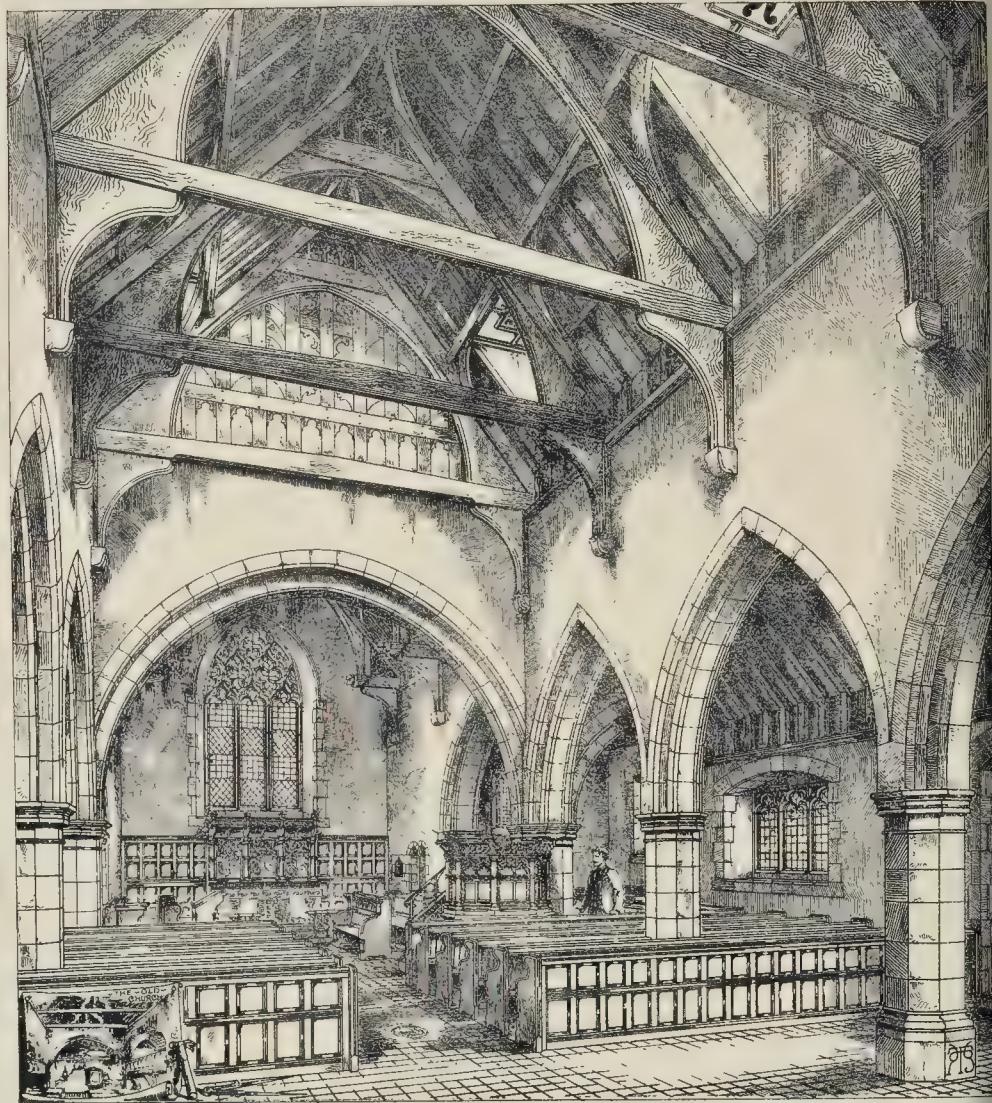
At a special meeting of the Council of this Institute last week, the following resolution was unanimously passed:—"That the Council desire to express and place on record their deep sense of regret at the great loss they have sustained by the death of their late President, Mr. John M'Curdy, whose unwearied attention to the interests of the profession for so many years deservedly gained for him the esteem and regard of all its members."

**Presentation of an Organ.**—At St. Church-road Chapel, Battersea, the ceremony of opening the new organ took place on the 15th inst. The organ has been designed and built at a cost of about 400l., by Mr. Fred. Stedman, architect, son of the late Mr. Stephen James Stedman, architect, who was for many years connected with the chapel, and has now presented them with it. It is supplied with wind by one of Blennerhassett's "Perfect Hydraulic Engines."

The Architectural School of the Royal Academy will re-open on Tuesday evening October 27th, at six p.m.





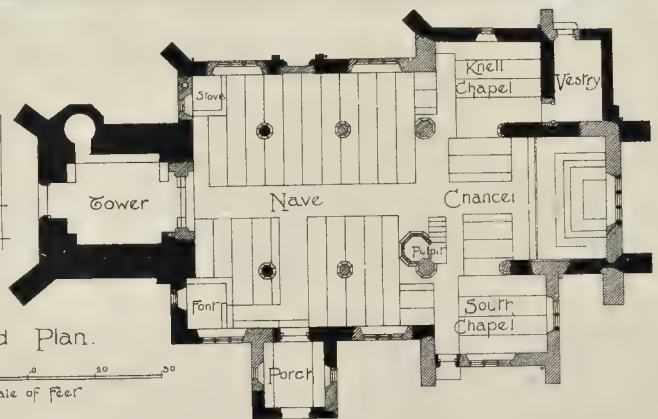


Sittings

|                       |     |
|-----------------------|-----|
| Nave                  | 178 |
| Chancel               | 27  |
| Knell Ch <sup>l</sup> | 25  |
| S. Chapel             | 31  |
| Total                 | 261 |

Ground Plan.

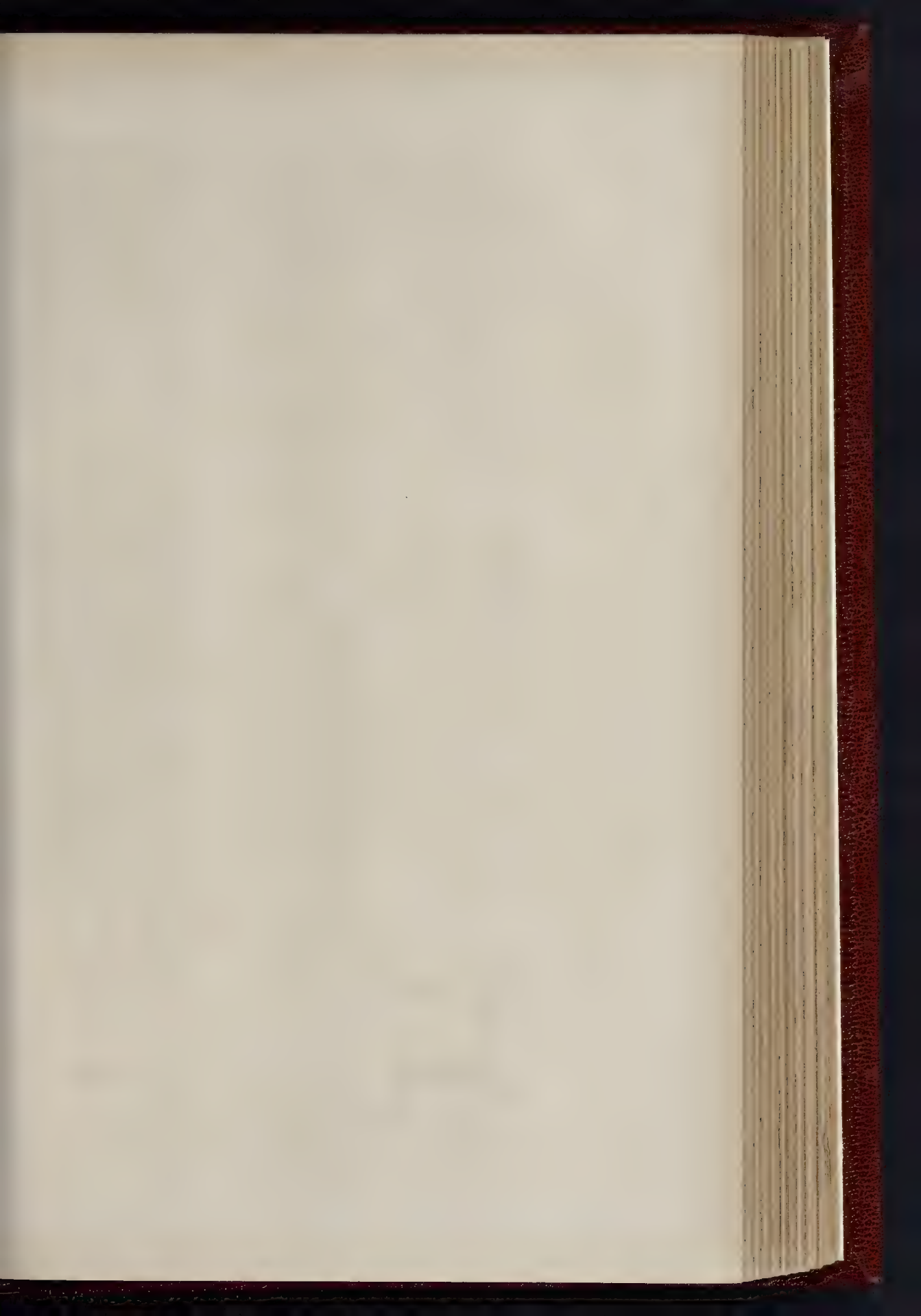
Scale of Feet

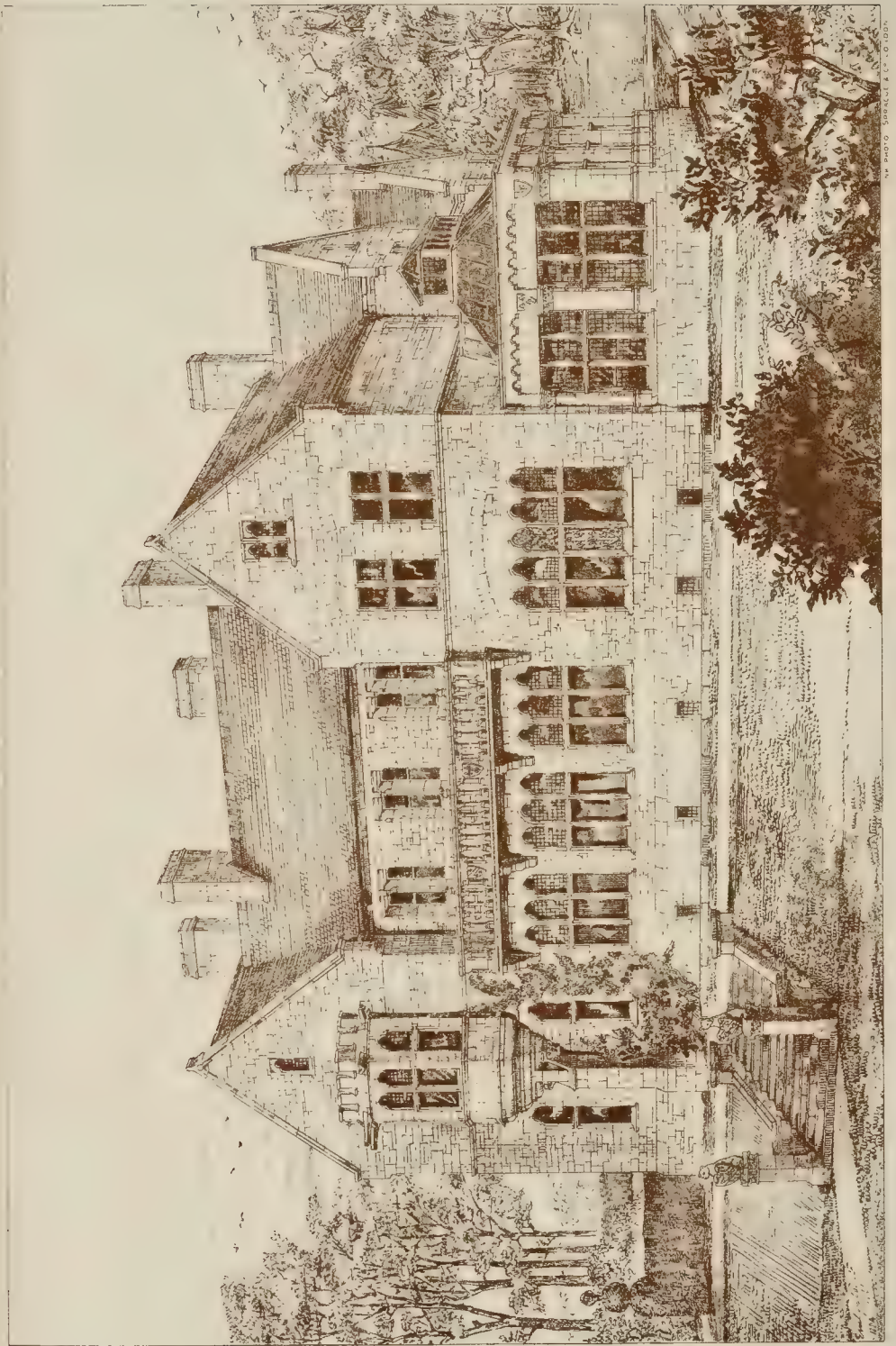


INTERIOR OF BECKLEY CHURCH, SUSSEX, AS RESTORED.

MR. R. T. BLOMFIELD, ARCHITECT

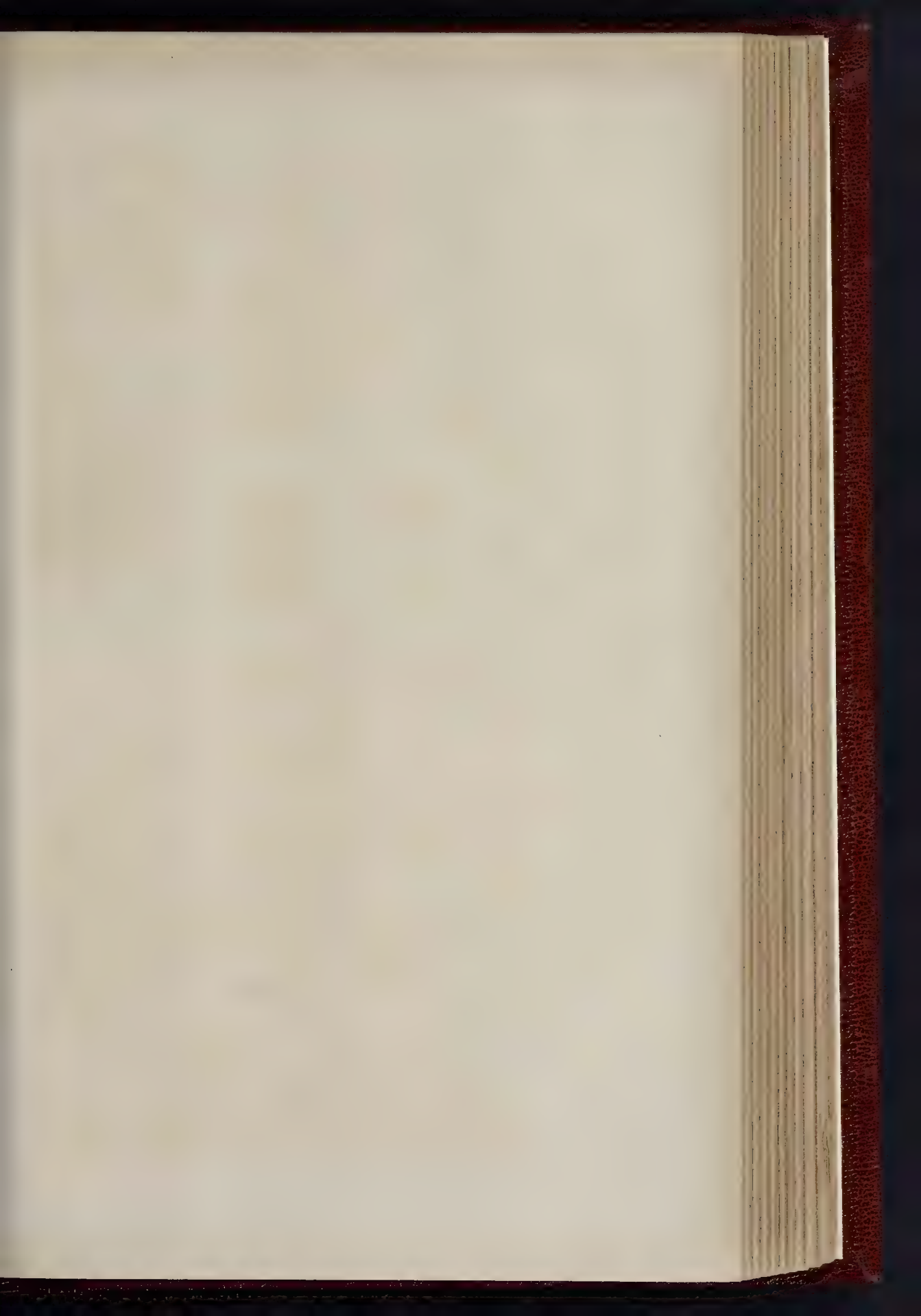






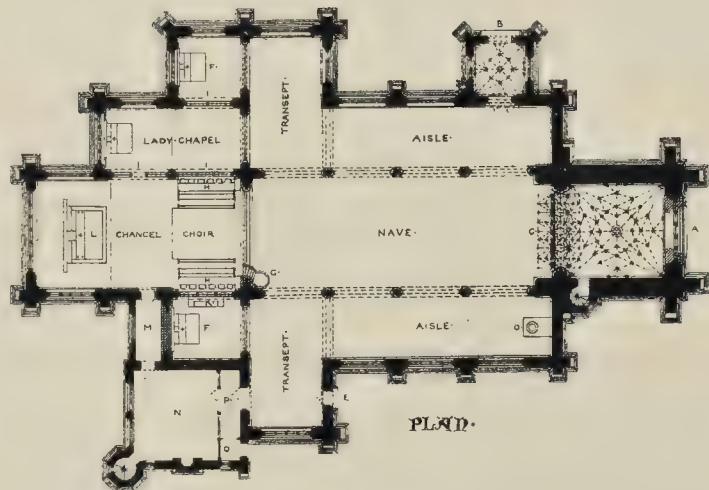
DOUBLE BOIS, CORNWALL.







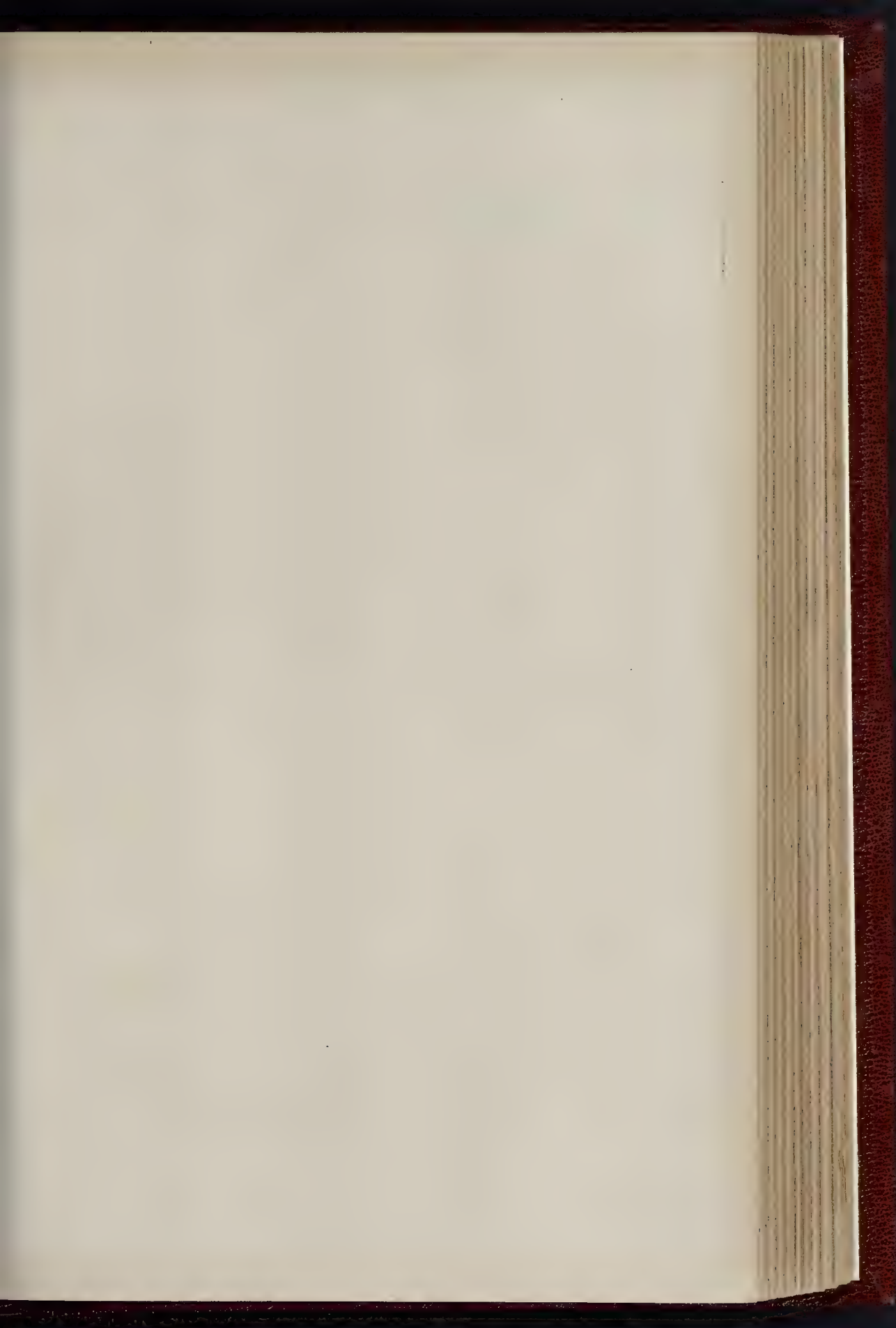
- A. TOWER AND PRINCIPAL ENTRANCE
- B. PORCH
- C. GLAZED SCREEN WITH ORGAN OVER
- D. FONT
- E. SIDE DOOR
- FF. SIDE CHAPELS
- G. PULPIT
- HH. STALLS
- HHH. SCAFFOLDS
- K. CHOIR ORGAN
- L. HIGH ALTAR
- M. PASSAGE OR LOBBY FROM SACRISTY TO CHOIR
- N. SACRISTY
- O. PORCH
- P. LOBBY FORMED BY GLAZED SCREEN



INK PHOTO. SPRAGUE & CO. LONDON.

PROPOSED ROMAN CATHOLIC CHURCH.  
MESSRS. GOLDIE, CHILD AND GOLDIE, ARCHITECTS.





THE BUILDER, OCTOBER 24, 1885.







CHURCH OF ST. DIONYSIUS, ESSLINGEN, WURTEMBERG.







MEMORIAL FOUNTAIN TO THE LATE LORD FREDERICK CAVENDISH.

Messrs. WORTHINGTON AND ELGOOD, ARCHITECTS







LESMOUGDIE, ELCAN  
MR W KINSEY, FRIEDY, ARCHTIC





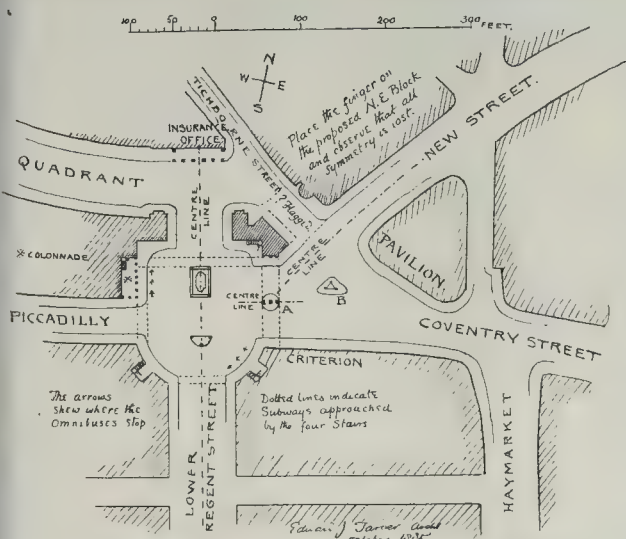


"COMMERCE": DESIGN FOR STAINED GLASS WINDOW.

BY MR. JAS. WEST







Plan Showing Proposed New North-East Block of Buildings at Piccadilly Circus.

# PICCADILLY CIRCUS.

SIR,—Until the other day London possessed a complete thoroughfare of undoubted magnificence, carried, with extreme ingenuity, by the genius of an architect, from the S.E. corner of Regent's Park to Waterloo-place.

It can have been no easy matter for Nash to compel the route between these two points into a continuous series of fine streets, and to treat the necessary turns as well-balanced architectural compositions, such as the view of Langham-place Church, and of the termination of the Quadrant as seen from Lower Regent-street.

This last composition has been thrown entirely out of shape by the demolition of the N.E. block of Piccadilly-circus, leaving the remaining three quarters of it abjectly facing the slanting lines of the new street and handsome Pavilion, and covering under the vast Criterion; while the Insurance office, which so fitly closed the view from Lower Regent-street, is now robbed of the architectural lines that led up to it, and tiny Tichborne-street is exposed as part of the coup d'œil.

The large open area that has been gained is, no doubt, valuable as space, and if the curve of the Quadrant could be continued on to the new street by throwing back the frontage of Tichborne-street, there would be some chance of putting the architectural lines into shape again.

The space thus enclosed would be large enough to be treated as a shapely and stately garden, adorned with fountains and statues.

Short of this it would seem better to treat the position again as a piece of street architecture, in which space, beyond a certain extent, becomes unmanageable, and to adhere to Nash's lines with such enlargements as the fresh circumstances render possible.

In doing so, the difference of date would be easily denoted by a change of detail, so as to make the new work tell its own story, while the main lines of the existing buildings would be continued.

The plan herewith submitted is intended to solve this problem and to bring back substantial ground-rents to the nation and rates to the parish.

October, 1885.

EDWARD J. TANVER.

# ON CIRCULAR HOSPITAL WARDS.

SIR,—I have thought it better to defer my reply to the courteous and able letter of your correspondent, Mr. John Brown, F.R.C.S., upon the above subject (see p. 479) until after you had published (see p. 549) a report of the discussion which ensued upon the reading of my

paper at the meeting of the Sanitary Institute of Great Britain, lately held at Leicester.\*

Mr. Brown takes exception to the dimensions and shape of the wards chosen by me for illustration and comparison, but he treats this part of the question in a rather desultory manner, and does not work out in its entirety his proposal for the adoption of a different basis of calculation. Your readers have, however, had my views, upon the question, and they have now the opinions of the experts who took part in the discussion at the meeting; and those, therefore, who are interested in prosecuting the investigation further have the opportunity of working out for themselves the problem set by Mr. Brown.

But Mr. Brown puts one part of the question most fairly and properly when he states that my "paper shows clearly that thirty beds form the outside limit for a parallelogram ward," and that a similar limitation of twenty beds holds in the case of circular wards. That is to say, you cannot put more than twenty beds in a circular ward, but you may put twenty and as many as thirty in a parallelogram-shaped ward. This is not my only contention, but it points to one of the most important factors in my argument, viz., that it is a sinful waste of money to build ordinary hospital sick-wards for a less number than twenty-eight or thirty patients.† If this can be shown to be a delusion, then my denunciation of the circular ward system loses a certain amount of its force.

Mr. Brown invites attention to the Burnley Hospital, which is being built upon this circular system. Little has been published as to the design of this hospital, but what I know of it enables me to say with some confidence that if Mr. Brown would kindly give me facilities for seeing the plans of this building, and learning the estimated cost of its erection, I could not have a more striking example for illustration of the extravagance my paper so much condemns.

H. SAXON SNELL.

# THE NEW GOVERNMENT OFFICES.

SIR,—As there appears to be a fairly general opinion that the plans for this building might be improved, I should like to be permitted to submit to those who take an interest in the matter the question whether it is not the principle of the plan that is wrong. There are nine closed courts, seven of which are only 25 ft. wide and over 100 ft. deep.

Looking at the various plans in Britton and Pugin's "Public Buildings of London," and in Fergusson's "Modern Architecture," the new Government Offices, if erected, will be, according to the present plans, the least liberally supplied with light and air of any first-class metropolitan building. They will even be worse off in this respect than Newgate

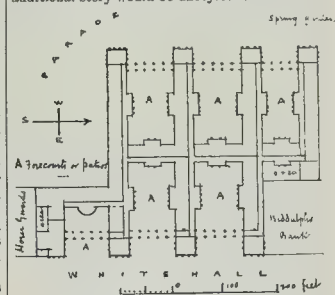
\* See p. 443, ante.

† Of course, I do not refer here to cottage or other small hospitals.

Prison, the yards of which have about the same area as the building. Can the Government persist in carrying out such a plan in these days of sanitary science? Will they venture to build an Italian palace with arrangements which are necessary only in a hot sunny climate in which shade and coolness are luxuries, but in England cause stagnant and unwholesome air, deficient light, and a cold and gloomy effect?

To build one of the most important national structures of the century on such a principle of plan will surely be the reverse of right. Posterity will certainly not accept the plea of limited area or economy as a justification for insanitary arrangements. If this be anything like the true state of the case, the land question should be reconsidered, and Messrs. Leeming re-commissioned. It appears to me that the alternative principle of plan is that of many fine old English mansions, in which all the rooms and corridors are purified on every side by the free circulation of air and full uninterrupted sunlight. There are no internal courts. On the contrary, every apartment is exposed to the beneficial rays of the sun at one time or another during the day, or, in its absence, to the fullest light available.

If this principle of plan were adopted, the structure, briefly described, would take the following form.—A block of buildings being placed in the centre of the land, extending from north to south. There would be three wings to the east and three to the west, advancing from this central block to the boundary of the land, with a space, or patio, of 80 ft. in width. Each of the smaller adjoining pieces of land would have a corresponding wing. The corridors of communication connecting the east and west end of the wings would be supported by open colonnades of light proportions, so as to interfere as little as possible with the circulation of air. With these buildings, 100 ft. high, as shown in the published drawings, the patios, 80 ft. wide, and the rooms having a south aspect, it is manifest that a cheerful and healthy result would be secured. Of course, the accommodation on each floor would be less than at present shown, but then upon the principle of plan I venture to offer for consideration an additional story would be unobjectionable.



But whether so or not it is clear that only by some bold and radical change of this kind can a building be obtained for the nation that will satisfy the ideas of the day, and the demands of sanitary science.

I feel well convinced that this general form of the building would lend itself to the very finest architectural treatment. I may, perhaps, say that it would be scarcely possible to spoil its effect. The spacious courts retiring inwards from Whitehall would be a striking novelty in street architecture, and would give apparent width just where it is wanted.

T. R. A.

# THE FIXING OF TERRA COTTA.

SIR,—I think that your conclusions in reference to this matter, as stated in your last issue [p. 527], are not well grounded. The fixing of terra cotta, as I take it, requires men adapted for this particular work. As to whether these shall be drawn from the masons or bricklayers I think is a question which might well be left in the hands of the employer himself to decide.\* He is the most likely person to know the capabilities of the men under his employ, and might have reasons for choosing from both. But if either one is to have the preference, my experience leads me to say, Give it to the bricklayers (if the quality can be met with). They will be found, as a rule, to be much cleaner in the use of the trowel, both in the fixing and the finishing of the work, than the mason fixers are likely to be; and, after all, it is a brick and not a stone bed and joint that is required. I also cannot conceive why a good bricklayer should not have as much truth in his eye as a mason. Another advantage is, that you will have a much larger staff of workmen to choose from, and, therefore, be the more likely to get what you require. The staff of mason-fixers is not very large, but with every bricklayer the use of the trowel is his trade, and their numbers are great.

JOSEPH W. TEMMS.

P.S.—In the above I have said nothing in reference to the prejudice which exists in the minds of

\* Precisely. But the men will not have it so.—Ed.



most masons against terra cotta, which might possibly tell against it in the fixing.

SIR,—In your issue of last week, referring to a letter by "A Mason," on the vexatious question of who shall set terra cotta, masons or bricklayers, the following remarks occur:—"The plain fact is that terra cotta, if it be decorative work, involves much more skilled working than ordinary bricklaying [walling], and ordinary bricklayers are not competent to execute it. Although the material is much more like brick than stone, the work is analogous to the better class of mason's work. The bricklayers, in claiming to do it, are claiming the right to execute what in all probability they would do badly, and what requires the assistance of skilled masons, or artisans of equal training and experience."

We disclaim all sympathy with the action of the bricklayers in the case referred to, believing that all artisans who have the skill have also the right to set terra cotta by virtue of that skill. But contractors (who invariably consult their own interest) as a rule prefer bricklayers as setters of terra cotta.

That they possess the required skill any person who visits the Natural History Museum (the most successful terra-cotta job in the kingdom) will at once admit.

While every bricklayer is a setter, the proportion of skilled setters among the masons is small indeed. In the localities of Manchester and Liverpool, where terra cotta is more abundantly used than in London, it is invariably set by bricklayers.

A BRICKLAYER.

SIR,—In your issue of the 17th of October, 1885, a letter appears from "A Mason" respecting the terra-cotta fixing at the bank and shops at —.

Now, sir, being an old subscriber, and a bricklayer working on the same job, I should like to say a few words respecting what "A Mason" says. He states the bricklayers struck against the masons, and they were discharged; which is absolutely false, as the contractor can prove. We certainly complained to our employer that we thought it was our work, and he admitted it was.

As regards it being a vexatious question, I may mention that bricklayers set the terra-cotta work on the Prudential Offices, Holborn; the Natural History Museum; and the Albert Hall, and gave satisfaction. I think a bricklayer capable of cutting and setting gauge-work is quite as capable of setting terra cotta. I do not think any ordinary mason can do gauge-work.

The bricklayers on this job bear no animosity to the masons, but only spoke for what they considered they were entitled to. Hoping this is not too long for your valuable journal, I beg to remain, in the interests of trade,

A BRICKLAYER.

\* \* We spoke with the recollection of more than one case (one a very large and important one) where the bricklayers insisted on doing terra-cotta work, and were spoiled it when stopped by the employer. In the special case referred to, they struck, and there was a long business about it. What is wanted, perhaps, is a special class of "terra-cotta hands." Our point is, that men who are not up to a special class of work have no right to demand to do it from a theory that it is "in their trade."

#### PROPOSED NEW CHURCH AT TOTTENHAM.

SIR,—In your "Church-building News" last week you mention that the new church for the Marlborough Mission at Tottenham is to cost "upwards of 3,000l." My estimate for the building is about 5,500l. I shall be obliged if you will kindly make this correction.

J. EDWARD K. CUTTS.

Oct. 22.

#### VENTILATION OF SEWERS BY SMOKE STACKS.

SIR,—Will you kindly allow me to ask, through the columns of the *Builder*, if some of your readers will inform me what towns (if any) ventilate their sewers by connecting them to large factory or works chimney stacks, and whether it is considered satisfactory to do so?

Any information on this subject will greatly oblige.

L. BROWN.

#### CHELTEMHAM GRAMMAR SCHOOL COMPETITION.

SIR,—May we ask the hon. secretary, through your columns (as we are forbidden to write direct to him by the terms of the competition) whether the professional assessor and the Governors jointly have selected the limited number of the plans, which are now being adjudicated upon, or whether, as may be inferred from the advertisement which appears in your issue of to-day, the Governors themselves have selected the limited number to be placed before the assessor.

If the latter interpretation is the correct one, as we fear it is, we must express our surprise that any architect of repute should have been found willing to occupy such a position.

If the Governors, after three months' discussion, cannot decide which of their friends is to be selected, it is a pity that an assessor should be called in to settle such a point.

A lottery would have been a more simple and a more honourable way out of the difficulty.

FOREWARNED.

#### PROVINCIAL NEWS.

Derby.—A large new theatre is about to be erected in Derby by Mr. Andrew Melville, who has purchased a site in Babington-lane. Mr. Oliver Essex, of Birmingham, has been appointed architect.

Sheffield.—A committee of the Sheffield Town Council has recommended the purchase of about forty acres of Meersbrook Park, Heeley, for preservation as a place of public recreation. The cost will be about 28,000l.

Southwold.—At a recent meeting of the Town Council of Southwold, a resolution was passed in favour of the construction of an iron promenade and landing-pier at this East-coast watering-place, according to the design submitted to them by Messrs. Copland & Gilmour, engineers, Old Broad-street, London. The object is, in addition to providing an ample promenade, to afford facilities for the easy landing of goods and passengers at all times of the tide. The proposed pier will comprise a promenade of about 400 ft. in length, with recesses and wind-screens, and a pier-head upwards of 20,000 square feet in area. On the pier-head will be erected a pavilion and concert-room, with refreshment-rooms, reading-room, &c., the roof of which will form an upper promenade. Seating accommodation will be provided for about 600 persons, besides the accommodation in the pavilion, which will have an area of over 3,000 ft. The cost of the whole is estimated at under 8,500l.

Southampton.—On the 15th inst. the Mayor of Southampton unveiled the monument to General Gordon in the Queen's Park. The memorial, which is in the Early English style, is composed of a cluster of four polished red Aberdeen granite columns, resting on a massive moulded and carved pedestal of Carrara marble and base of fine-axed grey Aberdeen granite. The columns are surmounted by a richly-carved capital, the whole being finished by an ornamental cross, the front of which is embellished by a dove with olive branch, and the back with a passion-flower. Besides the foliated carving on the pedestal, there are the crest and motto of the late General, the borough crest, General Gordon's name in Chinese characters, copied from his visiting-card as a Chinese Mandarin, and a bas-relief introducing a camel, pyramids, &c. The height of the monument is 19 ft. 7 in., and being elevated on a mound about 5 ft. 6 in. high, reaches a total altitude of more than 25 ft. The memorial is the work of Messrs. Garrett & Haysom, from the design of Mr. W. B. G. Bennett, Borough Surveyor.

The first sod at the new Southampton Waterworks at Otterbourne Hill was cut by the Mayor on the same day. The works will comprise, shortly, a circular tank, 150 ft. in diameter, with a capacity of a little over one million gallons, the depth of water being 10 ft. 6 in. The exterior wall will be of concrete, in the making of which the material obtained from the excavations will be utilised. Between the outer wall and the centre will be concentric rows of brick piers supporting five concentric rings of brick arches, the spandrels of which will be filled in with concrete. This will form the roof of the reservoir, and the surface of the common will be restored to its original state. The only feature that will appear above the surface will be a small circular tower from 10 ft. to 12 ft. diameter, and built of Portland stone, in the Norman style of architecture, which will serve the double purpose of an entrance to the reservoir and a ventilating medium. The water-wells and pumping-station will be some distance from the reservoir,—in the valley of the Itchen,—between Otterbourne Hill and Shawford Station. Two wells and borings, 100 ft. deep, will be sunk into the chalk, brick-lined 20 ft. down, and then 6 ft. borings the remainder of the depth. The water, after being softened, will be pumped up to the reservoir by two powerful engines, passing along 1½ mile of 24-in. piping to the reservoir. A by-pass will be constructed here so as to allow the water supply to continue to Southampton while the reservoir is being cleaned. The supply-pipes to Southampton will be 4½ miles in

length, and 16 in. in diameter. The contractors for the works are Messrs. S. Stevens & Sons, of Northam, Southampton. The works will be carried out from the plans and under the superintendence of Mr. Matthews, the Water Engineer. Mr. Matthews, in the course of a speech in connexion with the proceedings, incidentally remarked that these works, if carried out some years ago, would have cost much more than they would now. The manufacture of concrete had been brought to such a state of perfection that now it was a comparatively cheap material. The works there were to cost less than 5,000l., but thirty years ago they would have cost from 7,000l. to 8,000l. He acknowledged the great assistance he had received in the undertaking from his chief assistant, Mr. Blackwall, C.E.

Southbourne-on-Sea.—The new Undercliff Esplanade at Southbourne was opened a few days ago. The sea wall and esplanade works consist of a solid concrete wall, rising about 9 ft. above the present beach level, with foundations extending some 9 ft. or 10 ft. below it. The width of the promenade on the top of the sea wall is 30 ft. Immediately adjoining this, on the same level, is a carriage-road 40 ft. in width, and to the north of this, again, is another footpath 10 ft. wide. The latter will be immediately in front of the houses about to be erected on the Under Cliff. A central approach of 100 ft. in width has been made to the Under Cliff and Parade, with an easy gradient for carriages, from the Upper or Cliff Esplanade-road, which runs from east to west, above and to the rear of the houses about to be erected on the Under Cliff. Tenders for the first stage of these important esplanade works were asked for in the summer of 1883, but the estimates sent in varied so much, viz., from about 10,000l. to 23,000l., that the owners of the place determined upon carrying out the project by their own workmen, under the supervision of a good clerk of the works and suitable foreman. The whole work has been carried out under the supervision of Mr. Smith, their resident engineer.

Street (Somerset).—On Monday, October 12, the Right Hon. John Bright, M.P., delivered the opening address in Crispin Hall, Street, Somerset, which has been built by his son-in-law, Mr. W. S. Clark, and practically given by him to the inhabitants of Street. In connexion with the hall are provided reading, committee, smoking, and chess rooms for the Street Working Men's Club, also a library and spare room, all of spacious dimensions, and conveniently arranged. The Crispin Hall is 65 ft. long by 39 ft. wide, and 27 ft. high. The walls internally are lined with red brick, a dark-stained wood dado runs round the hall, window-cill high. The ceiling is plastered to the collar-beam, and the roof has curved principals. The Crispin Room, placed at the end of the hall, is 40 ft. by 20 ft. by 15 ft. high, and has a museum above it on the first floor, of the same dimensions. A caretaker's house, cloak-rooms, lavatories, &c., are provided. The whole of the buildings are of local blue lias stone, walling, with Ham Hill stone dressings and red-tiled roofs, having overhanging eaves and barge-boards. An octagonal vestibule and room over the entrance form a conspicuous feature in the elevation. The building has been designed by Mr. George J. Skipper, architect, Norwich, and executed by Mr. H. Hawkins, of Glastonbury. Messrs. Thorneloe furnished the gas-fittings, and Mr. Merrick carved the figures, &c., in the panels. Wilfrid Terrace, a row of workmen's dwellings, is now in course of erection for Mr. Clark in another part of the village, from designs by the same architect.

Stoke Bishop (Gloucestershire).—A village hall and reading-room was opened at Stoke Bishop, near Bristol, on the 15th inst. The new building comprises an entrance-hall, with public-bar for refreshments. Adjoining is the hall, which is to be used for public meetings, and entertainments, arrangements having also been made by which it can be divided with an sliding partition so that one portion can be used for a library and reading-room, while the other may be used for games. Attached are a cloak-room and lavatory, with a suite of rooms for the use of the caretaker. The internal fittings are in accordance with the architectural character of the building, which is of the style now commonly known as Queen Anne. The whole of the work has been carried out by Mr. Wilcox, of Weston-super-Mare, from the drawings and under the superintendence of Mr. Edward Gabriel, architect, of London.



**anley (Kent).—**The chapel belonging to new Convalescent Home of St. Bartholomew's Hospital has just received the remainder of its internal fittings, the most important of which is a richly-carved oak pulpit. The style of the chapel being Early English, the design of pulpit assimilates with it. In addition to a considerable amount of ornamental carving, it contains eight figures representing Moses, the Evangelists, St. Peter and St. Paul, and Bartholomew, the Patron Saint of the Hospital. This pulpit with the prayer-desk and altar were executed by Mr. J. Forsyth, of Chisle-road, Hampstead, from the designs of architects, Messrs. E. L'Anson & Son. The works, together with the chapel and all its fittings connected with it, are the gift of E. Homan, of Finchley.

#### CHURCH-BUILDING NEWS.

**Wembury.—**The interesting church of St. Andrew, Wembury, Devon, is now in course of restoration. The building, in the main, consists of a nave, north and south aisles, a chancel, transept, chancel, north and south apses, and western tower. It is built wholly of granite. The interior of the church is richly decorated. The nave roof is now of oak, and the work of restoring the fabric generally is being carried out from the designs of Messrs. Hine & Odgers, architects, of Plymouth. The workmen of the aquire (Mr. H. C. Cory, J.P., who is defraying the whole of the work), under the direction of Mr. William J. Sherwill, Mr. Cory's resident foreman of works. The rich carving of the roof of the carved seating, all of which will be in the best-possible English oak, has been entrusted to Mr. Harry Hems, of Exeter.

**Widale.—**The Church of St. Michael, Tiverton, has been supplied with a new pulpit of stone, the work being executed by Messrs. Lees & Willis, of Birmingham and London. The pulpit is hexagonal on plan, and the body consists of traceried panels, with canopied arches, the spaces between the arches being filled with diaper work. In the front panel is carved representation of St. Michael and the dragon.

**Berrow (Somerset).—**The ancient parish church of Berrow, near Burnham, has been opened, after undergoing restoration, at a cost of about 500*l.*, in accordance with plans prepared by Mr. J. Houghton Spencer, of London, the work being executed by Mr. H. Pollard, of Bridgwater. The church, dedicated to St. Mary, consists of nave, chancel, western tower, south aisle, south porch, and transept to the north of the chancel. The whole of the rough-cast has been removed from the external walls of the tower and church generally, and the stonework pointed with cement. The turret, which was covered with an ordinary lean-to roof, has had its battlemented roof replaced. In removing the plaster the original north doorway of the nave, in a very complete state, has been brought to light, the hammer on its edges being finished with a good thirteenth-century stopping. Traces of the arcades to the roof-loft were also laid bare in the same north wall, adjoining which was also used a very small narrow window, the object of which has given rise to some discussion. The tower has had a new roof, and the old lead has been re-cast and re-laid on the roof. The work on the roof of the south aisle has been similarly dealt with. The dressed stonework generally, which has been coloured or white-washed, has been repaired and the natural surface of the stone brought into view again. The steps in the turret have been repaired, and a new level, which was seriously displaced, strengthened with iron. The porch has had a new arch of Douling stone provided, of the same form as the old one, which was hopelessly decayed. The plastered ceiling has been removed, and the old deal rafters covered with boarding and moulded ribs, plainly oiled. At the west end a great alteration has been effected by the removal of the unsightly gallery and the ringing the tower arch into sight. The floor of the tower has been laid with Craven, Durnell, & Co.'s ornamental tiles. The walls have been re-plastered, and a new floor placed on the remains of the ringing-loft above. This woodwork has been oiled, and now forms the ceiling of the baptistry, which, with its new window, is very complete. The old beam and four columns which supported the gallery front have

been carefully preserved and placed against the north wall to form a framework for the bar and ropes of the chiming apparatus. The beam bears this inscription in quaint raised letters cut out of the solid wood:—

"I was set up right and even 1637. They are of the Lord a cvet that in theyr delings are not Just."

THOMAS NORVAL? WARRICK ——— J. dens.

Ellacombe's chiming hammers in connection with the bells have been attached to the ropes by Mr. Thomas Hooper, church bell-hanger, Woodbury, Devon. Four bells only can be used, as the tenor is broken, but it is hoped that funds will be forthcoming for re-casting it at no very distant date. The Jacobean pulpit and reading-desk have been freed from numerous coats of paint, and are now oiled. The former has had a new oak base provided in accordance with the character of the upper part. The latter bears the date 1631. The glazing was carried out by Messrs. Bell & Son, and the plumbers' work by Messrs. Hudson & Jones, both of Bristol. The stonework was executed by Mr. Charles Green, of Bridgwater, the general contractor for the whole being Mr. Henry W. Pollard, of Eastover, Bridgwater.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

4,523, Hot-water Boiler. H. Wheelwright.

The boiler is made of a number of tubes joined together, and forming a pyramidal coil. The water enters at one end and leaves at the other, the fire being made inside the coil, and the hot gases circulate round the pipes as they rise.

5,693, Privy. G. Burnall.

A shaft leads to the roof and is connected with the pan, and thus a downward current of fresh air is maintained in the pan to carry off effluvia. The excreta passes down the trap by its own weight.

8,249, Flushing and Ventilating Water-closets. T. W. Twyford.

The pan is of peculiar shape to effect the distribution of the water. Above the outlet-pipe is made a ventilating opening.

9,670, Ventilator. W. W. Fyfe.

A tube for admitting fresh air is provided over the ceiling, and is continued down into the ventilator to beneath a plate made more or less air-tight; from thence the air is projected into the room through slots. The impure air escapes through an ornamental grating placed near the ceiling.

11,515, Window Sash Fastener. J. Eaton.

A spring bolt fixed to the meeting-rail of the lower sash enters a hole in a plate on the upper sash, a similar bolt engages on the pulley stile, and thus the sashes are securely fastened. Each of the plates may be provided with several holes, so that the sashes can be secured at any height.

11,926, Soil-pipe. G. Cresswell.

For purposes of cleanliness soil and other pipes are made of glazed earthenware, enamelled metal or glass.

12,020, Fireplace. W. Potts.

The fireplace has no smoke outlet. The smoke, after ascending sufficiently to secure an upward draught through the fire and passing through a perforated plate coated with asbestos, mixes with the air and is conducted to a flue to the fire again. The fireplace is also applicable with slight modifications to cooking or heating stoves and bakers' ovens.

12,363, Glass Roofing. J. Sewell.

The glass is laid upon a bed of putty, overlapping longitudinally, and butting sideways as usual, the top of the supporting bars being flat. The corners of the glass are cut away to afford space for the insertion of a wooden plug having a head by which the glass is fixed. In the plug is a hole extending nearly to the end into which a nail or peg is driven in order to wedge the plug in the recess in which it is placed, and to tighten it down upon the glass, between which and the head of the plug is pressed a pad of putty to avoid breakage.

12,653, Anti-Fouling Paint. F. M. Lytle.

This is a poisonous paint, having for its basis the usual substances mixed with any unsoluble compound of mercuric chloride, or any oxychloride of mercury, with a copper salt or basic salt. When used on iron structures, a first layer of an inert paint must be used to prevent the reduction of the mercury and copper by the iron.

13,124, Handles for Hammers, Spades, Axes, &c. G. W. Elliott.

The blade is made with a tapering tang fitting in a correspondingly tapering socket, so that blows struck tend always to tighten the blade in its place. The handle is fixed into a second socket. It is thus possible to use the same handle for different tools.

13,355, Waterproof Cement. W. Smith.

Melting pitch is intimately mixed with about an equal weight of purely ground limestone or calcareous shale. The mixture may be used alone for making gas and water pipes, or as a cement for other materials.

14,621, Artificial Stone. J. Hatfield.

One part of hydraulic cement is intimately mixed with one of crushed granite and three of blast-furnace slag. Water is added, and the whole well stirred. Immediately on the total absorption of water, one part of slag wool is kneaded in.

14,847, Glazing Greenhouse Sashes. T. J. Hawkins.

The upper edge of glass is received in a groove in the top rail, and the edges rest in rebates in the stiles, having in them channels to carry away leakage. The lower edge of the glass is supported by a rail having at the back a rebate to carry off condensed water, and in front a groove in which rests the upper edge of the next sheet of glass. The lower edge of each sheet is secured by screws.

#### NEW APPLICATIONS FOR PATENTS.

Oct. 9.—11,995, W. Sanderson and T. Moffitt, Fasteners and Openers for Fanlights, &c.—11,998, G. Gray and Others, Improved Saws for Cutting Wood.—12,000, H. Vogt and G. Bernstein, Lamps for Removing Paint from Wood and Iron; also for Soldering and Brazing.—12,045, J. Gilmore and W. Clark, Improvements in Ventilating Apparatus.

Oct. 10.—12,056, T. Normanton, Improvements in Ventilating Apparatus.—12,062, W. Yates, Window Sash Fasteners.—12,068, H. Lake, Machines for the Manufacture of Sashes.

Oct. 12.—12,095, F. Stones, Improvements in Hoists.—12,099, W. Simons, Improved Sash Fastener and Lift combined.—12,113, G. Garrard, Machinery and Apparatus for the Manufacture of Tiles.—12,125, E. Murray, Register for Room to Room Communicator.—12,138 and 12,139, A. Williams, Improved Construction and Dustbin.

Oct. 13.—12,155, H. and A. Barlow, Securing Metal to Wood.—12,164, R. Johnson, Eclipse Steps and Ladders.—12,177, W. Benson, Improvements in Hinges.—12,191, A. Clark, Improvements in Window Sash Holders.

Oct. 14.—12,219, H. Fenney, Knobs for Sash Fasteners, Bell Hammers, &c.—12,221, D. Allport, Preventing the Slamming of Doors, &c.—12,222, S. Smith, Method of Working Window Sashes by Means of Chains and Pulleys instead of Weights.—12,223, R. Wyatt, Syphon for Flushing Cisterns and Water-waste Preventer.—12,247, T. Rooms and A. Smith, Carving and Shaping Wood.—12,251, W. McHaffie, Uptake Ventilators and Smoke Cowls.—12,252, A. Drummond, Improvements in Glazing.

Oct. 15.—12,285 and 12,286, D. Fergusson, Water Meters.—12,287, A. Lewis, Window Sash Fastener.—12,292, S. Hawkin and A. Clapton, Cooking Ranges or Stoves.—12,295, H. Buchan, Improvements in Water-closet Basins.—12,309, J. Kent, Machine for Planing, Jointing, Grooving, &c.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

10,036, D. Doyen, Door Checks or Closers and Annunciators.—10,445, G. Bird, Improvements in Paving Bricks.—10,740, G. Butchard, Kilns for Burning Cement.—10,840, L. Menning, Improvements in Locks and Latches.—11,058, W. Tylor, Improvements in Closet Basin and other Joists.—11,159, W. Scott, Improvements in Paperhangings.—11,349, E. Edwards, Improved Clamp.—9,827, P. John and T. Ballard, Improvements in Electrical Bells.—10,362, G. Butchard, Apparatus for the Manufacture of Cement.—10,838, A. Ward, Compound for the Manufacture of Pigments.—11,168, W. Ratcliff, Nail-making Machinery.—11,234, K. Proctor, Improvements in Wheelbarrows.—11,458, J. Farmer, Apparatus for Making and Pressing Bricks.—11,607, E. Knight, Water-waste Preventers.—11,634, L. Brodie, Porcelain Enamel Baths.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to opposition for two months.

15,161, W. Scott Morton, Embossed Canvas for Decorating Walls, &c.—16,393, J. Gillespie, Improvements in Bricks and Internal Walls of Furnaces, and in Concrete Walls.—16,394, J. Gillespie, Bricks for Garden and other Walls.—60, H. Robinson, Improvements in Roofing Tiles.—5,801, C. Brotherhood, Electric Bell Pushes, Contact Makers, and Indicators.—15,789, W. Margetts, Manufacture of Portland Cement.—16,791, P. Shiell, Apparatus for Cutting or Planing Wood.—16,950, W. Smith, Manufacture of Portland Cement.—16,962, J. Watts, Testing Pipes or Passages.—3,802, W. Johnson, Improvements in Walls, Roofs, Partitions, &c.—10,476, W. Haigh, Wood Planing Machines.

**The Seventh Exhibition and Market of the Brewing, Malting, Distilling, Licensed Victualling, and allied Trades, opens on Monday next, for the week, at the Agricultural Hall, Islington. During the progress of the Exhibition there will be a Brewers' Congress and a Mineral Water Trade Congress.**

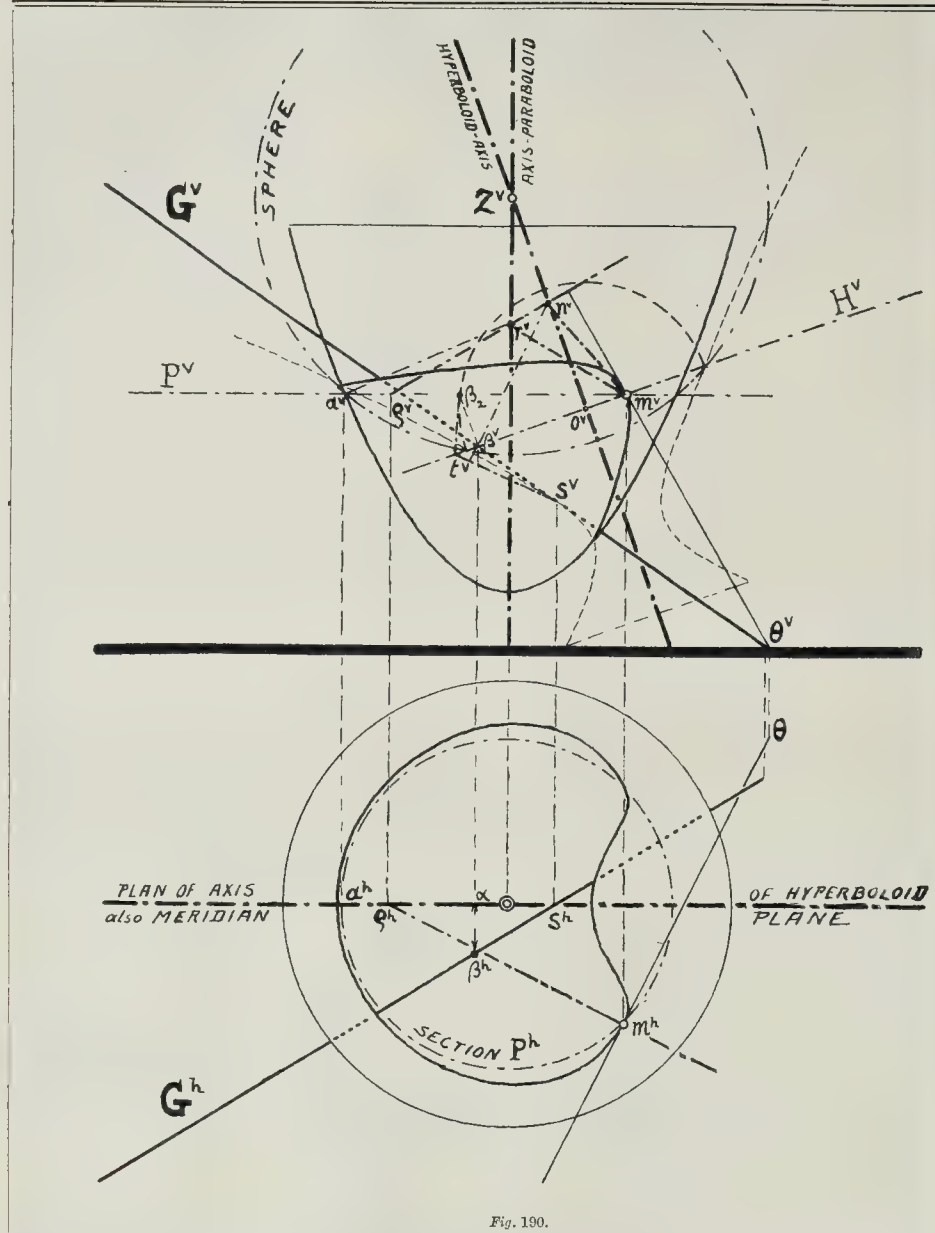


Fig. 190.

### The Student's Column.

#### DESCRIPTIVE GEOMETRY.—PART II. XXI.

**R**EVERTING to the remarks at the close of our last paper, we may observe that the foregoing conclusions, as well as what follows, are the result of algebraical calculation, and we beg the readers to accept them without any proof as facts of practical importance.

If you vary the diameter of the neck of the hyperboloid, but preserve the same inclination for the generators, you will get a series of hyperboloids, the meridian outlines of which will be similar curves. Therefore, all these hyperboloids are similar and concentric surfaces; and as this property holds good for the limiting cone, where the diameter of the neck is nul, we can affirm that, when a plane

cuts the hyperboloid and its limiting cone, the sections made in these two surfaces will be similar and concentric curves.

In the fig. 188 we have drawn a series of generators of one system and the outlines of the hyperboloid, so that the reader may better understand its surface. On the plan we have shown the upper part of the generators with a full line until they reach the circle of the neck, after which we have dotted them to show that they are hidden by the upper surface. On the elevation we have shown with full lines, the generators which stand in front of the meridian plane, until they reach the outline of the meridian; after which we have dotted them to show that they are hidden.

To find the plane tangent to the hyperboloid of revolution in a point  $m$  of its surface (see fig. 189) we have only to find the plane which contains the two generators of the surface which pass through  $m$ . For, the plane tangent to

the surface must be tangent to any line on the surface passing through the point of contact  $m$ ; and as the generators are such lines, it is evident that the plane that contains them is the tangent plane required, which we have called  $P$  in fig. 189. The vertical trace of  $P$  we have found by a horizontal line from  $m$  which has given us a point  $p$  thereof. We must also notice that the plane  $P$  is tangent to the surface of the hyperboloid in point  $m$ , but everywhere else cuts the hyperboloid along the generators which pass through  $m$ . This is a property similar to the one we have already noticed in the planes tangent to the internal surface of the torus.

Let us add that the fact that the generators of the same system never meet, shows that the hyperboloid is a skew surface, and cannot be developed on a plane like cylinders and cones. This is a question we shall examine in our general bearings further on.



and the intersection of a paraboloid and a hyperboloid, both of revolution, and the axes which meet. (The hyperboloid is given only by its axis and a generator, G.)

The paraboloid of revolution is the surface which forms the front part of cannon and rifle muzzles. In our figure (see fig. 190) the paraboloid has its axis vertical, and is supposed to

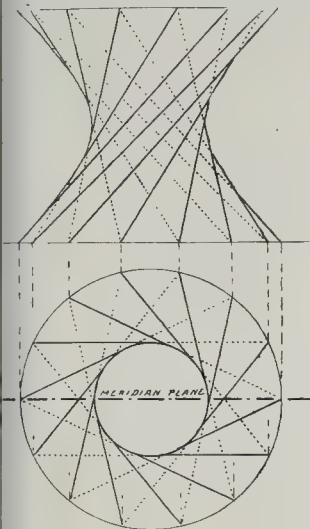


Fig. 188.

be hollow, so that we may look down into it; whereas the axis of the hyperboloid is inclined, and cuts the axis of the paraboloid in the point.

We have selected the elevation plane parallel to the plane which contains the axes of both surfaces, so that on the elevation the surfaces would have their meridian as outlines. To make the figure more intelligible, we have

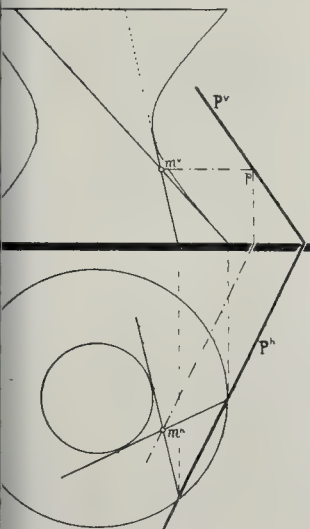


Fig. 189.

faintly dotted the outline of the hyperboloid; but as this surface is given to us only by its axis of revolution, and one generator, G, the reader must consider the dotted outline of the hyperboloid as non-existent. In fact, our drawing shows only the paraboloid, and the curve cut into it by the generator of the hyperboloid when revolving round its axis.

We know that any sphere with its centre in

Z will cut both the surfaces according to circles, for they are surfaces of revolution; but, as we have not got the outline of the hyperboloid, we cannot proceed exactly as we did in fig. 165.

We first cut the hyperboloid by a plane H perpendicular to its axis, which gives, of course, a circular section. The plane H will cut the generator G in the point  $\beta$ , and the axis in the point O, therefore the real distance from O to  $\beta$  is the radius of the circular section. If we turn down the section so as to lay it on the meridian plane, the point  $\beta$  will come to  $\beta_2$ , the distance  $\beta\beta_2$  being equal to  $a^2\beta$  (see plan); the radius of the section will, therefore, be  $O\beta_2$ , and we can draw the circle. The extremities of the diameter of that circle are on the outline of the hyperboloid; and, if we draw through them a sphere, the section of the hyperboloid by that sphere will be the circle of the radius  $O\beta_2$ . This same sphere makes also a circular section in the paraboloid; the elevation of that section is on the line P' and its plan is the circle P<sup>2</sup>. The point m', where the traces H' and P' meet, is the elevation of a point of the section of the two surfaces, its plan, m<sup>2</sup>, will be found on the circle P<sup>2</sup>.

To delineate the curve of intersection we have repeated the operation described above for a series of points. We were also assisted in our drawing by the knowledge that the elevation of the curve would be a hyperbola, as being the intersection of surfaces of the second degree. (See observations on fig. 165.)

#### DISSENTING CHURCH-BUILDING NEWS.

**Whalley Range (near Manchester).**—On the 10th inst. Mr. Samuel Stitt, of Birkenhead, laid the memorial stone of a new Presbyterian Church which is in course of erection at Whalley Range. The site chosen is at the junction of Upper Chorlton-road and Stamford-street, and the church is to supply the requirements of the united congregations of Coupland-street and Whalley Range. The designs selected are those by Messrs. Mangnall & Littlewoods, architects, of Manchester. The tender of Mr. Kendall was accepted for excavating, brickwork, and masonry, amounting to 2,805*l.*; and that of Messrs. Wilson, Tott, and Huntley, for the joiners' work, slating, plumbing and glazing, and plastering and painting, amounting to 1,795*l.* The contracts include, in addition to the church, the erection of church officer's house, built at the north angle of the plot, fronting Stamford-street, and separated from the church by the existing building containing the lecture-hall and schools. The church will have a tower and spire 110 ft. in height. The church is 81 ft. long and 44 ft. wide, the roof being in one span and without any internal columns. The floor will be composed of wood blocks set to pattern, and will have an inclination of 2 ft. from the front of the church to the Communion, affording pew accommodation for 540 sittings. The organ and choir are to be located in the north-east transept.

**Fowey.**—A new Congregational Church is to be built at Fowey. The architect is Mr. W. Wills, of Derby. The new buildings will include a church to seat 200 persons, a lecture-hall, and two class-rooms. They will be in the Early Gothic style, and will cost about 1,000*l.*

**Perth.**—The new church erected in Marshall-place for Free St. Leonard's congregation has been opened by the Rev. Donald Fraser, D.D. Marylebone, London. It has occupied about two years in building, and has cost about 12,000*l.* It is in the later Scotch Gothic style of architecture, founded on such old examples as Stirling, Linlithgow, St. Giles's Edinburgh, and St. Monance in Fife. A notable feature of this later Scotch style is the great crown surmounting the tower, of which there are examples at Edinburgh and Aberdeen, and till lately at Linlithgow. The architect, Mr. John J. Stevenson, reproduces such a crown. With a view of giving more importance and better proportion to the aisle windows, the arch is continued above them, and the space inclosed by the arch is ornamented with tracery, which is pierced with lights, as it is at the back of the gallery. The windows behind the gallery are kept small in order to avoid increasing the size of the aisles. They are more for ventilation than for light, the gallery having ample light from the clearstory. The buildings have been set on the ground so as to give the greatest appearance of length. The entrance is from the principal frontage, the pulpit at the west,

with the vestry, session-house, and hall beside it. The roof of the church is of moderate height, and the length of the church is about 70 ft. The lower part of the tower forms a large porch, giving ample space for entrance and exit. In the area 545 sittings are provided in pews, 53 in open seats, 58 for choir and for elders, and 329 in the galleries, making a total of 985. The hall, which is on the ground level, is lighted by the end window, and by a row of skylights on each side of the roof. It contains seats for 309 persons, exclusive of those on the platform. In the tower above the porch are two large well-lighted class-rooms. The heating is by hot-water. The cost of the church and accessories, including crown, has, as already stated, amounted to 12,000*l.* The contractors for the work were:—Messrs. Fraser, Morton, & Co., Perth; joiner, Mr. James Hay, Perth; slaters, Messrs. W. & A. Dewar, Perth; plasterers, Messrs. John Mackay & Son, Perth; plumber, Mr. Alex. Davidson, Perth; painters, Messrs. Stalker & Boyd, Perth; glaziers, Messrs. McCulloch & Gow, Glasgow; and ironwork and heating, Mr. James Taylor, Perth. The schedules and measurements were prepared by Mr. Wm. Campbell, ordained surveyor, Perth.

**Danbhill (Bolton).**—The memorial stone of a new Wesleyan Chapel at Danbhill was laid a few days since. The building is designed in the Italian style, and is to be built of patent red brick with stone dressings. The chapel will have a gallery on three sides, and will provide accommodation for 700 persons. The cost of the whole building, exclusive of the land, will be about 4,000*l.* The architects are Messrs. Woodhouse & Morley, of Bolton and Bradford. The builders are Messrs. Gornall & Booth, for brickwork; Mr. Jno. Dickenson, stonework; Mr. Warburton, for plastering and painting; Mr. Walsh, for plumbing; Mr. L. C. Webster, of Manchester, for woodwork; and Mr. J. Hodson, jun., for slating.

#### SCHOOL-BUILDING NEWS.

**Carlisle.**—A new school and lecture-hall in connexion with the Wesleyan Methodist Chapel, Fisher-street, has just been opened. The building has been erected upon the old burial-ground at the rear of the church, from plans prepared by Mr. T. Taylor Scott, architect, of Carlisle. The whole of the work has been carried out within four months by Mr. Hill, builder, and Mr. Hewitt, joiner, under the superintendence of the architect. The cost of the building has been about 800*l.*

**Newcastle-on-Tyne.**—The day schools in connexion with Christ Church, Newcastle-on-Tyne, are about to be further enlarged. It is stated that these schools are already the largest Church day schools in the North of England. Mr. Arthur B. Plummer, of Newcastle, is the architect for the additions.

**Bramcote (Notte).**—New national schools at Bramcote have been opened. They have been built by Messrs. Fish & Son, of Nottingham, at the sole cost of Mrs. Sherwin Gregory, the architect being Mr. Booker, of Nottingham.

**Migration of Industries.**—Following the example set by Messrs. Cammell, of Dronfield, another great iron and steel producing firm has moved its works to the seaboard. Messrs. Nettlefolds, of Birmingham, finding that they cannot successfully compete with firms who have a shorter distance to send their goods for shipment, have decided to remove their Castle Iron and Steel Works at Wellington to Newport, in Monmouthshire. A large expenditure will necessarily be involved in this change, but the firm are confident of recouping themselves. In railway freights alone they reckon that they will be able to save 15,000*l.* annually. This removal of all the heavy trades to the coast is becoming a serious question for those who have their capital locked up in inland towns, which, up to the present, have been the seat of such industries. As a centre of the iron trade, Sheffield is very directly involved in such a change, and property owners in the town will watch with a very real interest the result of these experiments.—*Sheffield Independent.*

**Rowbarton.**—A three-light Munich window has just been erected in St. Andrew's Church, Rowbarton, representing the Nativity of Christ. The inscription at the foot reads thus:—"To the glory of God and in memory of Maria Withington, who fell asleep 4th January, 1885." The artists are Messrs. Mayer & Co.



# RECENT SALES OF PROPERTY. ESTATE EXCHANGE REPORT.

|                                                                                                                     |       |
|---------------------------------------------------------------------------------------------------------------------|-------|
| By T. B. WESTACOTT.                                                                                                 |       |
| Haverstock-hill—93, Mansfield-road, 79 years, ground-rent 84, .....                                                 | £220  |
| Chalk Farm-road—47 and 87, Harwood-street, copyhold .....                                                           | 910   |
| Caledonian-road—No. 404, 91 years, ground-rent 107, .....                                                           | 510   |
| Hornsey-rise—128, 131, and 133, Marlborough-road, 89 years, ground-rent 134, .....                                  | 1,060 |
| Oct. 14.                                                                                                            |       |
| By S. B. S. DOWICK, SON, & WHELL.                                                                                   |       |
| Bushey Heath—The freehold residence, "Heathbourne," and 2a. 1r. 5p. ....                                            | 3,503 |
| Oct. 15.                                                                                                            |       |
| By HAINES & SON.                                                                                                    |       |
| Camden-road—No. 160, 2 years, ground-rent, 21. 10s. Nos. 220, 222, and 224, term 52 years, ground-rent, 100, .....  | 60    |
| No. 236 and 240, term 53 years, ground-rent, 107, .....                                                             | 3,800 |
| Kentish Town-road—No. 42, term 36 years, ground-rent 101. 5s. ....                                                  | 2,760 |
| Canonbury-road—No. 8, term 33 years, ground-rent 144, .....                                                         | 420   |
| Burton-crescent—27, Mabledon-row, 21 years, ground-rent 81. 8s. ....                                                | 750   |
| By F. A. B. MORRIS, ELIZ. CLARK, & CO.                                                                              |       |
| West Kensington—8, Farce-road, freehold .....                                                                       | 50    |
| Chelsea—22, Rawlings-street, 58 years, ground-rent 61, .....                                                        | 350   |
| Holborn—17, Kingsgate-street, 58 years, ground-rent 341, .....                                                      | 640   |
| Clerkenwell—3, Brower-street, 12½ years, no ground-rent .....                                                       | 780   |
| Euston-road—17, Walsley-street, 22 years, ground-rent 81. 8s. ....                                                  | 105   |
| By NEWBORN & HARDING.                                                                                               |       |
| Islington—40, Gibson-square, 40 years, ground-rent 81, .....                                                        | 130   |
| Kingland—An improved rental of 22k, term 16 years .....                                                             | 575   |
| Clapton—47, Powerscroft-road, 93 years, ground-rent 71, .....                                                       | 265   |
| Islington—10, Theberton-street, 30 years, ground-rent 61. 10s. ....                                                 | 200   |
| 87, Barnaby-road, 34 years, ground-rent 81, 134, 136, and 138, Rotherfield-street, 32 years, ground-rent 301, ..... | 380   |
| Holloway—147, Stroud-green-road, 78 years, ground-rent 11, .....                                                    | 456   |
| Blackstock-road—An improved rental of 160k. 8s. 9s. ....                                                            | 665   |
| 54 and 58, Blackstock-road, 86 years, ground-rent 121, .....                                                        | 475   |
| 28 to 40 even, Brunswick-road, 9 years, ground-rent 301, .....                                                      | 980   |
| 26 to 32 even, Eden-grove, freehold .....                                                                           | 965   |
| 60 and 62, George's-road, freehold .....                                                                            | 200   |
| Kingland—11 to 17 odd, Benyon-road, 40 years, ground-rent 81, .....                                                 | 1,775 |
| Commercial-road—E—1 and 3, Morris-street, 7 years, ground-rent 41. 17s. 6d. ....                                    | 710   |
| Lambeth—39 and 41, Oakley-street, 24 years, ground-rent 181. 18s. ....                                              | 1,405 |
|                                                                                                                     | 90    |
|                                                                                                                     | 250   |

## MEETINGS.

MONDAY, OCTOBER 28.  
Leeds and Yorkshire Architectural Society.—Mr. W. H. White (Secretary, R.I.B.A.) on "The Past, Present, and Future of the Architectural Profession."  
Inventors' Institute.—8 p.m.

WEDNESDAY, OCTOBER 23.  
Liverpool Engineering Society.—Prof. H. S. Hole-Shaw "On Recent Researches on the Nature of Friction and the Action of Lubricants." 8 p.m.  
Institution of Mechanical Engineers.—General Meeting in the Corn Exchange, Coventry. 9 p.m.

## Miscellaneous.

**The Association of Public Sanitary Inspectors.**—The second annual report of this Association states that the present number of its members is as follows, viz., 46 metropolitan, 73 urban, and 52 rural, besides 26 honorary members. The Council are disappointed with the work of the Royal Commission, as they feel that if more Sanitary Inspectors had been called upon to give evidence a much stronger case on behalf of the disability of Inspectors would have been elicited, and many important facts brought to the knowledge of the members of the Commission which they are not at present acquainted with. The recommendations of the Royal Commission have been fully considered by the Council, especially the portion affecting the qualifications of Sanitary Inspectors, and they thoroughly coincide with the recommendation that no person should be eligible for appointment as Sanitary Inspector unless he holds a certificate of competency from some recognised public authority, or has previously held office for three years. With this view the Sanitary Institute of Great Britain has been approached in order that the two associations might together promulgate some means for joint action. As it seems unlikely that the Legislature will provide any form of superannuation for Urban and Rural Inspectors, it has been considered desirable to form a benevolent fund in aid of the families of any Sanitary Inspectors who may be incapacitated or lose their lives during the execution of their duty, as, unfortunately, has been the case during the past year.

## Illuminated Fetes at the Crystal Palace.

A few facts with reference to the evening indoor-fetes, which will for the present take place tri-weekly, on Mondays, Tuesdays, and Saturdays, may be interesting. The normal lighting of the building, by about 5,000 ordinary gas burners, and seventy-five large electric arc lamps, each of a nominal 2,000 candle-power, will be supplemented by 10,000 gas-jets in lamps of various beautiful hues, and 4,000 "bucket" oil lamps. The tinted glass lamps, arranged in festoon and other devices along the girders and at other points of vantage in the building, have been specially manufactured at Stourbridge for the Crystal Palace Company. Amongst the most effective of the tints may be mentioned ruby, sapphire, emerald, canary, opal, opalescent, amber, "oriental," "aurora," &c. The bucket lamps are for the most part arranged in the vases of flowers and amongst the flowering plants, which form an important part of the decorations. The music will be mainly furnished by military bands, and these will play on a newly-constructed decagonal orchestra in the Centre Transept. This orchestra alone will be lighted by about 2,000 coloured lamps. The electric arc lamps in the centre will be masked, so to speak, by Chinese lamps encircling them, the object being to add picturesqueness to the general scene, and to prevent the milder lights from being overpowered by the electric light. The great stage which forms the background to the scene has been decorated by Mr. F. Fenton, and represents a semi-Oriental interior. This also will be brilliantly lighted.

**Liverpool Engineering Society.**—The fifth meeting of the current session was held at the Royal Institution, Colquhoun-street, on the 14th inst., Mr. W. E. Mills, President, in the chair. A paper by Mr. Peter Evans, on the "Application of Compressed Air to Warehouse Requirements," was read by the author. After giving a general description of the hoisting machinery at the Boundary-street warehouse of the Warehouse Owners' Company, Limited, including a description of the engine and boiler house, with air-compressors, air-mains, receivers and connexions to power hoists, the author described the system of cooling and improving cereals, and also of elevating and distributing same by means of compressed air. He then compared the first cost and working expenses of the different systems of transmitting the power for working the hoists, and showed the economy of compressed air in the case under consideration. The application of compressed air for refrigerating purposes was next dealt with, and he showed how warehouse cellars might be made valuable as stores for dead meat by exhausting into them the air after it had done its work in the hoists, the air on expansion producing an intensely cold, but pure, atmosphere. In conclusion he pointed out the great demand for a reliable compressed air-power meter, by which consumers could be charged for the amount of power actually used.

**Dr. Schliemann's Forthcoming Work on Tiryns.**—Great curiosity is felt regarding Dr. Schliemann's forthcoming work on Tiryns, just announced by Mr. Murray. It is well known that the work was printed in its four simultaneous editions, for England, France, Germany, and America, six months ago. But no sooner were the last proofs corrected than most important discoveries were made at Tiryns by the excavations again begun at Dr. Schliemann's expense, under the able direction of his architect, Dr. Dörpfeld. The results of these discoveries were telegraphed to the author during his visit to England in the early part of the summer. It was hoped that these new discoveries might have been dealt with in an appendix or fresh chapter, but the recent revelations have necessitated the preparing of quite a different ground-plan from that already printed. The workmen have now struck a deeper level, and laid bare the walls of buildings of an earlier date than any hitherto suspected. How the difficulty is got over will presently appear.—*Athenaeum*.

**Hydraulic Lifts.**—Messrs. Clark, Bennett, & Co. (Limited), of Bathbone-place, have received during the past week instructions to fix one of their hydraulic lifts at the Bank of England, that being the second fitted there by them. They are also about to supply a hydraulic lift for the National Provincial Bank of England in Manchester.

## Science Lectures and Entertainments for the People.

The managers of the Royal Victoria Hall and Coffee Tavern, Waterloo-road, are, with the approach of the long winter evenings, actively engaged in providing recreation and instruction for the denizens of the "New-cut" and surrounding districts. They have issued a programme of "Penny Science Lectures" to be given on Tuesday evenings. Next Tuesday, Mr. W. D. Halliburton, M.D., will lecture on "The Circulation of the Blood"; Tuesday, November 3, Sir John Lubbock will lecture on "Ants"; and on November 10, Mr. W. Lant Carpenter will lecture on "Electrical Fire Alarms in America." The Thursday evening ballad and instrumental concerts have been resumed with much spirit and success. Evening science classes have been formed for the study of Magnetism and Electricity (lecturer Mr. Leo H. Owen), and for Plane and Solid Geometry, Machine Construction, and Mechanical Drawings (lecturer, Mr. Frank Castle). Admission to these classes, which are intended specially for apprentices and artisans, is obtainable by a very small fee for each course. "Variety Entertainments" are given on two or three evenings a week. These entertainments, however, are susceptible of improvement, for they follow too closely what is known as "the music-hall type of entertainment."

**Arcades and Covered Ways.**—Probably few, if any, other large cities are so badly situated as London with sheltered resorts for the large and not unimportant class of the population which desires to walk out and transact its business with the retail shopkeepers. Would it not be possible, while the long list of incomplete plans for "improvements" is still under consideration, to ascertain whether or not a genuine public need, without serious drawback or inconvenience, could be supplied? It seems strange that the recognition of this requirement, and the promise of a way to meet it, have not long since been accomplished facts. A Regent-street would certainly have appeared a very suitable thoroughfare for covered footways, but those who are old enough will remember the clamour which culminated in the removal of the sheltering roof. It may be that had the agitation been postponed until 1851, after the Great Exhibition buildings had shown what could be done with light iron pillars and glass, the arcades would not have been wholly destroyed, but reconstructed so that the shops might be better lighted by day, and no objectionable obscurity created at night.—*Lancet*.

**Essex Archaeological Society.**—A special meeting of this Society was held on the 14th inst., with the object of visiting the churches of Fingringhoe and Wyvenhoe. The attendance, having regard to the very unfavourable weather, was good, and included the President (Mr. G. Alan Lowndes), the secretary (Mr. H. W. King), Mr. H. Laver, Mrs. Edward Catchpole, &c. The party left Colchester Castle at one p.m., and proceeded at once to Fingringhoe, where they were met by the Vicar, the Rev. H. N. Hewson, who pointed out the various objects of interest in the church, including several quaint frescoes of great antiquity, together with Mediaeval brasses and a chest hewn out of solid oak. The mural paintings that have been recently discovered also proved to be well worthy of inspection. At Wyvenhoe the party went over the church, which is a modern structure, containing, however, two fine brasses, one of Flemish handiwork. In the vestry is a curious iron chest handsomely embossed.—*Chelmsford Chronicle*.

**Clock for Llanfair Church, Welshpool.**—This church is being provided with a clock specially made by Mr. J. W. Benson, of Ludgate-hill. All the wheels are of hardened brass, and the pinions of steel, made by steam machinery. The escapement is Graham's dead beat. The dial is of copper, 5 ft. in diameter. The clock will strike the hours on a tenor bell of 9 cwt., and the quarters on two smaller bells. For the striking the rack repeating work is used.

**Removal.**—Messrs. Horne, Son, & Eversfield announce in an advertisement on another page that they have removed from their old premises, No. 80, Fore-street, where we understand their firm has carried on the business of auctioneers and valuers for more than a hundred years. They have taken offices at No. 84, Basinghall-street.



**Paint.**—We are informed that the whole of the lamp-posts and protection-posts, &c., of the City of London are being painted with Brown's permanent preservative paint, with which they were last painted eight years ago, pretty good lease of life for paint.

**The National Agricultural Hall, Kennington.**—We hear that the directors of the National Agricultural Hall Company (Limited) have appointed Mr. James Edmiston, of Old Road-street, their architect, vice Mr. Coe, signed from ill-health.

PRICES CURRENT OF MATERIALS.

| TIMBER.                             | £. s. d.  | £. s. d.  |
|-------------------------------------|-----------|-----------|
| Greenheart, B.G. ....ton            | 6 10 0    | 7 10 0    |
| ak, F.I. ....load                   | 12 10 0   | 15 10 0   |
| guano, ft. cube                     | 0 2 8     | 0 2 8     |
| h, Canada                           | 3 0 0     | 4 0 0     |
| ch " "                              | 3 0 0     | 4 10 0    |
| u " "                               | 3 10 0    | 5 0 0     |
| f, Dantisc, &c.                     | 1 12 0    | 4 10 0    |
| Canada                              | 3 0 0     | 4 0 0     |
| ne " red                            | 3 0 0     | 4 0 0     |
| " yellow                            | 3 15 0    | 5 5 0     |
| h, Th. Baltic                       | 3 0 0     | 4 0 0     |
| St. Petersburg                      | 5 0 0     | 7 0 0     |
| aincot, Riga                        | 3 0 0     | 4 10 0    |
| als, Finland, 2nd and 1st, std. 100 | 8 0 0     | 9 0 0     |
| " 4th and 3rd                       | 10 0 0    | 12 0 0    |
| Riga                                | 7 0 0     | 8 10 0    |
| St. Petersburg, 1st yel.            | 10 0 0    | 17 0 0    |
| " 2nd                               | 8 0 0     | 9 15 0    |
| " white                             | 8 10 0    | 11 0 0    |
| Swedish                             | 7 0 0     | 17 0 0    |
| White Sea                           | 8 10 0    | 10 0 0    |
| Canada, Pine 1st                    | 15 0 0    | 32 10 0   |
| " 2nd                               | 12 0 0    | 28 10 0   |
| " 3rd, &c.                          | 7 0 0     | 10 10 0   |
| " Spruce 1st                        | 9 0 0     | 12 0 0    |
| 3rd and 2nd                         | 6 10 0    | 8 0 0     |
| New Brunswick, &c.                  | 5 0 0     | 7 10 0    |
| all kinds                           | 4 0 0     | 13 0 0    |
| Boarding Boards, eq. 1 in.—Pre-     | 0 9 0     | 0 13 0    |
| pared, first                        | 0 7 6     | 0 8 6     |
| Second                              | 0 5 0     | 0 7 0     |
| Other qualities                     | 0 5 0     | 0 7 0     |
| har, Cuba                           | 0 0 3     | 0 0 4     |
| Honduras, &c.                       | 0 0 3     | 0 0 4     |
| Australian                          | 0 0 3     | 0 0 4     |
| ahogany, Cuba                       | 0 0 5     | 0 0 7 1/2 |
| St. Domingo cargo av.               | 0 0 5 1/2 | 0 0 7 1/2 |
| Mexican                             | 0 0 4     | 0 0 5     |

| TIMBER (continued).         | £. s. d.  | £. s. d.  |
|-----------------------------|-----------|-----------|
| Mahogany, Tobacco cargo av. | 0 0 4     | 0 0 5 1/2 |
| Honduras cargo av.          | 0 0 4 1/2 | 0 0 5 1/2 |
| Road, Rio                   | 7 0 0     | 17 0 0    |
| Bahia                       | 6 0 0     | 15 0 0    |
| Satin, St. Domingo          | 0 0 8     | 0 1 0     |
| Porto Rico                  | 0 0 8     | 0 1 3     |
| Walnut, Italian             | 0 0 4     | 0 0 5     |

| METALS.                   | £. s. d. | £. s. d. |
|---------------------------|----------|----------|
| Iron—Pig in Scotland      | 2 2 6    | 0 0 0    |
| Bar, Welsh, in London     | 4 15 0   | 5 2 6    |
| " " in Wales              | 4 7 6    | 4 12 6   |
| " Staffordshire, London   | 6 0 0    | 7 0 0    |
| Sheets, single, in London | 7 10 0   | 9 0 0    |
| Hoops                     | 6 10 0   | 7 10 0   |
| Nail-roads                | 6 0 0    | 7 0 0    |

| COPPER.                 | £. s. d.  | £. s. d.  |
|-------------------------|-----------|-----------|
| British, cke, and ingt. | 43 10 0   | 44 10 0   |
| Best selected           | 44 0 0    | 46 0 0    |
| Sheets, ingt.           | 52 0 0    | 0 0 0     |
| " India                 | 0 0 0     | 0 0 0     |
| Australian, fine cash.  | 0 0 0     | 0 0 0     |
| Chili, bars             | 38 15 0   | 40 2 6    |
| YELLOW METAL.           | 0 0 4 1/2 | 0 0 4 1/2 |
| LEAD—Pig, Spanish       | 11 2 6    | 0 0 0     |
| English, com. brands    | 11 10 0   | 0 0 0     |

| SILVER.          | £. s. d. | £. s. d. |
|------------------|----------|----------|
| Spanish, special | 14 7 6   | 0 0 0    |
| Ordinary brands  | 14 2 6   | 14 5 0   |

| TIN.           | £. s. d. | £. s. d. |
|----------------|----------|----------|
| Burats         | 91 12 0  | 92 2 6   |
| Australian     | 0 0 0    | 0 0 0    |
| English ingots | 93 0 0   | 0 0 0    |

| TIN PLATES. | £. s. d. | £. s. d. |
|-------------|----------|----------|
| 10 cks      | 0 14 6   | 0 18 6   |
| IX ditto    | 1 1 0    | 1 5 0    |
| IX charcol  | 0 17 0   | 1 0 0    |
| IX ditto    | 1 6 0    | 1 7 0    |

| OILS.                   | £. s. d. | £. s. d. |
|-------------------------|----------|----------|
| Linseed                 | 23 0 0   | 23 10 0  |
| Cocconut, Corchia       | 31 0 0   | 31 10 0  |
| Ceylon                  | 28 0 0   | 0 0 0    |
| Copa                    | 28 10 0  | 0 0 0    |
| Palm, Lard              | 30 0 0   | 0 0 0    |
| Palm-nut kernel         | 28 5 0   | 0 0 0    |
| Rapeseed, English pale. | 25 10 0  | 0 0 0    |
| " brown                 | 23 10 0  | 0 0 0    |
| Cottonseed, refined     | 20 15 0  | 22 10 0  |
| Tallow and Oleine       | 25 0 0   | 45 0 0   |
| Lubricating, U.S.       | 7 0 0    | 10 0 0   |
| " refined               | 8 0 0    | 15 0 0   |

| TURPENTINE.       | £. s. d. | £. s. d. |
|-------------------|----------|----------|
| American, in cks. | 1 6 6    | 1 6 9    |
| Tar—Stockholm     | 0 19 8   | 1 0 0    |
| Archangel         | 0 11 8   | 0 12 0   |

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

| Nature of Work.                               | By whom required.       | Premium.           | Designs to be delivered. | Page. |
|-----------------------------------------------|-------------------------|--------------------|--------------------------|-------|
| Storage Scheme                                | Walton-le-Dale Lcl. Bd. | 50L and 30L        | Jan. 31st                | ii.   |
| Designing, Specifications, and Estimates, for | Card. Univ. College of  |                    |                          |       |
| New College                                   | Wales, Aberystwyth      | 100L, 50L, and 25L | Not stated               | ii.   |

CONTRACTS.

| Nature of Work, or Materials.            | By whom required.      | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|------------------------------------------|------------------------|-----------------------------------|--------------------------|-------|
| Building, &c.                            | Folkstone, Corporation | A. W. Conquest                    | October 24th             | ii.   |
| Epistat Chapel, Worlington               | Willesden Local Board  | Banks & Townsend                  | October 26th             | ii.   |
| Can Closures, Steam Roller, &c.          | Cardiff Corporation    | O. Claude Robson                  | October 27th             | ii.   |
| Repairs to Lambeth Bridge                | Met. Board of Works    | J. A. B. Williams                 | October 29th             | xiii. |
| Waterworks                               | Exmouth Local Board    | Official                          | do.                      | ii.   |
| Guernsey Granite and Kentish Flints      | Acton Local Board      | E. Cousins & Son                  | October 31st             | ii.   |
| Repairs to Streets                       | do.                    | C. N. Lacey                       | Nov. 2nd                 | ii.   |
| for New Coal Offices, Chester            | G. W. and L. & N. W.   | do.                               | Nov. 3rd.                | ii.   |
| Sanitary, &c.                            | Rail. Co.'s Jnt. Com.  | R. F. Johnston                    | do.                      | ii.   |
| Draining, Tar-Paving, &c.                | Dover Town Council     | Official                          | do.                      | ii.   |
| utilizing Dining-hall of Workhouse       | Lewisham Bd. of Wks.   | do.                               | do.                      | x     |
| Low Goods Depot, Bread-street, E.C.      | Shoreditch             | F. J. Smith                       | Nov. 4th                 | ii.   |
| enlarging Postal Sorting-Office, Kilburn | Great Northern Ry. Co. | Richard Johnson                   | Nov. 5th                 | xiii. |
| Repairs for Waterworks                   | Com. of H.M. Works.    | Official                          | Nov. 6th                 | ii.   |
| Sanitary, Thirlmere                      | Northwich Local Board  | H. Bancroft                       | Nov. 7th                 | ii.   |
| ection of Vagrant Wards at Workhouse     | Brighton Town Council  | P. C. Lockwood                    | Nov. 11th                | xiii. |
|                                          | Manchester Corporation | G. H. Hill                        | Nov. 17th                | ii.   |
|                                          | Gdms. Mile End Old Tn. | J. M. Knight                      | Nov. 19th                | xiii. |

PUBLIC APPOINTMENTS.

| Nature of Appointment.         | By whom Advertised. | Salary.          | Applications to be in. | Page. |
|--------------------------------|---------------------|------------------|------------------------|-------|
| Surveyor of Highways           | Hendon R.S.A.       | 150L             | October 28th           | xvi.  |
| Temporary Assistant Surveyor   | Swansea R. S. A.    | 2L 10s. per week | October 30th           | xvi.  |
| Surveyor's Temporary Assistant | Chelsea Vestry      | 2L 2s. per week  | Nov. 3rd               | xvi.  |

TENDERS.

|                                                                                                                                                                                 |            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| BERMONDSEY.—For the erection of dwelling-house, 4th, and upper tenements, Upper Redbank-street, for R. E. Colman, Messrs. Geo. Elkington & Son, architects, Cannon-street, City | £1,790 0 0 |
| Robinson & Fisher                                                                                                                                                               | £1,790 0 0 |
| Aldridge & Jervay                                                                                                                                                               | £1,875 0 0 |
| F. Smith & Sons                                                                                                                                                                 | £1,827 0 0 |
| T. Rider & Son                                                                                                                                                                  | £1,659 0 0 |
| J. H. Tarrant & Son                                                                                                                                                             | £1,625 0 0 |
| BRIGHTON.—For section 2 of alterations and additions at the head-quarters of the 1st Sussex Artillery Volunteers, Mr. W. Puttick, architect, Prince Albert-street, Brighton     | £972 0 0   |
| Carpenter                                                                                                                                                                       | £944 0 0   |
| Newham                                                                                                                                                                          | £925 0 0   |
| Cheesman & Co.                                                                                                                                                                  | £917 0 0   |
| Barnes                                                                                                                                                                          | £918 0 0   |
| J. Reynolds, jun.                                                                                                                                                               | £918 0 0   |
| Longley                                                                                                                                                                         | £764 0 0   |
| Wright (accepted)                                                                                                                                                               | £718 0 0   |
| [All of Brighton, Architect's estimate, 780L.]                                                                                                                                  |            |

**BARNET.**—For the construction of Storm Water Drainage Works, for the East Barnet Valley Local Board.

|                                 |            |
|---------------------------------|------------|
| Mr. F. J. Rumble, engineer      | £3,551 0 0 |
| North British Plumbing Co.      | £3,414 0 0 |
| Wilson & Penketh (labour only)  | £2,963 0 0 |
| W. F. Williamson                | £2,750 0 0 |
| G. & J. Green                   | £2,654 0 0 |
| Thos. Vernon & Co.              | £2,580 0 0 |
| Jas. Pizzev                     | £2,568 0 0 |
| Beadle Bros.                    | £2,558 0 0 |
| H. Turner                       | £2,355 0 0 |
| J. W. & J. Neave                | £2,325 0 0 |
| B. Cook & Co.                   | £2,313 0 0 |
| Answell, Dyson, & Wainwright    | £2,200 0 0 |
| Jas. Bloomfield                 | £2,140 0 0 |
| L. Bottoms                      | £2,047 0 0 |
| H. W. Gould                     | £2,046 0 0 |
| Wm. Neave & Son                 | £1,998 0 0 |
| W. J. Botterill                 | £1,987 0 0 |
| E. Peill & Sons                 | £1,955 0 0 |
| G. Hall                         | £1,900 0 0 |
| H. Potter                       | £1,875 0 0 |
| H. J. Butler                    | £1,790 0 0 |
| C. Killenback                   | £1,777 0 0 |
| W. Nicholls                     | £1,769 0 0 |
| Hy. Hill                        | £1,661 0 0 |
| J. Jackson                      | £1,544 0 0 |
| J. Young (accepted)             | £1,544 0 0 |
| [Engineer's estimate, £2,303L.] |            |

**BELMONT (Surrey).**—For the erection of a bridge over the present level crossing at Belmont Station, L. B. & S. C. R., with approaches, &c., thereto, for the Trustees of Capt. Hilbert Tate, deceased, Mr. M. N. Inman, architect, Quantities by Mr. Walter Barnett, Queen-street, E.C.

|                           |        |
|---------------------------|--------|
| 25 ft. wide, 30 ft. wide. |        |
| J. Morter                 | £2,544 |
| Moviem & Co.              | £2,523 |
| J. Groser & Son           | £2,338 |
| W. Shurmur                | £2,349 |
| H. Young & Co.            | £2,345 |
| T. Elkington              | £2,193 |
| Brown, Son, & Bloomfield  | £2,050 |
| T. White                  | £1,899 |

**COBHAM (Surrey).**—For proposed new cottages and a shop, at Cobham, Surrey, for Mr. Albert Standfield, Mr. R. P. Eism, architect, Hampton Wick. Quantities by the architect:—

|                                 |          |
|---------------------------------|----------|
| J. Whitburn, Working and Ripley | £850 0 0 |
| J. Eiler, Teddington            | £10 0 0  |
| R. Wood, Cobham                 | £95 0 0  |
| C. Bonell, Teddington           | £99 10 0 |
| A. Newland, Cobham              | £85 0 0  |
| W. Hickinbotham, Teddington     | £84 0 0  |
| C. Oldridge & Sons, Norbiton    | £80 0 0  |
| * Accepted.                     |          |

**DOWNE (Kent).**—For additions, alterations, and repairs to Lutted Farmhouse, Downe, Kent. Messrs. Baxter, Payne, & Lepper, surveyors, and Mr. St. Pierre Harris, architect:—

|                          |          |
|--------------------------|----------|
| J. Laselett, Farnborough | £355 0 0 |
| D. Town, Downe           | £48 0 0  |
| Taylor & Son, Bromley    | £30 0 0  |

**EARL'S SHILTON (Leicestershire).**—For the erection of new Stores at Earl's Shilton, Leicestershire, for the Co-operative Society. Mr. J. Wells, architect, Hinckley:—

|                               |            |
|-------------------------------|------------|
| Geo. J. Fox & Son, Atherstone | £1,147 0 0 |
| Geo. F. Mason, Kirby Muxton   | £1,038 2 6 |
| J. & W. Harrold, Hinckley     | £923 10 0  |
| Harwood & Turner, Leicester   | £91 0 0    |
| Arthur Lane, Earl's Shilton   | £91 0 0    |
| J. E. Johnson, Leicester      | £88 0 0    |
| Thomas Shilton, Stoke Golding | £85 0 0    |
| Edwin Herbert, Barwell        | £73 0 0    |
| Wm. Rayns, Barwell            | £75 13 0   |
| * Accepted.                   |            |

**BRIDGE (Kent).**—For additions to Renby Grange, Bridge, near Tunbridge Wells. Mr. C. G. Vinal, architect, Guilford-street, Russell-square, W.C.:—

|                              |            |
|------------------------------|------------|
| Parmore & Son, Margate       | £1,131 0 0 |
| Beale & Son, Tunbridge Wells | £1,123 0 0 |
| Norman, Burgess Hill         | £1,119 0 0 |
| Pannett & Sons, Tonbridge    | £1,007 2 0 |
| * Accepted.                  |            |

**HEXTABLE (Kent).**—For completing three cottages at Hextable, Kent. Mr. St. Pierre Harris, architect:—

|                          |          |
|--------------------------|----------|
| J. C. Smith              | £132 0 0 |
| E. Hicknell              | £107 0 0 |
| F. B. Cologne (accepted) | £76 0 0  |

**ILFORD (Essex).**—For alterations to Angel Hotel, Ilford, Essex, for Mr. C. Hopson:—

|                          |           |
|--------------------------|-----------|
| W. Watson                | £170 0 0  |
| Lusk                     | £165 0 0  |
| A. Nicholls, Leytonstone | £149 10 0 |

**KENNINGTON.**—For alterations, painting, &c., at No. 10, South-place, Kennington. Messrs. Glasier & Sons, surveyors, Spring-gardens:—

|                             |          |
|-----------------------------|----------|
| Ryder & Son                 | £454 0 0 |
| Langdale, Green, & Co.      | £44 0 0  |
| Clarke & Mannoch (accepted) | £37 0 0  |

**KENSINGTON.**—For alterations to 95 and 97, High-street, for Messrs. J. Barker & Co. Mr. Alexander Pease, architect. Quantities by Mr. W. F. Storer:—

|                                                                                                                                  |            |
|----------------------------------------------------------------------------------------------------------------------------------|------------|
| Clarke & Bracey                                                                                                                  | £4,593 0 0 |
| Nightingale                                                                                                                      | £4,440 0 0 |
| Bowles                                                                                                                           | £4,166 0 0 |
| Brass & Son                                                                                                                      | £3,623 0 0 |
| Morter                                                                                                                           | £3,493 0 0 |
| Kilby & Gayford                                                                                                                  | £3,353 0 0 |
| Kearley                                                                                                                          | £3,099 0 0 |
| LONDON.—For alterations, &c., at No. 24, Haymarket, for Mr. G. M. Hughes, Mr. William Wimble, architect, Queen Victoria-street:— |            |
| Ashby & Horner                                                                                                                   | £529 0 0   |
| Morter                                                                                                                           | £15 0 0    |
| Faulkner                                                                                                                         | £457 0 0   |
| Clarke & Mannoch                                                                                                                 | £35 0 0    |

LAMBETH.—For repairs, &c., at Old Lambeth Work-house, Prince's-road, S.E., for the Guardian.—

|                          |          |
|--------------------------|----------|
| Fractor .....            | £370 0 0 |
| Castle .....             | 238 0 0  |
| Ford & Son .....         | 228 0 0  |
| Little .....             | 215 0 0  |
| Brown .....              | 197 0 0  |
| Arnold .....             | 196 0 0  |
| Brady .....              | 184 10 8 |
| Wood .....               | 179 0 0  |
| Richardson .....         | 175 0 0  |
| Harbrow & Co. ....       | 169 0 0  |
| Richards .....           | 169 0 0  |
| G. & W. King .....       | 161 16 6 |
| Dearing & Son .....      | 161 8 0  |
| Derby .....              | 157 0 0  |
| Walker .....             | 149 0 0  |
| Buller .....             | 145 0 0  |
| Cook .....               | 137 10 0 |
| Wood, Harris, & Co. .... | 133 0 0  |
| Eachow .....             | 128 0 0  |
| Seed .....               | 123 0 0  |
| Warren (accepted) .....  | 110 0 0  |

LEICESTER.—For alterations and additions to the Borough Fever Hospital. Quantities by Mr. J. Gordon, C.E., Borough Surveyor:—

|                                 |          |
|---------------------------------|----------|
| J. A. Sharpe & Sons .....       | £756 0 0 |
| Isa. Stevens .....              | 693 10 0 |
| J. W. Marston .....             | 652 0 0  |
| J. O. Jewsbury (accepted) ..... | 544 0 0  |
| T. B. Turner .....              | 542 0 0  |
| T. Richardson & Sons .....      | 497 0 0  |

[All of Leicester.]

LONDON.—For new buildings on site of Nos. 16 and 18, George-street, Mansion House. Mr. Charles Reilly, architect, St. Swithin's-lane. Quantities by Messrs. Gardiner, Son, & Theobald:—

|                              |             |
|------------------------------|-------------|
| Higgs & Hill .....           | £12,240 0 0 |
| Edwd. Conder .....           | 11,767 0 0  |
| Trollope & Son .....         | 11,760 0 0  |
| H. J. Sanders .....          | 11,698 0 0  |
| Clarke & Bracey .....        | 11,548 0 0  |
| Asby & Horner .....          | 11,480 0 0  |
| Hall, Beddall, & Co. ....    | 11,450 0 0  |
| Holland & Hannen .....       | 11,415 0 0  |
| Mark Patrick & Son .....     | 11,320 0 0  |
| Colls & Sons .....           | 10,970 0 0  |
| T. Wootner Smith & Son ..... | 9,339 0 0   |

..... Withdrawn.

LONDON.—For rebuilding No. 107, Fenchurch-street, E.C. Messrs. T. Chaffield Clarke & Son, architects. Quantities by Messrs. Leonard & Clarke:—

|                               |            |
|-------------------------------|------------|
| Philips & Bisiker .....       | £5,480 0 0 |
| Clarke & Bracey .....         | 4,220 0 0  |
| Colls & Sons .....            | 4,190 0 0  |
| Patman & Fotheringham .....   | 4,173 0 0  |
| E. Lawrence & Sons .....      | 4,090 0 0  |
| Hall, Beddall, & Co. ....     | 4,087 0 0  |
| Asby & Horner .....           | 3,969 0 0  |
| Brown, Son, & Blomfield ..... | 3,950 0 0  |
| J. & J. Greenwood .....       | 3,943 0 0  |
| Macey & Sons .....            | 3,906 0 0  |
| J. Morter .....               | 3,903 0 0  |
| J. Woodward .....             | 3,900 0 0  |
| B. C. Nightingale .....       | 3,860 0 0  |

LONDON.—For rebuilding No. 1, Fenchurch-buildings, Fenchurch-street, E.C. Messrs. T. Chaffield Clarke & Son, architects. Quantities by Messrs. Leonard & Clarke:—

|                               |            |
|-------------------------------|------------|
| Philips & Bisiker .....       | £5,369 0 0 |
| Patman & Fotheringham .....   | 4,873 0 0  |
| Hall, Beddall, & Co. ....     | 4,730 0 0  |
| E. Lawrence & Sons .....      | 4,721 0 0  |
| Clarke & Bracey .....         | 4,710 0 0  |
| Colls & Sons .....            | 4,600 0 0  |
| Brown, Son, & Blomfield ..... | 4,600 0 0  |
| J. & J. Greenwood .....       | 4,435 0 0  |
| Macey & Sons .....            | 4,486 0 0  |
| Asby & Horner .....           | 4,470 0 0  |
| J. Woodward .....             | 4,400 0 0  |
| J. Morter .....               | 4,347 0 0  |
| B. C. Nightingale .....       | 4,330 0 0  |

LONDON.—For alterations and additions forming steam laundry, at 637, Old Kent-road, for Messrs. Wehrspoon, Mr. W. H. Culbert, architect. No quantities:—

|                                |            |
|--------------------------------|------------|
| W. & E. Cartiss .....          | £1,348 0 0 |
| W. H. Smith & Son .....        | 1,288 0 0  |
| Wetherill, Lee, & Martin ..... | 1,286 5 0  |
| Strapp & Co. ....              | 944 0 0    |
| Henry Smith & Son .....        | 898 0 0    |

ORPINGTON.—For the Ford Croft Sewer, Orpington, Kent, for the Bromley Rural Sanitary Authority. Mr. Alfred Williams, engineer:—

|                                          |          |
|------------------------------------------|----------|
| T. Bulleid, Widmore .....                | £599 0 0 |
| Richard Mayo, Brixton .....              | 468 18 3 |
| Beeble Bros., Eritth .....               | 459 11 6 |
| J. Bingham, Hoadcorn .....               | 418 12 3 |
| W. Langridge, Croydon .....              | 399 7 8  |
| Thomas Lansbury, Bromley .....           | 354 12 0 |
| Davis & Atwood, Bromley (accepted) ..... | 354 12 0 |

WANDSWORTH.—For alterations, painting, &c., at Ashurst, Nightingale-lane, for Mr. J. K. Farlow:—

|                                   |          |
|-----------------------------------|----------|
| Clarke & Mannoch (accepted) ..... | £210 0 0 |
|-----------------------------------|----------|

Roads, Sewers, Boundary-Walls, &c., at Wandsworth.—Mr. W. Harris, of Southampton-street, Camberwell, writes to say that his "Estimate No. 1" was 3,147*l.*, not 1,714*l.*, as stated on p. 568 of our last. The list was printed as received by us.

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our Office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

#### TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

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## Architectural Commentaries of the Week.



OUR paper this week contains an unusual quantity of reported expression of architectural opinion upon architects and architecture, in the shape of Mr. W. H. White's vigorous and outspoken paper at the Leeds and Cheshire Architectural Society, and Mr. Street's opening address as President of the Architectural Association; and it is satisfactory to be able to say that the quality of the paper thus reported is proportionate to its quantity. Relatively speaking, in fact, it would be hardly fair to emphasise the idea of "quantity" at all in regard to the presidential address at the Association, which has the distinguishing merit of brevity as compared with the "lengthened sweetness long drawn out" of some previous presidential addresses at the same chair. Both addresses contain what is true and well put; both derive a certain semi-official emphasis from the position held by their authors respectively in relation to the Institute of Architects and the Architectural Association; and both touch a vital point on the subject of architectural education.

The Secretary of the Institute commences, however, by a reference to the much but surely necessarily vexed question of what an architect is, and in his reference to this subject he is not happy. He contrasts Mr. Street's opinion that architecture is an art, not a profession, with Sir E. Beckett's, that an architect would make good buildings should disavow grand ideas from his mind, and "above all call himself an artist"; and he thinks that the latter is the nearer the truth of the two. We are sorry to see Mr. White thus going over to the enemy. It is perfectly true, unfortunately, that Street's great building is an example of the fact that an architect cannot be an artist alone. But as to the latter view, to which Mr. White has very liberally given his support, it is simply an argument of the fox that lost his tail. "I am an artist, therefore an architect need not be an artist; I cannot draw, therefore drawing is necessary for architects"; that is the nakedness of the case. The argument is absurd and illogically used, that because some successful buildings were contrived and erected by men who could not draw, therefore not to be able to draw is a probable means of success. We have surely had enough of this nonsense. And as to the miser-

able advice, the shibboleth of persons destitute of any high enthusiasm, to dismiss all grand ideas from the mind, is that the spirit in which Mediaeval cathedrals were built? We throw not. "Aim high and you will strike high," is a sound old proverb, as true now as ever. Dream of producing something great and poetic in architecture, and if you do not realise something great, you will at least come nearer it than if you did not dream of anything beyond business common-places.

So much for our disagreements with Mr. White. The offending passage occupies but a small part of his paper, but it stands at the head of it, and casts a sinister light over the remainder, which we would rather have been spared. The argument, implied rather than expressed, seems to be that architecture, being a "profession," stands especially in need of a professional representative body, which it never had in times past, not having been then a profession in the sense in which it is so now. When the sun of the Institute arose upon it, then the profession of architecture began to take form and substance, and to be duly qualified for recognition. This view is natural to an energetic secretary, of course. Others may take it *cum grano*. But, in what Mr. White proceeds to say as to the Institute, and what it might, could, would, or should do for the profession, we are mostly disposed to agree. More particularly do we concur with him in supporting that view of the proper constitution of the representative body which excluded all persons commercially interested in the materials of building. In comparison with some certain other Institutions which are cited, the Institute might have had a larger number of members but for this restriction; but it may well be asked whether the leading architects of Continental capitals would have cared in that case to become honorary and corresponding members of the English Institute.

Another passage in Mr. White's paper which we read with sympathetic surprise,—or, shall we rather say, with surprised sympathy,—is that in which he, with official knowledge of the facts, tells us that there is no foundation whatever in the powers conferred by the Charter of the Institute for setting up as an article of faith the system of five per cent. charges, or for attaching the idea of "Rules" of the Institute to the paper of suggestions put out some years ago as to architects' charges. This, we are now informed, is not binding at all, and membership of the Institute involves, we are told, no obligation beyond that of honourable dealing in matters of business. This, we imagine, will be matter of surprise to many Fellows and Associates who have been accustomed to regard five per cent.

as one of the sacred laws of being. It appears, however, that if an architect has but a small conceit of himself, he is not dishonourable for charging less than five per cent, neither (if his self-appreciation be more developed) for charging more, if he can get it. We hope this expression of opinion, which we presume we may take as correct, will lend a helping hand towards the overthrow of that ridiculous percentage-charging altogether, which is a consummation devoutly to be wished. It is utterly illogical; it exposes architects constantly to the suspicions and innuendoes of people who do not perceive that the members of a profession which charges by the amount of money it makes the public spend may, in spite of such a system, be individually perfectly fair dealers; and it gives many people an erroneous idea that no other charge is right or allowable under any circumstances, so that we have heard people say, in regard to an architect's account for designing decorative work in which the material value was small compared with the artistic work, "I thought five per cent. was the usual charge for everything." The sooner the profession throw over the five per cent. dogma the better.

We are very glad that Mr. White speaks so decidedly in regard to the system by which architects, members of the Institute, and who are also members of the Board of Works, are professionally concerned in the purchase and sale of building sites by the Board. Mr. White recalls the vigorous protest of Mr. Street on this subject, when he expressed his strong opinion that a Fellow or Associate who became a Member of the Board of Works ought not to have any professional connexion with the purchase or sale of land by the Board. It is unpleasant to find that it is necessary to reiterate this protest, and it certainly seems either that the Institute has slackened its hands or that its members, or some of them, are virtually out of its control. We have reason to believe that it is so in some other matters; for instance, in regard to the exceedingly right and wholesome regulation that no member should have a commercial interest in materials used for building purposes or in immediate connexion therewith. We know that this is occasionally, at all events, evaded and treated as a dead letter. We have once or twice seen circulars from architects who were members of the Institute recommending their own patents for this or that improvement, the commercial interest in which was apparently in their own hands. These things ought not so to be. The immediate moral of the matter is, however, that all who wish well to the profession should combine to strengthen the hands of the Institute as much as possible, especially at this auspicious season of reform and expansion;



because the more the Institute is strengthened and supported, the more it becomes a desirable and even a necessary thing for architects to belong to it and to keep well with it, the more power will it have to keep in order these erratic brethren who tend to give cause to the enemy to blaspheme.

The remarks which Mr. White makes upon the action taken by the State in regard to architecture in this country,—a subject which he has made his own through the recent publication of his able little book on the relation of the State to architecture in France and in England,—equally merit attention. There is probably, as he intimates, little chance of the State seeing the error of its ways in this respect until we have, at some happy moment, a First Commissioner of Works appointed who really and in the broad sense understands the subject, and will have the originality and independence to take up a new line and leave a new precedent for his successors.

Mr. White concludes his paper with a protest in favour of education, the subject with which Mr. Pink's Presidential address is almost entirely occupied. The view of the subject taken in this latter address is as wide and as well balanced as we could wish to see it, and leaves little or nothing either for dissent or for addition, as, indeed, seems to have been felt by those who took part in the discussion which followed. Mr. Pink is able to speak warmly in favour of the artistic view of architecture; in favour, too, of that "enthusiasm" without which nothing great can be done, while at the same time emphasising the necessity for sound scientific training. The younger members who heard, and those who will read his address, cannot do better than adopt the views which he so ably set forth in regard to the scope of architectural work and the lines of study necessary to ensure success of the highest kind in it; not the mere commercial success, but that kind of success, too little valued in the present days of pushing and elbowing for the rewards of fortune, which consists in being able to do what has to be done as well and as thoroughly as possible. Professor Kerr, whose speeches at the Association, always well delivered and to the point, have become a feature looked for on these occasions, also gave his allegiance to the enthusiastic side, and suggested that there was a want of that quality in the meetings held in another room of the house in Conduit-street. We fear that in that said room we have occasionally heard the Professor's always fluent oratory engaged on the other side of the question, and bent towards throwing cold water on the aspirations of those who would regard modern architecture as a subject for loving pursuit. We will hope that those were the Professor's bad moments, or that he has repented, and that what he said at the Association on Friday represented his more genuine and permanent sentiments. We cannot but express gratification also at the tone in which the projected changes and improvement in the constitution and policy of the Institute were spoken of at the meeting of the younger society. The Institute is, we may hope, making a real effort to go out of its groove, too long persisted in, and to act in a larger spirit for the good and advancement of the profession. It has received a great deal of encouragement and support from the expressed opinions of the younger members of the profession, who will in the future reap the advantages of the reforms now provided. It is for the Institute to see that it does nothing to falsify or disappoint these hopes.

A point was touched upon by Mr. Aston Webb in the course of the discussion on the President's address, which has, to our thinking, more direct connexion with the scope and subject of the address than appears on the surface. This was in respect to the want of appreciation of each other's work with which architects are credited (or discredited) in comparison with other classes of artists,—a charge which is better founded than one would wish it to be. The present Professor of Architecture at University College spoke, years ago, very strongly, about the want of *esprit de corps* in the profession, a want which a better and

more generally popular policy at the Institute would do something, we hope, to lessen. But the feeling referred to by Mr. Webb as commonly supposed to exist, of want of sympathy with each other's work, arises, we believe, in great measure from the want of that broader culture which Mr. Pink suggested as desirable; the habit of adopting a special style, even a special school of draughtsmanship, as the test of excellence in architecture. This narrowness of view may be, often is, perfectly honest; it is none the less narrow, and is the result of a one-sided education, a mere adherence to an adopted style or manner, without consideration of the really important qualities which underlie this outside face of architecture, and which may be displayed equally in buildings of very different styles. A man who has made up his mind that Gothic is the road to architectural salvation regards the man who practises one of the varieties of Renaissance as a weak and deluded brother. A wider view of the subject would enable him to see that however his own predilections lead him to favour one special style, another's predilections may, from his point of view, be as reasonable; and that sound construction, effective plan, and artistic treatment, may be realised under many different forms of architectural expression. The broad basis of architectural education suggested in the address of the President of the Association would leave it hardly possible for this one-sided and unsympathetic view of each other's work to prevail among architects to the extent to which it does. Of course there is naturally a difference between architecture and engineering in this respect. An engineer has a practical problem to solve; he solves it, or does not, and whether he does or not is a matter capable of absolute demonstration. Architecture being in part at least an art, does not admit of this sort of demonstration: the question *de gustibus* comes in. But there is room for much more catholicity of taste and sympathy than at present exists, and we expect the architect of the future will learn this lesson more or less completely before long.

#### A MODE OF PROTECTING IRON WATER-PIPES, IRON SOIL-PIPES, AND IRON PIPES GENERALLY, FROM RUST.

BY H. BOWES SCOTT.

**T**HE constantly increasing use of cast and wrought iron pipes for purposes of water supply, and working of sewerage and house drainage, leads the writer to offer this description of a process by which, without destroying the tensile or crushing strength of the metal, the life of an iron pipe exposed to water, internally or externally, may be indefinitely prolonged, and this without producing any of those objectionable effects due to the use of a metal lining or of a waterproofing composition, whilst at the same time the interior of the pipes and mains is kept entirely free from rust, so objectionable in water required for washing linen and so injurious to the tightness of water fittings. This process, instead of injuring the iron, is found to toughen it.

This, which is termed the Bower-Barff Process, is the joint invention of Professor Barff and Mr. George Bower.

In Professor Barff's process the iron and steel and steel articles at a red heat are subjected to the action of superheated steam, by which the steam is decomposed, and the oxygen combines with the iron, forming magnetic oxide.

The Bower process consists in submitting the metals at a red heat to the action of ordinary air and carbonic acid gas, produced by the combustion of carbonic oxide inside the chamber in which the articles are treated.

The Barff process is direct and continuous, and forms the magnetic oxide directly by the decomposition of water. The Bower-Barff process is intermittent, the magnetic oxide being formed by a series of oxidising and de-oxidising operations. The process now under consideration is a combination of the two. It

is being carried out at works in London and the provinces.

The chemical description of the process is as follows:—

The excess of oxygen in the furnace in the first place produces  $\text{Fe}_2\text{O}_3$ , or sesquioxide of iron, and the under surface of this, being in contact with metallic iron, undergoes reduction to magnetic oxide in the following manner:

Four equivalents of sesquioxide unite with one of metallic iron, forming three equivalents of magnetic oxide, or symbolically  $(3) 4 \text{ Fe}_2\text{O}_3 + \text{Fe} = \text{Fe}_3\text{O}_4$ .

The furnaces can be made of various sizes. Some in use are of the following dimensions:—36 ft. long, 6 ft. 6 in. wide, and 6 ft. high. Others are 13 ft. by 4 ft. 3 in. by 4 ft. 3 in. They are built of fire-bricks, supported and strengthened by ordinary T or channel iron.

The gas-producers are three or more close hearths, each provided with a hopper above for the admission of fuel,—the fuel used is non-coking gas coal: of this about 7 cwt. per day is sufficient for a furnace, 13 ft. long by 4 ft. 3 in. high. Anthracite can be used equally effectively, if petroleum at the rate of about a gallon per hour is dropped in the gas-producer.

The carbonic oxide, from the combustion of the fuel in the producers passes along a conduit, under the control of a sliding door, to the openings, where it meets heated air ascending and is consumed. The products of combustion after being mixed with steam from a boiler at about 20 lb. pressure, are then conducted along a passage packed with open-built firebricks at intervals, by them they are thoroughly mixed; they then return along another lower passage, and enter by means of narrow oblong holes the chamber, or furnace proper, in which the iron articles to be treated are placed.

After having passed over, and among these, the waste gases escape downwards through ports into the regenerator-chamber, and thence to the chimney-flues, heating its passage the fireclay-tubes composing the regenerator which are supported by brick walls. Cold air enters the apparatus through a channel provided with a regulating valve under the control of the furnace-man. The air then passes along the lower rows of regenerator-tubes, and back through the upper tubes, thus becoming highly heated by the waste gases.

It is a remarkable feature of this process that not only does it protect from rust, but gives a very pleasing colour to the articles; that the cost of treatment, except in the labour of handling, is no more for 2,240 articles, weighing 1 lb., than in treating one article weighing 1 ton, the process being dependent on the searching flow of heated gases and steam following the most intricate pattern of the work.

When completed the article may be left in its natural state, or coated with paint, varnish, with the certainty that the varnish or paint will never peel off or be dislodged by action of the iron beneath it.

For ornamental iron-work a pleasing permanent bronzing effect is produced by rubbing the Bower-Barffed surface with copper or brass wire brushes. Small metallic particles will become ingrained in the surface, especially on all prominent parts: this gives exactly the appearance of a bronze casting, ornamental ironwork for houses, churches, and public buildings. This process gives a pleasing and permanent effect.

Arrangements are, of course, made for constructing the furnace by which a crucible containing a large number of small iron articles can be stacked outside the furnace and afterwards drawn into it by means of a chain, in the same way as larger cores are treated in a foundry core oven.

In conclusion, it will be as well to point out that this process enables iron pipes of any size to take the place of lead for service-pipes at less than half the cost, and with absolute immunity from any risk of metallic poisoning, no matter how soft the water may be. The advantage of being able (without producing rust and its attendant disadvantages) to



net all service-pipes and joints of the stronger & cheaper material scarcely requires pointing; this is more especially the case in districts where pressure is high and where the system of supply is constant. There are in this country alone vast numbers of villages without any adequate water-supply. Many of these are from time to time adopting gravitation and even pumping schemes, the water being supplied at stand-pipes, and only rarely being brought into the cottages in consequence of the expense. These villages might have the supply taken into every cottage at an expense only slightly in excess of the cost of stand-pipes if wrought-iron Bower-Barff pipes were adopted, whilst the comparative merit of the scheme, which brings the water into the house rather than leaving it to be carried, scarcely requires drawing attention to.

The increasing use of iron for soil-pipes and use-drains opens another and a large field for the Bower-Barff process.

The advantage of preserving the interior of a soil-pipe somewhat cannot be overrated. It has hitherto been difficult to ensure, as ordinary iron-pipe has been very liable to rust and corrode.

#### NOTES.

THE deputation received by Mr. Chamberlain last week on the subject of railway charges probably represented every trade and industry of any importance in the kingdom. The Mayor of Birmingham introduced the deputation, and explained that the aspect of the "terminals" question had been so materially altered by a recent legal decision that they wished to urge afresh the necessity for putting it out of the power of the railway companies to impose these charges. We understand that some of the rates from Birmingham district have recently been reduced, showing that the efforts of the different bodies who have pressed this question so perseveringly are not been without success. But with the "standing grievances of undue preference" and "terminals" still unredressed the conflict between traders and the railway companies will still go on. The former question does not appear to have been brought forward at the reference referred to, and with regard to the latter, Mr. Chamberlain seems to hold entirely different views to those expressed by the deputation. In the Bill bearing upon this subject introduced by him as President of the Board of Trade, these charges were to be legalised, and the clause was regarded as an inducement to the railway companies to compile the new classification and scale of rates required by the new clause. But Mr. Chamberlain explained last week that he had always considered the railway companies entitled to make terminal charges, his opinion being in favour of fixed rates to be settled by Parliament or the Railway Commissioners. It has been well said that if these charges were legalised there would be a precedent which the companies could use in charging passengers certain sums in excess of the Parliamentary maximum for the various services performed and accommodation provided at the stations, some of which were not bought of when the fares were fixed. We hope that the matter may yet be argued out in Parliament, as it is not likely that the traders would desire anything manifestly unfair to the railway companies any more than Mr. Chamberlain himself.

It is to be hoped that the Metropolitan Board of Works will not be deterred by any idea of false economy from purchasing and securing a permanent hill in perpetuity as an open space. To leave a large piece of ground so nearly neighbouring on Hampstead Heath to be built upon would detract very much from the attractiveness of the Heath itself, and for its own sake an open space is most valuable in the neighbourhood of our increasingly-crowded city. It may be true that "the ratepayer is poor," but he will not feel this burden much, and it is a matter of health and recreation for generations to come as well as the present. Miss Octavia Hill makes a strong appeal in favour of the purchase in a letter in Wednesday's *Times*.

IN another column we give a brief report of the proceedings at Worship-street Police-court on Wednesday last, when a question of great importance was raised by one of the summonses taken out by the Metropolitan Board of Works against the builders of the blocks of artisans' dwellings in Chatham-gardens, Nile-street, Hoxton. The conditions under which these buildings are being erected were set forth in Mr. George Godwin's letter to us a few weeks ago, and were again mentioned in our last. The magistrate has decided that the passage or way between the blocks of dwellings is not a street within the meaning of the Act. We believe that another metropolitan police magistrate has given a decision to the like effect, while a third magistrate has, on the contrary, twice decided in the Board's favour on the same point. It is to be hoped that the Metropolitan Board of Works will take steps to clear up the point in dispute. Surely, it can never have been intended by the Legislature that an important provision of the Building Acts (Amendment) Act of 1882 should be evaded by the erection of a pair of iron gates, as is, it seems, the intention in the present case. The erection of the gates will not affect the vital question whether artisans' dwellings, erected under such conditions of light and air as in the case of those under notice, can possibly be healthy. Mr. Grain, who certainly availed himself to the full of "the licence of counsel" (if, indeed, his continual interruption, contradiction, and paraphrasing of his opponent's observations be within the bounds of such licence) made much of the "philanthropic" aspect of the case. Were the Joint Charity Estates Trustees, he asked, to be hindered in their beneficent desire to provide better dwellings for the poor? The magistrate, we fear, was a little carried away by this appeal, and so probably did not appreciate the full gravity of the case. It cannot be too often repeated that however much we may "improve" the construction and fittings of the dwellings of the poor, all the "improvements" will be to a very great extent thrown away if the dwellings are at the same time deprived of adequate light and free circulation of air. The difficulty of bringing points raised under the Building Acts within the comprehension of the average magisterial mind seems to point to the necessity of either appointing technical assessors to assist the magistrates, or establishing a special court or courts for dealing with such cases.

THE opening of the Law Courts after the Long Vacation sees also a much needed alteration in their structure. There is now a staircase from the north end of the great hall up to the north corridor. This staircase adds much to the facility of access to the courts, and is a standing protest, so to say, against the oversight of practical matters in the construction in the first instance. But this staircase is, though a necessary convenience, wholly unworthy, architecturally, of being the chief means of access from the hall to the courts. It is a mere back staircase, quite small in size, not so wide, indeed, as the staircase which connects the barrister's north robing-room with the north entrance. Of course it will answer its purpose but it is still much to be regretted that the authorities have not been able to build a staircase from the great hall up to the north corridor of a size and dignity fitting for such a building. That it is possible to do so is quite certain, but we presume it was decided to make the alteration as cheaply as possible.

WE hear with great regret of the death of Mr. A. J. Grahame, a young architect, pupil of Mr. T. G. Jackson, who had given promise of eminence in his profession, and had also taken up the occupation of a University Extension lecturer. He died from the effects of a fever caught in Italy in the course of a sketching tour which he took earlier in the present year with the view of gaining further material for his lectures. Among the drawings awaiting their turn for

publication in this journal is a design of his for a church, which he brought to us himself some months since, and which we will publish immediately as an example of his work. He was an exemplification of that standard of general culture in an architect which is spoken of as so desirable in the course of a paper printed elsewhere in the present number. His early loss is much to be deplored.

THE recent commemoration of the Huguenot bi-centenary amongst the French congregations in England should be an interesting event to Englishmen in some senses, when, by the infamous Revocation of the Edict of Nantes, the Huguenots, who had previously had secured to them liberty of conscience and freedom to pursue their various vocations, were forced to fly for their lives to the more tolerant and genial protection of our shores. This protection was paid back to us a thousandfold, for the immigrants brought with them the knowledge and skill in those trades, principally textile, which have for so long a period, formed one of the chief supports of English prosperity. Indeed, we may safely say that, had it not been for the Huguenots and Walloons, this country would have been a long way in the rear as regards industrial supremacy. The linen trade was originally started in Ireland by the Crommelins, a Picardy family, whose descendants are still to be found in Antrim occupying good social positions. The baize manufacture was also introduced by the Huguenots into Kent, and flourished for a considerable time in the neighbourhood of Sandwich, whence it was eventually transferred to Lancashire and Yorkshire. Our earliest market-gardeners (as a systematic industry) came from their ranks, while several minor trades, one of which was wax-bleaching, took root in Canterbury and its vicinity. It may not be generally known that a very tangible relic of Huguenot times is still to be found in that ancient city, in the shape of a French service held every Sunday in the crypt of the cathedral, while traces abound all along the Kentish coast in names of distinctly French and Flemish origin. It may not be amiss for us, with our strong insular notions of superiority, to keep in our mind the fact that we owe our chief successes in industrial enterprises to foreign importation.

THE Amalgamated Society of Railway Servants have made the very practical recommendation, in regard to the important question of automatic or improved coupling appliances on railways, that a trial with the full-sized working appliances ought to be made, as the only reliable test. They talk of setting aside a sum of money to award prizes to the inventors of the most successful couplings. Surely the railway companies themselves ought to do something towards the expense of ascertaining the best form of coupling to use. It appears that 130 men were killed last year in the course of shunting. Of course there may be contributory negligence, but any one who has watched the operations of shunting and uncoupling goods trains must have perceived that the present system cannot but be highly dangerous to those employed, even with the greatest care on their part. It is anything but creditable to the great railway companies that they should allow this annual slaughter to go on and show no sign of doing anything to render it less inevitable, for to some extent it is practically inevitable with the present clumsy and antiquated appliances.

WE have received the illustrated syllabus of the course of instruction in drawing in primary schools under the English and Scotch Code for 1885. It commences with the very simplest geometrical figures, parallel lines, angles of various inclinations, &c., going on to simple freehand drawings. The subjects are not first-rate in style, it must be admitted, but they may serve the purpose of educating the infant hand and eye. That the subject should have been established as an integral part of



primary education is in itself a great step, and one which will not be without its results. The curious thing is that we should have been so long in coming to it.

WE hear that the Midland Railway Company have ordered a sample quantity of 5,000 steel sleepers from Belgium, the English steelmasters who were applied to not having the plant necessary for the work, and wanting a higher price (to cover the initial expense of the plant) than the railway company were disposed to give. If steel sleepers are adopted more largely this difficulty about the English supply will, of course, be got over; but the incident is somewhat significant of the importance of being abreast of the demands of the day.

FOLLOWING in the wake of the anti-restoration movement in England, there appears to be an increasing feeling against the unnecessary rejuvenation of old monuments in France. The last number of the *Chronique des Arts* contains a long and strong letter from "A Subscriber," calling attention to the manner in which the ancient building, known as "Le Monnaie," is being scraped by masons, who are depriving not only the walls, but the old sculptures, of the toning and preservative coating of time. "I saw, in fact," he says, "four practitioners scraping and cutting, with an evident confidence in their own skill, at the graceful figures of Dupré and Caffieri, representing the Earth, the Air, the Water, and the Wind.\* Under their chisels the figures were rapidly losing their tints of age, and at the same time their delicacy of form and modelling, to appear all white, doubtless to the great satisfaction of the passers-by." In a similar tone, M. Adolphe Guillon, the painter, writes in the same number of the *Chronique* to protest against the announcement of a somewhat similar treatment threatened against the old tower, called that of the "Ducs de Bourgogne," and he quotes a newspaper paragraph, which might have come out of an English "daily,"—"La vieille tour de Jean sans Peur, restaurée et rajournée, constituera un des spécimens des plus intéressants de l'architecture des habitations fortifiées du XIV<sup>e</sup> siècle." *Restaurée et rajournée!* Mais, si elle est restaurée et rajournée! elle ne constituera plus un spécimen de l'architecture du XIV<sup>e</sup> siècle," which unquestionably is as true as it is lamentable. It is perhaps some consolation to find that fools are the same in all countries: we have no monopoly of the tribe.

WE have received from Mr. A. B. Mitchell, who was the winner of the Soane Medallion this year, and whose design for a bank we publish in the present number, a very well got-up monograph of the interesting church of Shottesbrook, near Maidenhead, containing measured drawings of the plan and elevations, the tombs and brasses, profiles of mouldings, &c. The volume is a highly creditable production, and shows, along with Mr. Mitchell's other work, that he "means business." We must put a note of interrogation, however, to one remark in his preface, where he excuses himself for a fresh publication of the church (in view of the fact that Mr. Butterfield in 1844 published a very complete description and illustration of it), on the ground that "the methods of reproducing drawings by photo-lithography are so great an improvement on the old system of engraving." For geometrical elevations they are, no doubt, and no doubt some lithographed perspective views are much better than some engravings. But there are engravings and engravings; and when the graver is in the hands of a man who knows how to use it with artistic feeling as well as with correctness and truth, it gives a firmness as well as a balance of tones and half-tones which lithography cannot give. The deficiencies of lithography in this respect are pointedly illustrated in the one little perspective in Mr.

\* Is this unusual definition of the four elements correct?

Mitchell's own book, in the corner of plate 9. An engraver who knew what he was about could have made a far better thing of that.

THE *Berliner Philologische Wochenschrift* (Oct. 10) reports a very interesting discovery at Eleusis. Some years ago, as is well known, the remains of a great assembly-hall, supposed to be used in the ceremony of initiation into the Eleusinian mysteries, were laid bare. This assembly-hall was supported by forty-two columns, and was planned by Iktinos, the architect of the Parthenon. There was always the presumption that it was erected on the ruins of an older temple destroyed by the Persians. This presumption has now become a certainty. Digging deep down below the foundations of the Iktinos temple, the excavators have come upon the remains of a square building, undoubtedly the older sanctuary. It fits exactly into the north-east angle of the Temple of Iktinos, so that a part of the north and east walls of the earlier and later buildings are precisely coincident. It is the intention of the Government, for the better preservation of these most valuable ante-Persian-invasion remains, to fill in the excavations again, but in such a manner as to leave the upper part of the ancient structure just visible.

FROM the same journal we learn that excavations carried on at Eining, in Lower Bavaria, have met with extraordinary success. The remains of a great Roman military station have been discovered; so perfect is the preservation, that the heating apparatus of a part of the building is still serviceable. It is delightful to hear that, by a happy fortune only too rare in the annals of excavations, the "find" of precious objects has already more than paid the outlay. Among the most noteworthy of the discoveries we may mention a number of weapons of various forms hitherto unknown,—tools, domestic apparatus of every description, a great number of potters' stamps with names that are new to archaeology; some medical instruments, valuable rings set with turquoise, lapis lazuli, jasper, cornelian, opals engraved with figures of Mars, Jupiter, Amor, Victoria, Fortuna. To add to the value of the discovery, a long series of coins have been found, dating from Nero to Valentinian II., among them some very rare specimens of emperors who only reigned a very short time. The local museum where these treasures are to be permanently stored will become of high importance to Roman archaeologists.

WE hear that the Church of St. Sebald, at Nuremberg, is reported to be falling into rapid decay, and the architects who have examined it state that if steps are not at once taken for its restoration it will in a very short time be irreparably ruined. The cost of the necessary repairs is estimated at 40,000*l.*, and application has accordingly been made to the Government to sanction the formation of a society for raising the sum by subscriptions.

THE *Courrier de l'Art* publishes a report to the Minister of Public Instruction on the subject of mosaic, signed by MM. Guillaume, sculptor, Lenepveu and Lemare, painters, and Ch. Garnier, Moyaux, and Sédille, architects. The signature of M. Muntz, Conservator of the École Nationale des Beaux Arts, is also appended to the document. The object of the report is to indicate the line which modern mosaic should take, and the aim which artists in that work should keep before them. The memorialists are opposed to the prominence given to Byzantine influence by modern mosaic students, and emphasise the idea that mosaic is in fact a classic Roman rather than a Byzantine art. This is characteristic of the French artistic mind, though it will seem a profanity to some of our own decorative artists and architects who are so much enamoured of the stiff architectural forms of Byzantine mosaic art, grand no doubt, but expressionless. The French memorialists, however, are careful

to point out that the opposite excess of too much movement, realism, is quite at variance with the genius of mosaic. Raffaello, they suggest, in the mosaics of the Chigi Chapel had hit the golden mean. We subjoin the paragraph in regard to the Byzantine school:—

"Si l'école byzantine, dont le triomphe ne s'affirme qu'à partir du VI<sup>e</sup> siècle, ne saurait revendiquer en aucune façon l'invention de la mosaïque d'émail, elle n'est pas qualifiée non plus pour imposer exclusivement ses modèles, comme elle semble avoir point de le faire, à l'art renouveau, renaissant, de la mosaïque. Insister sur l'antériorité des efforts tentés par l'antiquité classique, ce n'est pas seulement élucider une question d'histoire, c'est surtout mettre les artistes modernes en garde contre des influences dangereuses. L'instinct du public n'est pas trompé lorsqu'il a attaché au terme de mosaïque byzantine l'idée d'un style pauvre, froid et vide; en publiant uniquement dans des productions dont la grande majorité relève de l'archéologie, plutôt que de l'art, nos artistes couraient risque de donner raison aux préventions populaires. Quelques pages d'un style plus libre ou plus ample, certaines parties des mosaïques de Saint-Marc de Venise, de Sainte-Sophie de Constantinople, ou encore de Palerme et de Montréal, ne sauraient faire oublier tant de productions dont la vie, la pensée, le drame, en un mot, tout ce qui forme la raison d'être de l'art ont été systématiquement bannis. Qui oserait, après un instant de réflexion, entreprendre de ramener l'art contemporain aux règles étroites de l'école byzantine!"

WE regret to have to record the death of Croydon last Sunday of Mr. W. F. Lascelles, who was so well and favourably known to many of our readers for his energy, ability, and high character. He was an inventive and enterprising, especially in the use of concrete (not only constructively but decoratively), and in other directions, has frequently been commended by us, and was widely appreciated by several eminent architects under whom he erected mansions and other buildings innumerable. In consequence of declining health he retired a few years ago from the business at 121, Bunhill-row, which is still being carried on by his successors.

WE have commented strongly several times lately on the reprehensible habit of addressing circulars to architects offering the commissions on the introduction of work, the employment of materials, and have given the names of those who did so when architects have forwarded such circulars to us. A letter in another column of this number, from "Local Surveyor," who is a person holding position of trust and responsibility, affords still more pointed comment on this practice and on the line we have taken in regard to it. The local surveyor suggests that any person offering to bribe an officer of the local authority should be liable to a substantial penalty. We hope this suggestion will not fail to take ground. Of course, in the case of a public officer there is a more legally recognisable propriety in offering such bribes than in the case of a private practitioner; but the moral is the same in both cases. An architect acts in the interests of his client; to offer him a pecuniary inducement to do otherwise is, if he is a man of high principle, to insult him; if he is a man of lower principle, or a struggling journeyman in the profession, it is to put temptation in his way. In either case the practice deserves the strongest reprehension and exposure.

The Surveyors' Institution.—The 31<sup>st</sup> ordinary general meeting of the session will be held on Monday, November 9<sup>th</sup>, when the President, Mr. E. P. Anson, will open the session with an address. Students proposing to enter their names for the Students' Preliminary Examination, to be held on the 19<sup>th</sup> and 20<sup>th</sup> of January, 1886, must intimate their intention to the Secretary before the last day of November. Students eligible for the Proficiency Examination, to be held in April, 1886, must give notice of the sub-division in which they elect to be examined, not later than the last day of November. Examinations qualifying for classes of Professional Associates and Fellows will also be held in the month of April. Names of applicants for these later examinations to be sent in before the 9<sup>th</sup> of January next.



## FLOWERED AND OTHER QUARRIES.

## PART THE FIRST.

THE term "quarry" or "quarrel" has been used to designate those diamond-shaped panes of glass with which both the windows of churches and religious and domestic houses were glazed in times gone by, and which are still made use of, with adaptations and modifications, by architects, glass-workers, and church restorers even to the present day.

We find that at Taynton, near Burford, Oxon, and at Headington, in the same county, the term "quarry" is used to describe a diamond-shaped piece of freestone or marble which is sometimes inserted for ornament in the borders of pavements. A "band quarried" appears to be a technical term. "A marble floor, of black and white squares, with a border of whin-stone quarried," i.e., in diamond shapes, occurs in a Buckinghamshire builder's agreement of the year 1772.

Some persons maintain that the technical word "quarry" comes directly from the French *carre*, "a four-sided figure." Others that it is derived from the Latin term *quadrellum*, "a

as in Italy and Spain, the ordinary inexpensive glazing, as should be noted, has long taken this shape, more especially in country churches; while the same variety of figured ornament,—though differing somewhat in type and character,—is still to be found burned into the quarry.

Here, in England, the destruction of stained glass in general under the Tudors, as well as that which took place during the Civil War, together with the subsequent neglect of the Georgian era and the rough-and-ready restorations of the age in which we live,—well enough intended, but lamentably destructive,—have resulted in a vast and universal loss of such curious and interesting ancient examples, as in the days of Anthony à Wood, or even of Thomas Hearne, of Oxford, and Browne Willis, of Buckinghamshire, were still to be found here and there in abundance.

Five-and-thirty years ago the writer began to make a collection of such as could be frequently acquired for a mere song in the shops of various country glaziers, and gathered a certain number of curious specimens; and at the same

and interesting; and this latter, as a consequence, was too often irretrievably lost. Unless the local squire or parson was of archaeological tastes, and took a pride in the local House of God and all its ancient details and antiquities, much of ecclesiastical and genealogical interest was carelessly and ruthlessly destroyed.

Upon those flowered quarries of which we possess examples or original sketches, we find the rose, honeysuckle, marygold, coxcombe, gillyflower, broom, columbine, lily, poppy, cowslip, vetch, primrose, forget-me-not, primula, acorn, mushroom, flowering-grass, daisy, ivy, blue cornflower, ragged Robin, poppy, trefoil, vine-leaves, sheaves of wheat and ears of corn (some represented archaically, others put into the form of a cross).

These, of course, all differ considerably in artistic merit. Some are but feebly designed; others, again, more especially the earlier specimens, are remarkable for the vigour of their treatment,—boldly drawn, with much effect secured by a few powerful touches and a judicious use of a few colours. Of these yellow, chocolate, or brown and black are



Fig. I.

1. Jesus College, Cambridge.  
2. Upper Hardres, Kent.

3. Westwell, Kent.  
4. Baulking, Berks.



Fig. II.

1. Beckley, Oxon.  
2. Sherrington, Wilts.

3. Winchester College.  
4. Castle Morton, Worcestershire.

small square." Others, again, hold that it comes from an extinct Italian term, *quarria*, *quaria*, or *quarria*, signifying a four-angled piece of mosaic,\* glass, or marble, either for decoration, glazing, or inlaying. Hence, it is argued, its special adoption in describing the four-angled pieces of glass,—the "quarries" in question,—is so universally used in glazing church windows, in many parts of England we have found that his term "quarry" is altogether unknown. For example, in the western part of Yorkshire and in the eastern part of England below the Trent. In both these districts the word "pane" is used to describe the figured glass under consideration. In France† and Belgium, as well

time made sketches or tracings of nearly four hundred different examples found in the course of visits to various churches and old mansions during different archaeological and ecclesiastical rambles.\* These sketches and tracings, as well as a few original specimens, have served in the main, after having been examined anew and tabulated, to furnish the information and illustrations here set forth. Since the period to which we have referred, however, from A.D. 1848 to 1856, we believe, from careful inquiry and subsequent personal research, that scarcely one third of the specimens of which tracings or drawings were then secured now remain. Such have been removed, lost, or destroyed. The glazing and lead-work of the old windows in which a few ancient specimens of quarries, much weather-beaten and worn, were then to be discovered, had obviously become so battered, imperfect, and unsafe that new and cheap modern "cathedral glass" mechanically made, all alike, and cut into identical shapes, were very largely substituted for that which was time-worn, curious,

generally found to predominate and to produce every politic and needful artistic effect. It is possible that a deep red may have been used of old, but this has faded or darkened in many cases after exposure for centuries. In some later examples a deep ruby tint has been introduced, but such instances are somewhat unusual and rare.

The Early English quarries, or those found in First-Pointed windows, are specially notable for the conventional style of their ornamentation, the boldness and breadth of their lines, and the stiff and vigorous drawing of the flower, leaf, device, or fleur-de-lys thereon represented. Their backgrounds are sometimes hatched with rude and bold cross-lines,—full of effect,—and, as a rule, they have no special borders nor bands, though to this last-named rule there are found to be several exceptions.

In the following descriptive list,—made from my own collection, numbering several hundreds of specimens,—we have in the main avoided verbose repetitions, describing only those varieties and specimens which, being special and peculiar in themselves, appear to deserve such description, with the view of pre-

\* The late Very Rev. Father Vincent Zanetti, of Turano, near Venice, an accomplished archaeologist, in the autumn of 1877, afforded us the above information; and in the exact terms set forth.

† Several exquisite examples of flowered quarries still remain in Rouen Cathedral,—some of the most artistic and interesting being not diamond-shaped, but six-sided panes. In the Cathedral Church of Chartres, M. Lascaz's "Histoire de la Peinture sur Verre," may be probably consulted. Some examples therein set forth were produced in the late Mr. Henry Shaw's valuable "Encyclopædia of Ornament."

\* These have been mainly taken in Bucks, Berks, and Oxon.

serving a record of such as stand so greatly in danger of destruction, and which, both from their obvious antiquity and archeological merit, are of considerable intrinsic interest. Many such have been utterly lost during the past forty years, and, in great probability, no sketches or traces of them remain.

The descriptions which follow are not arranged chronologically, though commencing with a few very early and well-known examples. It is not easy to determine the exact date of flowered quarries. On this point opinions widely differ. Most of those described, however, belong probably to the fourteenth and fifteenth centuries, the heraldic panes to the sixteenth:—

*Lincoln Cathedral.*—A leaf, boldly drawn, under a broad band, with cross-hatching behind the leaf, is found in several of the windows of this cathedral. It is outlined in dark brown.

*Westwell, Kent.*—A fleur-de-lys, similar in type and kind to that just described. Outline black.

*Chapel of Prebendal House, Thame, Oxon.*—A boldly-drawn fleur-de-lys, under two broad bands, bordered with a brown line. The flower outlined in dark brown.

*Fulbourne, Cambridgeshire.*—The flower known as "coxcombe," with two leaves, one on each side, archaically and somewhat stiffly treated; outlined in dark brown and coloured yellow.

*Culham Church, Oxon.*—A primrose plant, with three flowers and two leaves, all outlined in pale brown. (See illustration, fig. III., No. 3.)

*Fulbourne, Cambridgeshire.*—A star of six points in pale yellow, placed upon another star of a like character,—the latter deepened in effect by bold cross-hatching with black lines. The drawing is rude. (See illustration, fig. IV., No. 3.)

*Checkendon, Oxon.*—The sacred monogram *Shc* in yellow, outlined in black upon dark-green glass. (See illustration, fig. III., No. 1.) The monogram of the B.V.M., consisting of the letters *M* and *R* conjoined, and crowned (*Maria Regina*), outlined in dark brown; the letters and crown being yellow, surmounted with fleur-de-lys ornaments. A quarry of green glass charged with a label, on which the word *monum* is encircled, the label being yellow, and the inscription dark brown.\*

north side of the chancel in 1864, in the upper part of a window, when we made a careful sketch of it. (See illustration, fig. III., No. 4.)

*Sherrington, Wilts.*—Under a broad border charged with a wavy line between three spotted flowers, a bold fleur-de-lys in outline. The border and fleur-de-lys in yellow, outlined in dark brown. (See illustration, fig. II., No. 2.)

*Fawkham, Kent.*—A large vine leaf outlined in dark brown, with a double border of two bold lines on the two upper sides of the quarry.

*Milton, Cambridgeshire.*—A white rose on a stem, with tree leaves on a spray on either side, and two other leaves lower down upon the stem, one on each side. Both leaves and stem are in yellow. (See illustration, fig. IV., No. 4.) A spray of ivy, with berries at the head, the leaves boldly drawn, and alternately shaded in dark brown and yellow, half of each leaf being left white.\*

*Doddscombeleigh, Devon.*—A conventional flower, made up of three primrose-leaves, with two trefoiled sprigs between the leaves, one on each side. The centre of the leaves are coloured yellow, hatched with brown.

*Winchester College.*—A single vine-leaf on a perpendicular stem, under a brown border or



Fig. III.

1. Checkendon, Oxon.
2. Magdalen College, Oxon.
3. Culham, Oxon.
4. Hackington, Kent.

*Stanton Harcourt, Oxon.*—A leaf, probably of the vine, surrounded by a plain border on every side, may be seen on several quarries here. It is rudely but effectively drawn with an outline of dark brown.

*Good Easter, Essex.*—A vine leaf on a stem, placed under a broad border, boldly outlined in black.

*Fawkham, Kent.*—An oak leaf under a somewhat similar border, outlined in dark brown.

*Pelmarth, Essex.*—A stem with three trefoil-shaped leaves under a bold border, outlined in black and conventionally treated.

*Chigwell Church, Essex.*—A boldly-drawn vine-leaf springing from a perpendicular stem, running throughout a quarry. This is artistically drawn in black outline and most effective.\*

\* In many windows of Early English glazing,—notably in one in Mark's Tye, in Essex,—a vine pattern runs throughout the whole window, all the details being part of the general design. In the above-recorded example at Chigwell, the quarry, as regards design, is perfect and complete in itself. And it is only such as are complete in themselves as can be termed "quarries," and are described in this paper.



Fig. IV.

1. St. Alban's Abbey.
2. Kirby Malzard, Yorkshire.
3. Fulbourne, Cambridgeshire.
4. Milton, Cambridgeshire.

*Upper Hardres, Kent.*—Under a bold band, edged with a broad line in brown, a conventional fleur-de-lys of an early type. (See illustration, fig. I., No. 2.) [Independent of those here referred to and described, there are fleurs-de-lys of varying shapes at Southacre, Norfolk, Sherrington, Wiltshire; Emmington, Oxfordshire; Tisbury, Wiltshire; Watlington and Easington, Oxfordshire; Beverley Minster, and Tanfield, Yorkshire; and at Tewkesbury Abbey.]

*Hackington, Kent.*—A large half-opened rosebud on a stem, out of which springs the figure of a female saint, with aureole, having flowing hair. In her right hand is a cross on a staff, in her left a box or a book, probably the former. The words *St'a maud'p*,—possibly standing for St. Mary Magdalene,—are placed on either side in black letter above. This quarry is small in size, and much weather-worn. It was in the

band, two-thirds of an inch wide, charged with seven white quatrefoils,—a most artistic and effective quarry. (See illustration, fig. II., No. 3.)

*St. Alban's Abbey.*—A spray of smooth-leaved ivy, with three berries and seven leaves conventionally arranged, but drawn with irregular freedom, remained, in 1876, when I sketched it in the window of a building to the south side of the south entrance of the Abbey Church. The outline and shading were dark brown, the berries black. (See illustration, fig. IV., No. 1.)

*Waterperry, Oxfordshire.*—A floriated ornament of three leaves, developing three fleurs-de-lys,—all yellow, with brown outline.

*Queen's College, Cambridge.*—A primrose flower, with three blossoms in white, their stems yellow, and with two spreading leaves, one on each side, in yellow.

*Upper Hardres, Kent.*—A primrose with three leaves, with a cluster of berries or fruit, leaf being yellow, the stem brown, the outline and berries being black,—is represented on a quarry in the south transept of Salisbury Cathedral; and *smpr paltitmar*, in a window of Leigh Church, Surrey, near the monument of Sir Richard and Lady Ardenne, A.D. 1494.

\* In most quarries the labels do not fill the whole space, but are placed in the centre. The word *mistrtr*, we believe, occurs on a quarry in a chapel in the south transept of Salisbury Cathedral; and *smpr paltitmar*, in a window of Leigh Church, Surrey, near the monument of Sir Richard and Lady Ardenne, A.D. 1494.



lossoms, one represented full and the other two sideways, in yellow, with four leaves springing from the stem, these leaves being half coloured in brown.

**Beckley Church, Oxfordshire.**—Three pears, in a single stem, coloured yellow, with four brown leaves. . . . Three pears on three stems, shaded with yellow, with six leaves, likewise so shaded. (See illustration, fig. II., o. 1.)

**Castle Morton, Worcestershire.**—(From an old vase; the quarry itself, now broken, in the author's possession.) A four-petalled flower, apparently a lily, with a single leaf, outlined in brown, and tinted with yellow.\* (See illustration, fig. II., No. 4.)

**Little Kymble, Buckinghamshire.**—A butterfly with its head downwards, and its wings extended. Yellow, shaded with brown. . . . Other specimens with the head upwards, the body yellow, with red spots, and the wings yellow.

**St. Mary Magdalene College, Oxford.**—A single white lily-flower (part of the arms of the college), delicately outlined in light brown. (See illustration, fig. III., No. 2.) . . . A somewhat similar white flower, only with two trailing leaves on each side, springing from the stem. The leaves and pistils yellow. This remained in the window of one of the chaplain's lodgings in the year 1854. In 1884 it could not be found.

**Baulking Church, Berks.**—A conventional flower in yellow, with dark centre, outlined in black, and shaded in brown, with five single leaves arranged around it in the form of a star. white border occurs round the whole. (See illustration, fig. I., No. 4.)

**Melbury Bubb, Dorset.**—A label, outlined in black and shaded in yellow, conventionally and artistically arranged, with the inscription, "St. Walfridus Bokeri. This remains in the st. window of the choir."

**Ockham, Surrey.**—A sprig of ivy, with a cluster of berries, and a leaf on each side. The stem yellow, the leaves white, and the berries black brown.

**Northmoor, Oxfordshire.**—A stem of cormor, with two leaves and one blossom, outlined in brown, the flower being partly yellow. The excellent effect is obtained by bold, most coarse lines, and by effective drawing.

**Westwell Church, Kent.**—A boldly-drawn, conventional fleur-de-lys under a white border. The flower is outlined in black, and its background filled in with cross-hatching in brown.

**Baulking, Berks.**—Here is represented a six-petalled yellow flower without stem; with red cross-hatching in black,—the whole surrounded by a narrow border of white.

**King's College Chapel, Cambridge.**—The bosom of a white lily is here represented sideways, with stem curved, and bold shading in brown throughout it.

**St. Cross, near Winchester.**—A rude, five-petalled flower, with five triangular leaves outlined, placed under a white border outlined by a single broad brown line.

**Garsington, Oxfordshire.**—A leaf and head of poppy upon a curved stem outlined in brown, the cross-flores placed within a diamond to the left. On the two lower sides of the quarry found a border of bold double lines.

**North Moreton Church, Berks.**—Within broad borders of double lines, two of which only are coloured yellow, four conventional leaves of the me mixture are found conjoined in the form of a cross. . . . A somewhat similar quarry, the only one border,—the foliated cross being simple and vigorous, but more elaborately finished.

**Marsh Baldon, Oxon.**—A conventional floral design of white, placed within a four-sided diamond-shaped figure in yellow, with trefoil outlets in brown at the corners. . . . A conventional floral cross, with a four-petalled blossom in the centre, the arms of the extended cross ending in fleurs-de-lys. Colour, dark brown and black.

**Horsepath, Oxon.**—A sheaf of wheat, boldly drawn,—the corn yellow, and the outline in pale brown.

**Nether Winchendon, Bucks.**—A conventional

We are indebted for this to the late Rev. Dr. Wood, rector of Castle Morton, but afterwards of the diocese of Lincoln.

One specimen of this quarry, we are told, is preserved in the Picture Gallery of Chequers Court, Bucks, near Bletchley. During a visit there, seven years ago, we were able to discover it.

Messrs. Powell & Sons, of Whitefriars, possess a somewhat similar quarry.

floral cross of yellow, with a four-petalled white flower in the centre, and the arms of the cross itself ending in stiffly-drawn yellow fleurs-de-lys.

**Kyfield Church, Berks.**—An archaic and conventional cross, with a flower of four petals in the centre, and the same number of pale brown fleurs-de-lys springing from that centre, between each equal arm of the cross, outlined in brown and stained yellow.

**Kirby Malzarid, Yorkshire.**—A boldly-drawn five-petalled flower, with long and thin extending leaves standing out between each petal, the centre of flower being cross-hatched. (See illustration fig. IV., No. 2.)

**Sutton Courtney, Berks.**—A small yellow circle in the centre, with four sprays of dark brown leaves arranged cross-wise, and four batches of yellow berries outlined in black between each spray.

**Luton, Bedfordshire.**—The word *hola* boldly written in yellow, outlined in dark red, with a kind of architectural trefoil placed in either angle of the quarry.

**Fulbourne, Cambridgeshire.**—Under a broad border on the two upper sides, of brown and yellow, two acorns and two oak leaves arranged in the form of a cross,—the acorns in brown, the leaves in yellow.

**Headington, Oxfordshire.**—A conventional yellow flower, of four petals, placed upon a larger conventional flower of a similar type, and the same colour, with four single leaves added in outline so as to represent a cross. . . .

. . . A conventional lily, with two stiff leaves, one on each side, and with the letter M on a smaller diamond-shaped shield placed to the left; the leaves and letter being yellow, the lily white.

So much for the specimens described and illustrated up to the present point. In the second part of the paper, quarries of a later date, containing devices, rebuses, and heraldic illustrations, will come under consideration.\*

#### ARCHITECTURAL EDUCATION.

THE PRESIDENT'S ADDRESS, ARCHITECTURAL ASSOCIATION.

MR. CHARLES R. PINK, A.R.I.B.A., President of the Architectural Association, delivered the following address at the opening meeting of the Association on Friday, the 23rd inst.,—

Our Association is essentially of a democratic character, all our members being on the same footing and enjoying the same privileges. At the same time, it is a society established for the promotion of the study of civil architecture, and the members are naturally formed into two divisions,—those who form the executive, and those who receive instruction. I believe it to be my duty, as President, to address the second class—the rank and file of the Association,—without whom we should practically lose our *raison d'être*. I mention this because of the presence of so many senior members of the profession, who might consider my remarks very trite and elementary, and who might expect that I should touch upon larger and more burning questions. The other point to which I would call attention is that in consequence of the prize-giving this evening it leaves less time at my disposal for the addresses, and for hearing our other friends. I have, therefore, condensed my remarks as much as possible.

It is fortunately no new thing to be able to congratulate the Architectural Association upon the close of a successful session, and to make a reasonable forecast of success for the coming one. This I feel I may certainly do on this occasion; and at the same time I would thank you once more for the honour you have done me in electing me to this chair, an honour I can assure you I value most highly, and shall always recollect with sincere pleasure. My best endeavours will be directed to the accomplishment of the work of the Association, so that I may be able, at the end of my term of office, to render a good account of my stewardship.

This session may be taken as marking an important epoch in our history. The reforms and amendments recommended by the sub-committee which so ably took the question of possible improvement in hand, have been sanctioned and adopted by you. We shall now have an opportunity of judging of their working. I believe the results will be most advantageous; but at the same time I may remind you that, with our

present funds, it is impossible to fully realise the results which have been shadowed forth.

For what I have to say this evening I shall not be able to lay claim to originality. Mine will prove indeed, I fear, a twice-told tale, but the importance of its subject may justify repetition. I simply propose to review briefly some features and branches of our professional education, keeping especially in view the increased advantages now offered to the student by the Association.

And here, I may add that I shall view the duties of an architect in the broadest spirit. I cannot allow myself to regard him solely either as artist, "scientist," or [man of business. It is no kindness to a student to advise him, as some do, to neglect during his pupillage important branches of an architect's work. An architectural student should endeavour to make himself, as far as may be, conversant with everything connected with building. He may hereafter be able to confine himself to some special class of work, but he will much more probably find himself started amid the troubles of a general practice, and then, I can assure him, no knowledge will come amiss. If, as a student, he should have posed himself as a specialist, he will find himself most likely, when in practice, elbowed out by the civil engineer, surveyor, "sanitarian," or decorator, as the case may be. There is nothing unworthy, notwithstanding suggestions to the contrary, in a student aiming at being in a position to live honourably by his art. Such an ambition is, indeed, right and praiseworthy, so long as "the last or farthest end of knowledge be not mistaken or misplaced." This being so, and in the face of ever-increasing numbers joining our ranks, I certainly do not wish to see the legitimate field of the architect's work narrowed one whit.

It is unfortunate, doubtless, that in the Association we should only be brought into contact with the student when he is already, for good or ill, pledged to the pursuit of architecture. We can have no voice in his initial selection. This duty falls primarily upon parents and guardians, and secondarily upon the architects who accept the charge of pupils. I would that the responsibility of advising a young man to follow our profession were more deeply felt. Undoubtedly, a decided bent and special capabilities are important to the making of an architect. Lord Bacon said,—

"In the culture and cure of the mind of man, two things are without our command; points of nature and points of fortune; for to the basis of the one, and the conditions of the other, our work is limited and tied."

These words should afford matter for profitable consideration to those who have to decide the future calling of any one, in whose well-being they are truly interested.

This much, however, I may urge (not but what it has often been urged before), that boys, as a rule, begin their professional education at too early an age. A good and liberal education, if possible, obtained at public school and university, is of as great importance to the future architect as to the members of other learned professions. Our technical education should, in my judgment, follow a good grounding in classics, mathematics, and the other studies which make up the necessary school-training and education of a gentleman. Mr. Ruskin has told us how important the study of the *humanities* should be to us; and, with regard to mathematics, we know "that they do remedy and cure many defects in the wit and faculties intellectual. For, if the wit be dull, they sharpen it; if too wandering, they fix it; if too inherent in the sense, they abstract it." Indeed, whilst a knowledge of the principles of mathematics and geometry is really indispensable to us in our practical work, its collateral use "is no less worthy than that which is principal and intended."

Although most strongly advising a student to devote himself, heart and soul, to the work of his profession, and to avoid distracting and dissuatory studies, I would at the same time warn him not to allow his knowledge to be entirely restricted by his practical needs. An architect is reasonably expected to be a man of general information, and to have a more or less intimate acquaintance with the various branches of science and art lying outside his own professional groove. Indeed, to know any subject thoroughly and intelligently, we ought to know a good deal about its border-lands.

So soon as a student is articulated it is of the

\* To be continued.



utmost importance that he should begin serious work. He must not postpone taking advantage of the opportunities for study placed in his way. He must not let his first enthusiasm cool. That a student should possess enthusiasm, I conceive to be of the highest importance. An architect who has risen to well-deserved eminence told me, a short time since, that it was a source of the deepest regret to him to find that as he grew older his enthusiasm for his art became, he supposed necessarily, less ardent. He felt that without thorough enthusiasm no really first-rate work was possible. A pupil may at once dismiss the idea that, within the four walls of his principal's office, and during the prescribed hours, he can obtain the full knowledge required to fit him for the practice of his profession. I do not for one moment depreciate the value of a practical office training; on the contrary, I strongly feel its value. It does not, however, afford all, or nearly all, that is necessary for the student. The very existence of this Association proclaims this fact to you. And here, I would say, that I trust principals may take a more liberal view of their relations to pupils than has been sometimes the case. In the office, pupils should have opportunities of really seeing how a work is carried through, in every detail, from start to finish; they should have every chance given them of inspecting buildings in progress; and after having acquired the first elements of office-work, they should not have their time mainly filled up with the (to them) unprofitable labours of tracing and copying specifications. With regard to academic teaching, of course an architect in practice cannot be expected to give this; but he may reasonably be asked to afford facilities enabling his pupils to obtain it elsewhere. Within reason, and under proper regulations, a principal may well grant his pupils time to attend lectures and classes or for sketching and studying buildings. It is indeed his duty to give them every chance, so far as lies in his power, of acquiring a good knowledge of their profession during their pupilage. It should be remembered, too, that a student cannot be expected to do himself justice in his more advanced studies, if he can only devote to them the evenings of days spent in office-work.

I must, however, now return to the Association and its work. I will presume that a student will not long delay joining our society after having seriously commenced the study of architecture. As soon as possible after his election he will do well to consult our newly constituted Committee of Advice, so that he may be recommended what classes to join and what general course of study to pursue. A young student will, I think, find the recent division of the classes into two distinct divisions, Elementary and Advanced, very helpful to him. The aim of every member on joining us should be to pass through our whole curriculum. This, however, must be done by degrees, and it is assuredly better to do a little well than attempt too much at a time. A course of private reading, illustrative as far as possible of class-work, must not be neglected.

And now to turn to individual branches of our work here. First, we have design. This is the study of paramount importance, and you may depend upon it that whatever your natural powers may be, good design will only be the outcome of close application. Our classes, I feel sure, offer to the student of architectural design the best available help, supplementary to the study, sketching, and measurement of actual buildings. In selecting buildings for special study I would advise you as architects, and not merely antiquaries, to exercise a wise discrimination. Rest assured, some inferior designs were carried out in old times as well as now. Further, do not be ashamed to take a keen and intelligent interest in the buildings now rising around you; for in this direction lies the path of progress. Sooner or later you will find you must not, you cannot, neglect modern works, for they form, especially in their plan, construction, materials, and arrangement, the record of means discovered and adopted to satisfy the ever-increasing needs of our modern civilisation. You will also derive great benefit by forming a habit of observing the details of buildings, old and new, methodically, in some certain order of relation. The Institute published many years ago a pamphlet called "How to Observe." Its suggestions and information have become antiquated, but I think a similar work, adapted to the present time, would be useful.

With regard to the vexed question of styles, I will say nothing on this occasion, but only point out that the true artist seldom fails to give us good art, irrespective of what we call a style. One characteristic of all good buildings, architecturally speaking, is that their design is appropriate to their purpose. Mr. T. G. Jackson has recently enforced very ably this truth. If we carefully analysed the design of old houses, homesteads, and other every-day buildings which please us, we should soon discover that the good results are not obtained by redundancy of "ornament" and general unrest, but by good materials, solid building, broad masses, and generally by common sense, perhaps "commonplaceness," in plan and elevation. I think it was the late F. P. Cockerell who said, "We architects have yet to learn the value of a plain brick wall." Do not introduce ornamental details simply for their own sake, but make them help the general design, and let them always show evidence of thought and refinement. One other point I would urge in passing, and that is, the value of giving "local colour" to your buildings; the distinctive peculiarities of material and design in our country districts should, if possible, be preserved. An attention to this will ensure a building harmonising with its surroundings, and possibly make it, instead of a disfigurement, an addition to the beauty of the country side. It is no insignificant matter in these days, when on all sides we see the towns spreading over the fair expanse of rural England, to endeavour to make the changeless abrupt, less gloomy, less sad. Would that we, as architects, had the power to deal with the main evil, the deplorable work of those "field-rangers," the speculating builders.

In the internal decoration of houses and other buildings, undoubtedly a great advance has been made of late years. The architect now finds himself provided with a varied supply of beautiful and excellent materials, such as he could scarcely have dreamed of but a short time ago. I hope, therefore, our class for the study of colour decoration, provided as it is with such an admirable staff of visitors, may obtain a larger attendance than it has heretofore been able to secure.

And here I may supply what may seem an omission in my previous remarks, I mean a reference to the importance of being able to draw "in freehand" thoroughly well, with accuracy and facility. Good draughtsmanship is no substitute for good design, but its value to students can scarcely be over-rated, and, indeed, is so patent that I may be contented with a bare allusion to it. The Association does not profess to supply the teaching of an ordinary "Art School." This is the less to be regretted, inasmuch as opportunities for gaining skill in drawing from the flat, round, and living model have multiplied in London, and, indeed, all over the country. No architectural student must, therefore, neglect to acquire the grammar, as it were, of art expression.

Now, with reference to the scientific section of our work here, I would say, let your study of construction and materials go hand in hand with your efforts in design. When you have passed through the ordinary classes of construction and practice, do not neglect, as has been too much the fashion, the advanced class. It ought not to be necessary for you, when in practice, to call in a specialist to advise upon any ordinary problem in iron or other construction. If you obtain a general grasp of mechanical principles and their application, the intricacies of strains and stresses will no longer discourage you. It is, therefore, an excellent thing when a student before commencing work in an office can pass through such a course in the applied sciences as University College (London) provides. In these days you must also not fail to take a thorough and intelligent interest in the progress of sanitary science as it affects buildings, and make yourself familiar with its practical details. The issues depending upon the knowledge of what should be done in order to secure healthy homes are so momentous, that ignorance in this respect on the part of an architect would be indeed culpable.

Our members will find the class for the study of quantity-surveying and specification-writing a great help in practical work. Such a class cannot fail to teach, among other things, how many are the limitations in design brought about by the all-important question of cost, and also by trade-usages, the market forms of materials, &c. An architect may, probably, not have to practise as a quantity-surveyor, but he will

never regret having studied the anatomy of a building in the light of quantity-taking. Such a course will give him a knowledge of the minutiae of construction as nothing else can, and method, clearness, and ease will consequently be displayed in his specifications and writing.

In passing, I would also just mention the class for the study of land-surveying and levelling, as affording students an opportunity of acquiring an art which they will often find useful hereafter. I have received strong testimony from members to the advantages they derived from attending this class.

I have not yet referred to the courses of lectures which have, during the last year or two, been given in connexion with the classes of design and construction. These lectures, I consider, mark a distinct advance in the Association's work, and I am convinced they greatly increase the benefit students derive from the classes. Our best thanks are due to the lecturers, who have so ably helped us in this matter, and only hope we may be able to find ways and means to establish lectureships in other subjects connected with our professional studies.

I have already alluded to the importance of private reading. Our library here exists for this end, and the reference and lending libraries of the Royal Institute of British Architects, as well as the National Art Library, are available to the student. The list of students' books published by the Institute will be found useful in directing a course of reading; the new Brown Book also furnishes a list of books relating to design, and our Committee of Advice will give any information which a member may need respecting books for study. The elementary text-books are moderate in price, and a student should not fail to buy these for his own use. Speaking of books leads me to point out that a knowledge of one or more modern languages is of practical use to the architect, apart from the increase of facilities it gives for travel. Many of the best treatises on our art are published in French and German, and they are sealed to us if we only know our native tongue.

I have now briefly referred to what I may characterise as the chief branches of the work of the Association. To their work here, our members add that of the office. We must, however, never forget that nothing done either here or there can take the place of the study of actual buildings. The student should never lose an opportunity of examining works in progress. We arrange fortnightly visits of interest during the Session, and I am very glad that they are now enabled to give members further advantages in this direction by granting general passes to various buildings under proper conditions. Professor Roger Smith advises, to watch all buildings in progress which you may pass to and from your office, affords a good practical hint. When you are on a building I would urge you to make a sketch or written note, even of details, apparently it may be, very trivial. I believe if we commence practice we often find ourselves in want of accurate knowledge of small matters which we have missed hundreds of opportunities of noting. In the specifications which pass through your hands do not allow expression or reference to remain obscure; take the earliest opportunity of solving the point in the light afforded by an actual building. If you have the chance of visiting the builder's workshop do not neglect it; you can arrange to work there for a time, the more the better. Cultivate also the acquaintance of any workman who is master of his craft, and rest assured you will learn much that is valuable by so doing. I remember arranging with a fellow-pupil on more than one occasion to spend a day on buildings in progress, in the company of a good builder's foreman. We were not afraid of asking questions; we noted down all the answers we obtained, and in this way derived very much practical information.

Before referring to other matters, let me more earnestly beg, that in all our studies, our work shall be distinguished by system, solidity, and thoroughness. May we avoid that "make-up imposture" which "delivers knowledge" in such a manner as men may speedily come to show of learning, who have it not.

It must be apparent that in giving details of the means at our disposal for architectural education, I have had mainly in view our students in London. Country members can, I am glad



say, avail themselves of many of the advantages of the Association, but in the nature of the case, it is impossible for us to offer them the equal educational privileges with residents of London. Where a country town can support its own local architectural society, however, one may be done to put the London and country students on a similar footing. The pupil of an architect in the country, nevertheless, often possesses some special advantages, such as extended opportunities of becoming acquainted with a very varied practice, and of studying old buildings and works in progress, and to speak of his closer contact with the study of nature. I may, perhaps, also add that the counter attractions to study are, as a rule, fewer in the country than in London. I have often thought that correspondence classes, giving especial reference to preparation for the Architectural Examination, would prove a great boon to country students. I would suggest that they might be established much on the lines of the London University Correspondence Classes; examiners prescribing the course of reading, setting papers of questions, and correcting and annotating the answers. The study of Architecture, the Science of Building, Materials, Building Law, and Sanitary Science, at once suggest themselves, as affording good subjects for instruction by this means. I should be glad if some such scheme of this I have sketched, could be vigorously tried.

More and more I look forward to the Architectural Examination established by the Institute being recognised as the test of our students' work, here and elsewhere. I trust, therefore, our members may, from the very first, be led to direct their studies with the full intention of passing this Examination, which, in my opinion, could receive the strongest support that can possibly be given to it. It was established, for long and unceasing efforts, by those who rightly considered it the most important step towards ensuring to the profession in the future a proper position and influence. I have had experience of the Examination, both as a candidate, and subsequently as a moderator, and I am convinced that it will be found only a fair test of necessary architectural knowledge. No doubt by degrees a higher standard will be set, but the present scope of the examination cannot be pronounced too wide, or too deep. With regard to the probationary work which is to be submitted, there is no reason why it should frighten the would-be candidate. His drawings required have not to be specially prepared, but are, indeed, such as a student, after a few years in the profession, is likely to have made for other purposes. This examination question is a very pressing one for the younger architects, and I cannot believe that the need of our professional sheet-anchors will be allowed to fail in its intention for want of their hearty co-operation and support.

Speaking of the Examination leads me naturally to refer to the Institute itself. I think you will permit me to say this much, respecting the alterations now proposed in the Charter: that they will receive, especially such as shall secure to country members and the Associates generally, their proper voice and due influence in the management and work of the society, our hearty sympathy. I trust that without shock or revolution, the Royal Institute of British Architects will now be able to re-establish itself on a firmer, stronger, and wider basis, and so attract to its ranks all who are worthy to be named as architects. It is becoming more and more important to the profession that it should be represented by an influential corporate body; it is, therefore, of consequence that the Council should be loyally supported in its endeavours to reform the old Charter (by which it has heretofore been bound), and so to place the Institute in a position to meet the present needs and wishes of the profession at large.

The stronger we can make our representative society, the more abundantly I believe will architects feel, and show forth true *esprit de corps*. Real professional etiquette is only another reading of the Golden Rule, and we cannot observe it too scrupulously. Our association together for the promotion of common objects cannot fail, I believe, to make for the amenities in practice we most all desire. I am allowed to repeat here a few sentences in this subject, spoken by one whom we all honoured and esteemed, and whose recent loss we deplore. I need scarcely add I refer to the

late Professor Donaldson. He said, addressing the students at University College:—

"In seeking for employment, an architect must use the delicacy of a sensitive and refined mind; and utterly abhor and avoid any underhand unworthy means of success. He must not urge his pretensions, unless justified by the occasion, or authorised by any accidental circumstance; and his conduct must be noble, open, and generous. He must never attempt to supplant a professional brother, nor seek by foregoing a portion of his fair professional remuneration to underbid him. He must never volunteer an opinion to the disparagement of another architect."

Professor Donaldson, indeed, represented the architect's ideal, as defined by Prof. Cockerell, being truly "an artist among gentlemen, a gentleman among artists." His constant efforts for the good and advancement of his profession, his work at the Institute, and, above all, the active interest he took in architectural education, can never be forgotten by us.

And now I must endeavour to bring my remarks to a close. I fear I have been too discursive, but, indeed, my subject is wide and many-sided. Even now I have merely touched the fringe of many matters of great interest to us as architectural students, and several points of importance I have been obliged to overlook altogether. In the few remaining words I have to say, I would fain "point the moral" of my address, and beyond all details, fix your attention distinctly upon the pressing need of the time.

It behoves us, then, as Mr. Cole A. Adams (to whose admirable conduct of affairs during the past two years we owe so much) urged from this chair, to look to our professional training, and see that it advances *pari passu* with the general advance of education and knowledge throughout the country. We have not, unfortunately, at present, the academical advantages our brethren in art enjoy in France and Germany; but we have some practical advantages they lack, and any deficiency only renders it the more incumbent upon us to avail ourselves of all the means of study we possess, at the same time endeavouring to extend them and make them more effective. Depend upon it, we must work with a will, and be afraid neither of new methods nor new studies, if we are to hold our own in the profession against an invasion of specialists; do our duty to our clients; and obtain the confidence and esteem of the people at large. In this scientific age it will do no good for a student of architecture to proclaim, as some would have him do, that he, as an artist, has nothing to do with the dry bones of science. Rest assured, such a one must sink into the position of a decorator or mere *dilettante*. First and foremost, by all means let us be artists, and thorough ones too, but if we fail to study also the science of building, there will be no place for us among that throng of great architects,—great constructors,—to whom we rightly look back with pride and admiration. They always strove, in all things, to be in the very fore-front of their age; and if we do not follow their bright example, the very art of architecture—the mother of all the arts,—will have "but a name to live and be dead."

But, fortunately, it is in our power, and I feel sure that it is our set purpose, to prevent any such result as this. If we, in the strong bonds of union, now earnestly work in the cause of architectural education, we may look forward to the future with confidence, believing that our art will still produce works to vie with those noble buildings, which raised aforesaid, are counted among the very chief and most enduring glories of our country.

[For a report of the discussion which ensued, see p. 622.]

**The Late Mr. Ordish.**—At a meeting of members of the Leicester Society of Architects, recently held, the following resolution was adopted:—"The members of the Leicester Society of Architects, deeply lamenting the sad death of their old friend, Mr. Frederick Webster Ordish, remembering him as a genial companion, an accomplished artist, a bold and original thinker, desire to record their sense of the loss the profession and the society have sustained, and to express their heartfelt sympathy with his widow and the family."

**Royal Institute of British Architects.**—The first ordinary meeting of the Session, 1885-86 will be held on Monday evening next, when Mr. Ewan Christian, the President, will deliver the opening address of the session.

## THE PAST, PRESENT, AND FUTURE OF THE ARCHITECTURAL PROFESSION.\*

ONE of the great architects of our own time, in his powerful and unique address as President of the Royal Institute of British Architects, studiously avoided the use of the word "profession," and he urged to me in private that architecture is an art, not a profession. On the other hand, a man who knows the world better than the late Mr. Street did, has publicly advised an architect if he wished to make good buildings to dismiss all grand ideas of the sort from his mind, and "whatever you do," said Sir Edmund Beckett, "don't call yourself an artist." We are artists, he maintained, in respect of our drawings, but not in respect of the buildings erected from them, and, said he, "experience has long enough shown that there is no connexion between the power of making nice architectural pictures and the power of producing fine buildings." Between the two extremes I am induced to think that the lawyer is nearer the truth than the artist, as he wished to be called. What Bacon wrote of medicine in his time, in the "Advancement of Learning," may, perhaps, be applied to architecture in ours, as "a science which hath been more professed than laboured, and yet more laboured than advanced, the labour having been rather in circle than in progression." In the same memoir the arts intellectual were defined by him as four in number, and I think that architecture belongs to each. Surely it is an art of inquiry or invention; of examination or judgment; of custody or memory; of eloquence or tradition. Surely, also, it is admitted that there does exist, and rightly exist, a profession of architecture. I nevertheless feel certain that in the past the greater number of the architects of all countries were neither artists nor professional men as we in England now understand the terms, and they were not, so to speak, professionally educated.

### I.—The Past.

Taking the roll of great modern architects, I do not find that their studies were limited to what we now call architecture. With a few exceptions they were men who began practice with a foundation of general learning, and who had travelled much and far. Michelangelo, and, in a minor degree, Bernini, combined the three arts; Vignola, who was a painter, Delorme, and Palladio, measured, studied, and put on paper an immense number of ancient buildings during long years, beginning at a very early age, and the three were great travellers before they attempted the execution of any edifice. Pierre Lescot was a priest, and Perrault a physician. Inigo Jones was a citizen of the world who had seen courts and distant countries, and he painted a little. When possessed vast scientific erudition before he began even the study of architecture. Sir William Chambers was similarly, though in a less degree, a man of general information. According to Quatremère de Quincy, the three works of architecture which the French esteem most, due to men who had not made that their special profession, are the old Louvre by P. Lescot, its great colonnade by Perrault, and the arch of St. Denis by François Blondel, who began the practice of architecture at the age of forty-seven, after he had been employed on diplomatic missions, had taught mathematics, and had been the daphn's tutor. J. H. Mansart, the nephew of the Mansart, was perhaps more like an architect of our own time than any of the remaining eleven. The architects in the sixteenth, seventeenth, and eighteenth centuries were undoubtedly the acknowledged masters of arts. Painters and sculptors assisted them, but as subordinates, and the works entrusted to these masters were necessarily royal palaces, cathedrals, great churches, and buildings of a national character. The larger number of persons who, at the present time, support the professional architect did not then employ so exalted a personage. Their work, when they required any, was done by the mason, carpenter, and smith: the master-workman of their time, and indeed of ours too among the older nations and in several parts of Europe.

The pre-eminence of architecture was recognised in the charter granted by Louis XIV. to the Academy of Painting and Sculpture in 1717,—a pre-eminence which was taken away sixty

\* A paper read before the Leeds and Yorkshire Architectural Society, by Mr. William H. White, Secretary of the R.I.B.A., on October 26, 1885.



years afterwards by another charter received from Louis XVI., the first clause of which assimilated in so many words painting and sculpture with literature, science, and the other liberal arts, especially architecture. A few years previously, in 1708, in an "Instrument" conferred by George III. on his Royal Academy of Arts, the position of intellectual superiority given to architecture is apparent, but not clearly defined. The order of precedence is not invariably painting, sculpture, and architecture. By clause VIII. the office of treasurer, only second to that of president, was given to an architect; under clause XI. a professor of architecture was ordered to read annually six public lectures "calculated to form the taste of the students [of architecture, painting, and sculpture], to instruct them in the laws and principles of composition, to point out to them the beauties or faults of celebrated productions, to fit them for an unprejudiced study of books, and for a critical examination of structures"; and his appointment under the "Instrument" preceded that of the professor of painting and the professor of perspective and geometry. By clause XX. there was to be a library of "books of architecture, sculpture, painting, and all the sciences relating thereto." \* Our Royal Academy was established, to use the exact words, "for promoting the arts of Design," that word possessing a signification much more nearly allied to *dessin*, or drawing, than to "design" as it is understood by the modern architect. On the other side of the Channel at that period the Academy of Painting and Sculpture, founded 1648, was firmly established, and the Academy of Architecture, founded 1671, was still in so flourishing a condition as to consist of sixty members, with about an equal number of students. But though much was already done in the matter of art for our French colleagues, they were not represented as a profession until 1840-43, when the Société Centrale des Architectes was founded in Paris, principally with the object of instituting a diploma.

Fifty years ago the architects of this country, some of whom already belonged to a professional body called the Architectural Society, were invited to meet for the purpose of forming an institution responsible (1) to the public for opinions on points through whose observance the national character for taste might be directed and maintained; (2) to individuals in cases whereon recourse might be had to its opinion; and (3) to the body of the profession for a determination to uphold by conjoint exertion a high character and respectability amongst its members. With a view, then, to the promotion of such important objects the Institute of British Architects was founded in 1834, and incorporated three years afterwards by royal charter.

That I should deem the profession of architecture in this country to be indissolubly connected with the Institute of Architects is obvious, and I think the belief is shared by a great many persons less personally interested in that article of faith than myself. The late Professor Donaldson has left, in a speech delivered at a meeting of the Institute just fifteen years ago, a personal note of the founders' motives, and given a reason for the comparatively limited number of its members. I recollect the profession," said he, "before many here,—for about half a century [i.e., since 1820]. At that time there was a very intimate connexion between architects and builders. . . . It was determined by some young and ardent spirits that a severance of such connexion should take place to remove that scandal. That was the foundation of the Institute: to establish a body of members purely architects, and not mixed up with builders. It is not that we disregard the builders. They are, for the most part honourable, intelligent, and high-minded men, but their duties are distinct from ours, and our professional reputation might suffer by any intimate connexion with them. . . . That is the reason why there is such a great difference in point of numbers between this Institute and

\* The Queen, like her great predecessor who was prepared to unfrock a bishop, can undo at a stroke the work of her royal grandfather, and do no wrong. Hence British architects can only bow to circumstances whereby many of the provisions relating to architecture in the original institution of the Academy have been for years ignored. But it is not too much to add that, if the high distinction and honourable privileges conferred by that charter upon the architect have been recently sacrificed, the loss is due in a great measure to the spathy and indifference of those who, since the death of Street, have been the chief representatives of the profession at the Royal Academy.—W. H. W.

that of the Civil Engineers, for the engineers have no such restriction. They admit contractors as members, also persons engaged in several trades in connexion with engineering, whereas if we admitted builders, paperhangers, plasterers, and decorators,—men whom we respect in their several stations because very much depends upon them in the execution of our works,—we should have an Institute as numerous as that of the Engineers." It will be seen by a careful perusal of the first address of the Institute, printed in the new Kalendar just issued to members, that not only the provisions of the charter under which we are now governed, but also the professional obligations which bind both Fellows and Associates, were formulated and agreed to as early as the year 1834, three years prior to the grant of the existing charter.

About the same period a Fellow of the Institute, the late Mr. James Noble, published a little book on the professional practice of architects and of measuring-surveyors, &c., a somewhat involved and rambling piece of composition which, oddly enough, is the only work of the kind yet offered to the public. According to him there were barely twenty-five architects in the United Kingdom at the commencement of the last century, and it was not until the time of the great Lord Burlington that the employment of architects began to be systematised. It was then that a commission of five per cent. became the established compensation for duties and services of every nature, from the making and finishing the first sketch of a design to the complete execution of the work, the final arrangement and settlement of the cost, and the certifying and signing the various accounts. The system which still obtains in Paris and throughout France was the English system during the latter half of the last century. Works were paid for by measurement according to a certain tariff of charges, and the architect employed to design and erect an ordinary building had to treat with a dozen or more master-artificers, often unknown to each other, innocent of any sort of mutual organisation, and unwilling to accept instructions from any one but their master the architect. It was he who ascertained the quantities and data for the various materials and labour, and he who determined the value of the same. Hence it was usual for a master-artificer to employ a measurer whom he paid as his assistant,—as he still does in France,—to check the measurements made by the architect, and the latter's assistants. It was the State that introduced the general contractor. The Government of this country about the beginning of the present century was the first to supersede the groups of master-artificers, who technically understood their respective trades, by a capitalist who accepted the responsibility of the several tradesmen without possessing in himself any technical education whatever, or indeed any capacity for the building arts. Such action not only ultimately ruined the master-artificers, but it also struck a heavy blow at the architectural profession, and the seed then sown has produced the British workman of to-day,—a fact which has been already noted, I think, by Mr. Herbert Spencer. At the same time the labour of an architect was lessened, and his employer was rendered able to judge in advance, and with comparative accuracy, of the amount he would be likely to expend upon a new building. With the creation of a class of so-called builders there arose a new profession. The measurers, who were originally the journeyman-assistants of the artificer, who was a master of his craft, became the indispensable advisers of the capitalist-master, who understood no trade except that of making money. The measurers developed into an important body of well-educated men, and have become the business advisers of architects as well as of capitalist builders.

The clerk of the works also became, under the general contract system, a personage. But though raised from an assistant to be a superintendent,—though his duties, powers, and responsibilities were largely increased,—he was, and still is, chosen from a subordinate class of artificer. Recently a special vocation has been constituted of these technical officers, who in this country do work which among the French is entrusted to trained architects and to young men who are training for the profession. The clerk of the works, as he is known in England, is extremely rare among our neighbours, and how detrimental he often is to the proper execution of the work, especially in the choice and

reception of materials, I leave actual practitioners to say, for it is now time to consider the more recent relations of the Institute with the profession.

One course of action, for which it made itself responsible, was taken without a title of authority. There is nothing in the Institute's charter, and there never has been any by-law made under it, which treats of the remuneration of practitioners. At a period anterior to the foundation of the Institute, a scale of charges or terms for business transacted was sometimes drawn up by individuals who made that scale a basis of agreement with their employers, and a notable example is extant on Joseph Bonomi's terms, dated January, 1794. A Schedule of Charges was formulated by the Institute in 1862, and confirmed at a general conference of practitioners. But subsequently the unhappy word "rules" was prefixed to this excellent document, in its modified form of twenty years later. Utterances were made concerning the duty of every member, irrespective of age, class, or experience, to charge his clients not less than five per cent. commission on executed works, and thereby adhere strictly to the terms of the orthodox schedule of "rules." The inevitable accusation of genteel trade-unionism might have been answered by a direct negative, but not the corporate powers been exceeded, for the slightest acquaintance with the by-laws sufficed to show that membership of the Institute, whether as Fellows or Associates, involves no obligations upon them other than those of honourable dealing in matters of business entrusted to their charge, and in the interest even of their employers than of themselves. Another misconception which has done harm was traced, after much inquiry, to an address delivered by Mr. Waterhouse in 1878, as President of the Manchester Society, and repeated in various places, notably at Leeds. He told his audience that members of the Institute were forbidden to act in the capacity of quantity surveyors,—unwisely, he thought, because no employment could be more remunerative or instructive to the young architect than to take off the quantities of the designs of older men. But he was entirely mistaken, for no such restriction has ever existed as far as the young members are concerned, namely, the Associates who are nearly 700 in number. They have always been permitted to act as quantity surveyors, while a Fellow is only prevented from taking off quantities for works which are not executed under his own superintendence.

## II.—The Present.

It may not perhaps be altogether idle to speculate upon what might have happened had the founders of the Institute of Architects drawn their charter as to admit to the rights and privileges of corporate membership of the general contractor and the large manufacturer of building materials. Without doubt it should have been richer, and we should have had a larger Benevolent Fund, probably in extensive request among the more artistic members, but there would have been few, if any purely professional architects at the present time. The prominent members would have been contractors with seats possibly in the House of Commons, and, as a consolation, they would have possessed a better knowledge of the art and science of architecture than the majority of the successful contractors enjoy to-day. But I doubt whether the great European architect, the *conférence* of Berlin, Paris, and Vienna, Italy and Russia, would have cared to hold or diploma of Corresponding Member, or acknowledge Fellows of the Institute as brethren and colleagues. Many of us, on the account alone, will render tribute to the wisdom of our founders, and to none more heartily than to him who, remarkable for general attainments and a high degree of learning, and respected both at home and abroad, ended a long life of honourable exertion in August last. His mission, however, had been to some extent accomplished. The world is completely changed in character since Donaldson was in his prime. At the beginning of this century the latest foreign news upon scientific, archaeological, or artistic questions was sought at the Royal Society or the Society of Antiquaries. In 1840, we learned at the Institute of Architects what new buildings were in contemplation, what methods of design or construction were most in vogue in Paris or Vienna, and the drawings of such Continental novelties were sometimes first exhibited in our rooms. But a professional press does



t now, and, considering how expeditiously it  
lone, does it marvellously well. Indeed, an  
exchange of professional periodicals has  
ults far greater than any "foreign corre-  
spondence" between societies can produce.  
other object of the founders was to form a  
seum of antiquities, models, casts, specimens  
materials which tend to illustrate the arts  
sciences in their application to design and  
struction, and to report on new inventions.  
t the State has lately done this at South  
nnington, and previously at the British  
seum, in an unrivalled manner, while exhibi-  
ons of materials, periodical and permanent,  
and not only in London, but in all parts of  
country. On the other hand, the formation  
an architectural library has probably been  
ended with more success than many of the  
gnitors in the year 1836 dared to expect.

It is quite different as regards the practice  
ness of the profession, the control of which,  
uccessfully attempted in the early years of the  
stitute, has been allowed almost to lapse.  
ke a deplorable instance, indirectly referred  
y two Presidents in succession, that of the  
duct of the Metropolitan Board of Works.  
he principal business of that Board is trans-  
acted by the Works and Purposes Committee,  
hich is a committee of the whole Board. The  
ent chairman of it, Mr. F. H. Fowler, who is  
Fellow of the Institute, was employed to  
sign and superintend the erection of the so-  
led "National" Opera-house on the Victoria  
bankment, and also the new theatre in  
Northumberland-avenue. Another member,  
J. E. Saunders, also a Fellow of the Insti-  
tute, has been employed, in open partnership  
with architects (not members of the Board) in  
the design and erection of the new Grand Hotel  
at the new Hôtel Métropole, situated at each  
extremity of Northumberland-avenue; and also  
in partnership with another architect (not a  
member of the Board) in the design and erec-  
tion of the new London Pavilion Music-hall.  
All these buildings are situated on land which  
under the charge and, so to speak, jurisdiction  
of the Board. The land is let by the committee  
in which these architects are members. The  
membership of a member of the Board with  
holders, who are virtually customers of the  
land, is admitted both in Spring-gardens and  
St. Stephen's. I cannot for a moment doubt  
that everything done by these gentlemen in  
business so conducted is perfectly straight-  
forward and correct. But the principle of the  
thing is wrong, and no integrity, however  
zealous, can make the practice right. Re-  
ferring to this subject, the late Mr. Street, on  
November 7th, 1881, said:—"I do not think it  
right to close the few words I have to say on  
the Northumberland-avenue question without  
advising what fell from my predecessor in  
his chair on the subject of architects who are  
members of the Metropolitan Board. 'Archite-  
cts,' he said, 'may be elected members of that  
Board, just as barristers, solicitors, and doctors  
may be so elected. It would be ridiculous to  
say that professional men shall not sit at that  
Board because they may have had a pecuniary  
interest in some of its building transactions.  
But I shall run no risk of censure when I say  
that a Fellow or an Associate of this Institute,  
if he is elected a member of the Metropolitan  
Board of Works, ought not, from that moment,  
to have any professional connexion whatever  
with the purchase of land offered for sale or  
lease by the Board; nor should he be profes-  
sionally engaged in the superintendence of  
buildings to be erected on land which is the  
property of ratepayers whose agent and repre-  
sentative he is.' Such a statement is so  
obviously right and beyond question," continued  
Mr. Street, "that I am sorry it should be neces-  
sary to repeat it." That was said in 1881, and  
now, four years afterwards, it would have been  
still necessary, had he lived, to repeat a similar  
denunciation.

Indeed, it is now ten times more urgent to  
direct public attention to the matter. An ex-  
tended representation of the people has been  
sanctioned by Parliament. It is probable that  
few practising architects may, in course of  
time, obtain seats in the House of Commons.  
Are they to carry on and promote their busi-  
ness in the House itself? Are they to use their  
honorary position as legislators to obtain pro-  
fessional work for themselves? If so, I think  
that such licence will be injurious to the public  
interests, and that such Members of Parliament  
should be regarded by the profession as the  
common enemies of all. It was this very thing

to which *Prévost-Paradol* alluded when, in one  
of his admirable articles on the English consti-  
tutional system, he expressed a fear that its  
decline would be accelerated by private Bill  
legislation and the personal interests of legis-  
lators. For my part, I think that this country  
has strength and vitality enough to survive the  
sins of its rulers, as recent events show, but the  
British Empire will be very far on the road to  
ruin when a Cabinet sitting in Downing-street  
is composed of a dozen tradesmen who use the  
various embassies of the world as trade agencies  
for the sale of their wares,—a logical deduction,  
surely, of the system which two Presidents of  
the Institute of Architects have publicly re-  
proved.

The principle, however, on which the Metro-  
politan Board of Works acts in regard to the  
profession of architects is the right one. The  
Board does not attempt to build on the sides of  
the new streets which it makes, nor does it  
allow the Superintending Architect to monopoli-  
se any such work, or even to practise on his  
own account. The land is apportioned in lots,  
and let to individuals who employ architects  
and others to erect buildings for them, the  
Board merely requiring the drawings of the  
same to be submitted for approval before the  
buildings are executed. True, the person who  
wishes to build does not always succeed in  
obtaining his land direct from the Board. Large  
premiums have to be paid on the sums paid  
by the original purchasers, notably, in the  
case of the "National" Opera-house and other  
important buildings; but such instances are  
commercial and often accidental in their nature,  
—not absolutely detrimental to the principle of  
freedom involved,—and, therefore, what munici-  
pal government the metropolis may be said to  
possess does not exclude, or compete with, or,  
perhaps I may say, "boycott" the profession of  
architects, as the State has done for a good  
many years.

The system under which the State erects  
public buildings is not only discouraging to the  
profession, but it is singularly fatal to the crea-  
tion of a national school of architecture. Ob-  
serve what happens when a public office, say,  
is required at Manchester, or Leeds, or else-  
where. The drawings are made in London, the  
quantities are taken off in London, and a clerk  
of the works is sent from London to take charge  
of it as the building rises. From that moment  
until it is handed over to the proper authorities,  
the architects of the actual locality, their  
assistants, their pupils, and the public generally,  
regard the whole matter as alien to themselves,  
of no local interest, and national only because  
the nation has to pay for it. A public building  
of the kind which requires two or three years,—  
or even a year,—to erect, ought, on the con-  
trary, to afford an example to the elder mem-  
bers, and a school to the youth of the profession.  
The State, advised as it should be, by the  
highest architectural talent the country can  
produce, might, sometimes with advantage,  
associate with such a building one of the archi-  
tects of the locality; and its representative from  
London in charge of the works,—obviously  
better than an ordinary clerk of the works,—  
should attract to his office on the works, where  
many drawings would necessarily be made,  
some of the younger professional men, who  
would personally benefit,—to say nothing of  
other local fruits,—by contact with the Govern-  
ment servants. But the State invades the pro-  
vincial cities of England as an enemy or a  
foreign competitor; it takes possession of land,  
fortifies it, and leaves the work it has erected  
to testify for a generation to its selfishness and  
ill-will. Even were the State to command the  
services of genius, such a course as it now pur-  
sues in regard to provincial public buildings  
would be inimical to local interests,—except,  
of course, in the fact of the transcendent excel-  
lence of its work. But, may I ask, is the work  
done by the State in Manchester or Leeds better  
than municipal and private work? As for  
London, what Philibert Delorme said 300 years  
ago of his masters applies with equal force to  
ours of to-day. While in Berlin, Vienna, and  
even Paris the few advice respecting public  
buildings and the many execute, in the capital  
of the British Empire "la charrette conduit les  
bœufs,"—the mob initiate and suggest. The  
story of the concentration by the State since  
1839 of its public offices is so good that it bears  
constant repetition,—a ludicrous tale of fruitless  
effort and wasted opportunity during forty-six  
years, and even now only begun.

There is, unfortunately, no recognised autho-

riety to which the British public can appeal  
when, as the majority of men may fairly do,  
they distrust their own judgment in such  
matters. There is no standard of taste in  
this country, not even a bad one! Opinions  
upon architecture are confused rather than  
divided, and any attempt to get at principles  
breeds despair. In France, the academical  
"Forty," always kept up to the strength of  
fourteen painters, eight sculptors, eight archi-  
tects, four engravers, and six musical com-  
posers, form a tribunal of experts. The Paris  
School, or, more properly, University, of the  
Fine Arts is one of the great institutions of  
the world, containing a school of architecture,  
the traditions of which, in France, Rome, and  
Athens, may be traced back through two  
centuries. But in England it has always been  
the fashion to decry such things. Our Royal  
Academy is primarily a fashionable market  
for the exhibition and sale of pictures, and its  
architectural class, which works six hours a  
week (in the evening) during only a portion of  
the year, merely turns out draughtsmen. At  
the same time the Royal Institute of Archi-  
tects, though it has established examinations  
in London and the provinces, though it possesses  
valuable studentships, and offers prizes which  
are much competed for, does not command  
adequate support.

The difficult question of professional educa-  
tion is the most perplexing one of the present  
time, for it is astonishing how much secret  
and indirect opposition exists to the establish-  
ment of any thorough system, and how many  
highly-respectable practitioners regard even the  
examination for membership of the Institute  
as an error or a misfortune. This neglect and  
indifference, it seems to me, is but a poor  
compliment to those who employ architects  
and hope to get well served, and, indeed, as  
always happens, the public are even with us  
on that score. You, Mr. President and gentle-  
men, will remember the unpleasant couple,—

"If of dull parts the stripling you suspect,  
A herald make him, or an architect."

Persons who have never heard of Martial nor  
read Addison accept this advice, for I have  
known it adopted on three occasions since I was  
first elected Secretary of the Institute: twice  
with and once outside its walls. One gentle-  
man, having a son of weak mind, gravely con-  
sulted me as to the advisability of making him  
an architect; another, similarly favoured,  
brought his unhappy progeny for me to look  
at! The public impression that an architect  
works with his fingers,—that, in fact, he is a  
draughtsman or decorator,—is fatally prevalent.  
Even men who have opportunities of learning  
better fancy that a stay of three years in a  
practitioner's office suffices to make an architect,  
and young men are sometimes entrusted with  
responsible works by their relations after  
having served that term of indenture. Who  
does not know by heart the anecdote which  
possibly applies less to Little Peddington than  
to the capital of Barsetshire, or even Oxbridge  
and Camford? How a young gentleman from  
the country was articled at some cost to a  
London architect for three years; how at the  
end of the term he set up in practice in his  
native town, where, having good connexions, he  
obtained work at once, and took a pupil with a  
premium to help him do it; how at the end of  
the orthodox three years the ungrateful pupil  
took a room on the opposite side of the street,  
set up on his own account, and brought over  
with him his master's best client; how for the  
remainder of that master's professional life he  
never sought another pupil, but got his tracings  
made by errand boys, and his specifications  
copied at the stationer's. The story is not op-  
posed to evidence. It is certain that among  
other vocations and professions the public are  
less facile and less venturesome than they are  
with us. On the other hand, and in an opposite  
extreme, the French architects complain that  
while they are spending their years of probation  
at home and abroad, at Rome, Athens, and  
elsewhere, the errand boys in the Paris offices  
are learning the business of the profession, and  
starting as architects on their own account, a com-  
plaint not altogether unfounded, but immensely  
exaggerated.

I am, however, sanguine enough to think that  
the recent proposals to apply to the Queen for a  
new charter, in which powers will be given to  
the Institute to develop its examinations and  
further professional education, will be pro-  
ductive of important results. The extension of  
voting powers to the Associates will also tend



to make the decisions of the body of British architects more representative, and these, properly directed, may contribute to the foundation and formation of a healthy public opinion upon matters in which the profession is vitally interested. At the present moment a memorial addressed to the Government is easily described by opponents as the outcome of divided opinion among some 400 Fellows in a Society numbering 1,300 members. But when the whole body of subscribing members enjoys the right of giving practical expression to opinion upon matters of professional education, State and municipal works and improvements connected with the architecture of the country, as well as upon such matters as the election of an annual Council, the Institute will surely speak with a less uncertain voice than it has done for many years. At the same time, members resident at a distance must submit to the inconveniences, even in these rapid days, of time and space; for, after all, the primary object each has in view when he pays his annual contribution is the maintenance and advancement of architecture as a profession, as well as an art and a science. Power to vote in the election of the representative Council could not be extended to members in India, in the Australian Colonies, or in Canada, though any resident in any part of Europe might easily assist in such election. Personally, I believe that the election of the Council by voting-papers, issued to all members in the United Kingdom and Europe generally, is quite feasible, and a mere matter of secretarial routine. But I see difficulties in any attempt to settle through the post questions of professional practice or of other matters which require discussion, and the decision upon which is influenced by argument. In such cases I think that too much stress is often laid upon the value of a personal vote. It would be far more useful, and carry more weight, if the opinion of the various societies of British Architects, not only at home but also abroad, could be obtained previously to passing in London any important and decisive measure affecting the whole profession. For instance, under the proposed new charter, powers are asked to enable the Institute to grant a diploma, which has been the dream of architects everywhere. If these powers be obtained, the method to be adopted in instituting and making such a grant will require careful discussion, and by members of the whole profession. It is impossible to hope that every member of the Glasgow, the Manchester, and the Leeds and Yorkshire Societies will make a journey to London for the purpose. But why should not each society discuss the matter in its own head-quarters, pass a resolution thereon, and forward the same to London? Other non-metropolitan bodies of architects might do likewise, and those in the colonies might, on such a subject, contribute valuable information and advice. The uses and powers of local societies have never, in my opinion, been properly developed, and I feel assured that a body like the Leeds and Yorkshire Society, which, like that of Glasgow, is now registered under the Companies Act, and thereby incorporated, may do an infinite amount of good by regular communication of the kind with the central body. Again, the present degrading mode of remunerating architects is a subject on which the corporate action, not only of British societies, but of the whole world, might be sought. The mode of payment by commission is regarded in France, as well as England, with disfavour, and an international conference, if it were held in London, might be preceded by an invitation to the societies of Europe, America, and the Australian colonies to call meetings on the subject and express, as corporate bodies, their respective opinions on this difficult subject.

Furthermore, I think that the non-metropolitan societies and also the Architectural Association of London may advance the cause of professional education by instituting a preliminary examination for students on the lines of the Examination in Architecture. If in each of the great provincial centres a small library were formed, containing the books selected and recommended for reference, the studies of young men desiring to enter themselves for examination would be facilitated; and possibly the classes for students already existing might be enlarged so as to embrace the various sections of the Institute programme. Perhaps, in offering these remarks I may be suspected of aiming only at the aggrandisement of the Institute,

but I take it that a non-metropolitan society would also increase in numbers and importance were it to enlarge its present sphere of usefulness and establish a scheme of education for students, followed by an examination which would be preliminary to the higher professional test for membership of the metropolitan body.

### III.—The Future.

The future is perhaps an easier thing to treat, and likely to be more happily treated, by men when they are in their twenties than in their forties; and were I to accept what wisdom and experience in the seventies are sometimes good enough to tell me, the future course of the architectural profession will not be bright, successful, or enduring; but when these Nestors cherish memories of the past which often blind their mental vision. For my part, I cannot yet persuade myself that any "good old times" ever existed at any period of our national existence. I think that our professional future will be shaped very much in accordance with the manner in which the architects of to-day treat such vital subjects as the existing divorce of architecture from the general public, and of the profession from the State; such as the pecuniary interest of practitioners in trade contracts, and in trading companies; and such as the education of students.

The present want of sympathy between us and the community at large may be rudely met by the ultimate dismemberment of the majority of independent architects, and the rise of an advising class of professional men,—a class bearing the same relation to the draughtsman and the general contractor as the physician bears to the surgeon and the general practitioner of medicine,—a class in communication with, or, perhaps, to be more exact, in touch with the world in general. That touch was, to some extent, maintained, during the early years of the Institute, by the existence of a non-professional President, who, in all important matters, acted as an intermediary, and to whose tact and influence under many trying circumstances the early successes were largely due. Since the death of Earl de Grey the Institute has enveloped itself closely in the mantle of professionalism. In the wise determination to exclude the trade element from the corporate body it has fatally ignored a large number of learned men, amateurs and connoisseurs of the arts, even professional painters and sculptors, and also literary men, who, had they been given the rights and privileges of corporate membership, might have increased our strength and assisted the work of progress without any likelihood of the charge of dilettantism being flung at the Institute. At the same time they would have acted as the scouts of architecture in its advance towards public appreciation. There is still an opportunity of redeeming this error, as I venture to call it, by giving the Honorary Associates the same rights and privileges as are to be granted under the proposed charter to Associates. As for the State, it year by year becomes more commercial in its views, and its test of success in government is the amount of pecuniary profit it can make or save. The gulf now yawning between the State and the profession will probably be closed by some Curtius of a First Commissioner, who has pluck enough to make the leap, and the improved education of architects may go far to encourage and possibly justify a sacrifice of the kind. Macaulay, writing in 1830, and referring to the "fame of public works," argued the matter in his characteristic fashion. "In a corrupt age," he said, "there will be a direct embezzlement. In the purest age there will be an abundance of jobbing. . . . In a bad age it is the fate of the public to be robbed outright. In a good age it is merely to have the dearest and the worst of everything." It may be considered certain that the State will do a great deal more harm to architecture before it will be induced to relieve its crucial error; but that matter may be left to work its own cure, if only the architects are true to themselves.

A tendency which now prevails to revert to the condition of things existing prior to the foundation of the Institute is not to be so easily overcome. The architect-traders may increase in numbers, because undoubtedly architecture as a trade is for the nonce more profitable than architecture as a profession. Many draughtsmen of talent who begin life as "architects" become "art-tradesmen," and execute work as well as design it. Ultimately it may become

common for the general contractor to keep staff able to design all sorts of buildings and do it well, and this absorption of professional men may be accelerated by the architect-trade placed, as they are to-day, in competition with the capitalist-contractor, who employs skilled labour,—a competition in which in the long capital is likely to win. But I cannot suppose that the example set by a few professional men who at the present day are excluded from the Institute of Architects on account of their connexion with trade, and their pecuniary interest in building materials, will be followed by those who reflect that, though a few may thus succeed, numbers in an attempt to imitate them must perish. To remove the present restrictions which prevent such persons from joining the Institute would imply that the founders were wrong, and had no cause for the suspicions they then entertained and the statements they afterwards made. Rather than do so, I personally, would prefer to see the Institute closed at once, and our funds handed over to the Royal Academy, with a request that it will open an efficient school of architecture.

With regard to education, I believe it to be admitted by a large number of members of the Institute during its fifty years' existence has not done all that its charter allowed, and, indeed, invited it to do in promoting the study of civil architecture. Meeting after meeting has been held to discuss modes of electing a Council, and other half personal matters, which have been aptly described by an accomplished writer and speaker as "the inconsiderable commonplace of daily maintenance, the narrow things of the house." But battles upon the subject of professional education have been rare, and, indeed, it has been hardly thought worthy of a fight. There should, however, be no more hesitation. There has been enough reflection, too little determination,—

"In the moment of our talking evensong time has passed away.  
Seize the present, trust the morrow, 'e'en as little to-day."

A closer alliance than has hitherto existed between the non-metropolitan societies and the Institute, and between it and the junior bodies of British architects in London, may yet accomplish great ends. With an extended charter granted on the unanimous prayer of the corporate body, the means of advancing the profession both in quality and status will be secured; and this happily effected, the watchword of all who have its interests at heart should be, I humbly think, Education! Education! and for a long time Education!

### Illustrations.

DESIGN FOR STAINED GLASS, BY  
E. BURNE JONES, A.R.A.

THIS is a reproduction from Mr. Burne Jones's cartoon for a three-light window for New Ferry Church, near Birkenhead. The titles of the subjects are given on the plate.

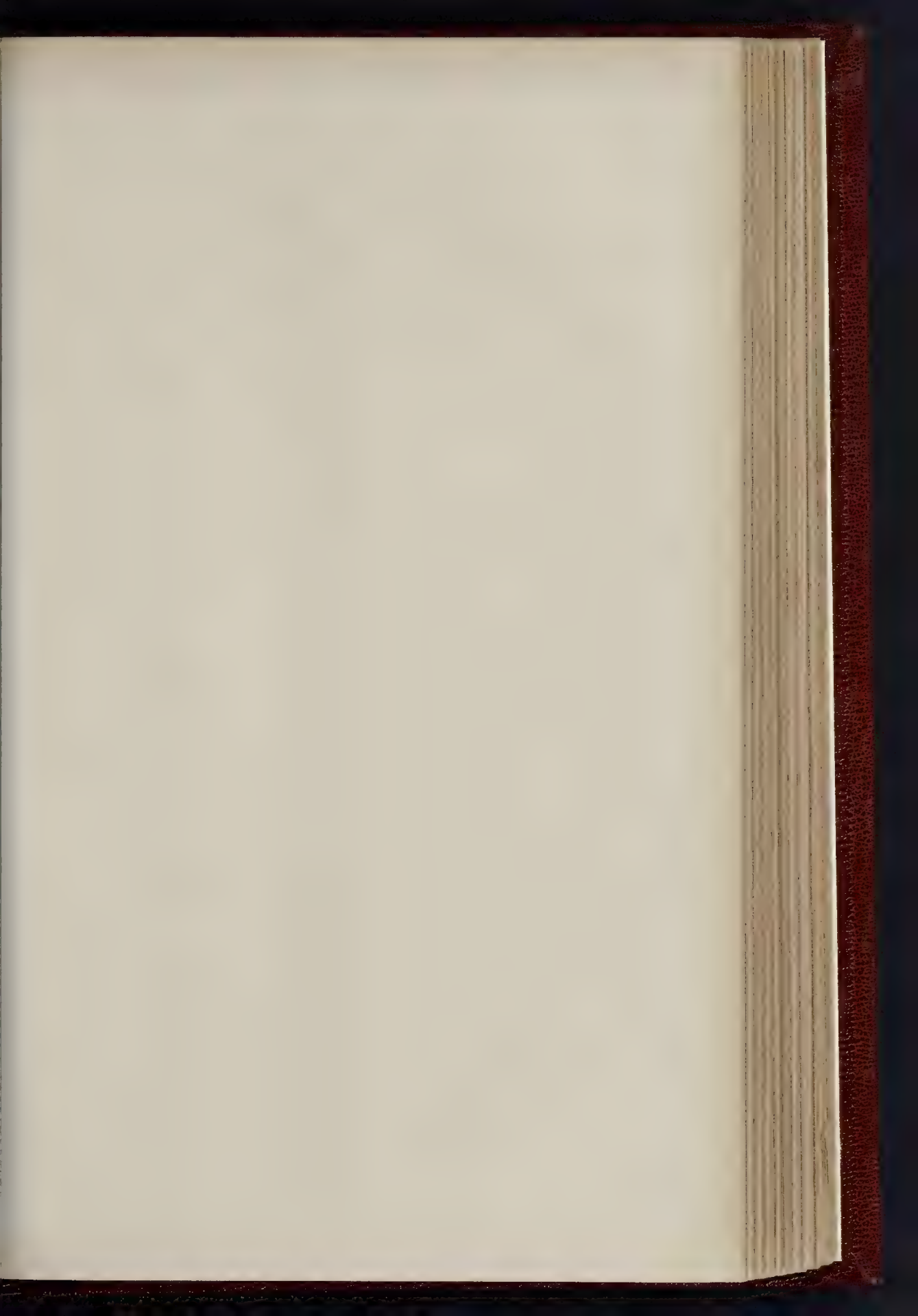
### PARK.

THIS house, once of considerable importance, was built by the Earl of Leicester for a hunt lodge, Elizabeth having conferred upon him the old Welsh lordships of Arwystley and Cyfeiliog, the surrounding country forming a portion of his estate. His tenure seems to have been of rather uncertain character, and, after his death, considerable litigation ensued. A rent-charge in favour of University College, Oxford, had been created upon this portion of his estate, and the litigants settled their differences, giving up the property entirely to the College in whose hands it still remains.

The house is completely modernised externally and very much cut about and altered inside. The hall, at one time utilised as a kitchen, has been partitioned off with panelling taken from the large withdrawing room, of which the handsome mantelpiece and one panelled side alone remain. On the other side the floor to ceiling and with heavy cornice, while the stairs are tolerably perfect. Upstairs the greater portion of a very elaborately-carved mantelpiece remains in one of the bedrooms. The house is now a farmhouse.

T. E. PRYOR.







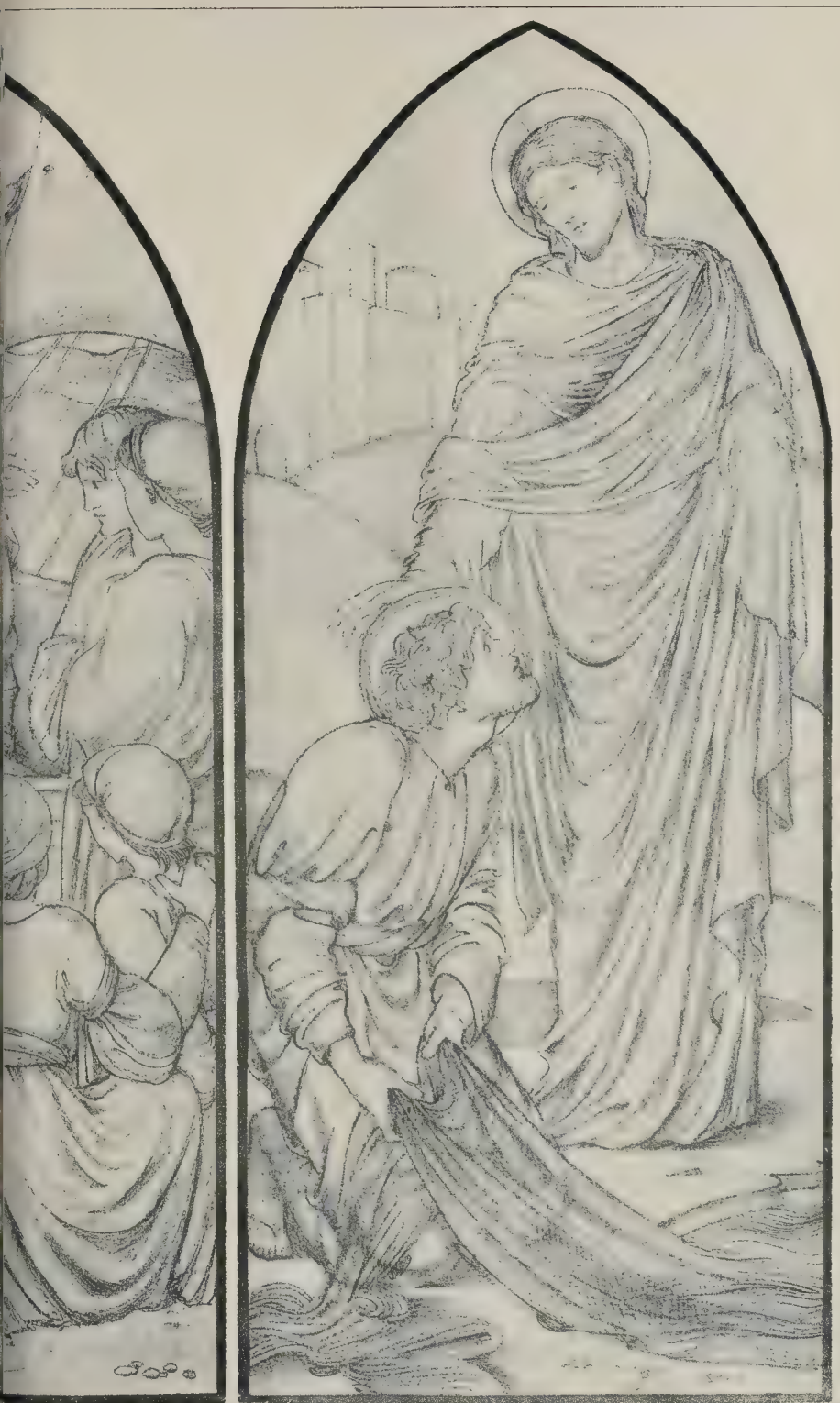
THE MIRACULOUS DRAUGHT OF FISHES.

CHRIST

DESIGN FOR STAINED

WINDOW IN THE





SHIP.

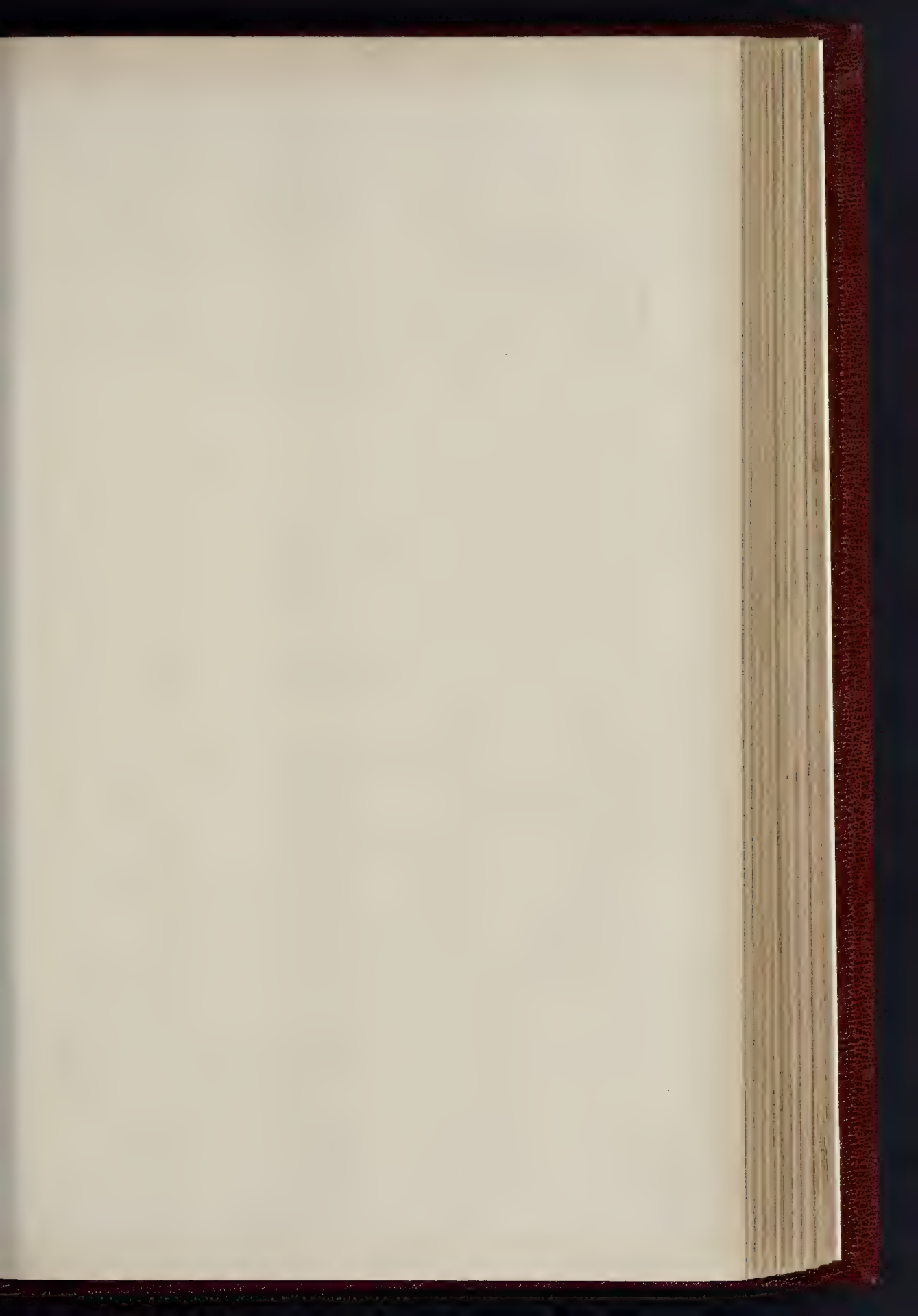
CALLING OF PETER

E. BURNE JONES, A.R.A.

CHESHIRE









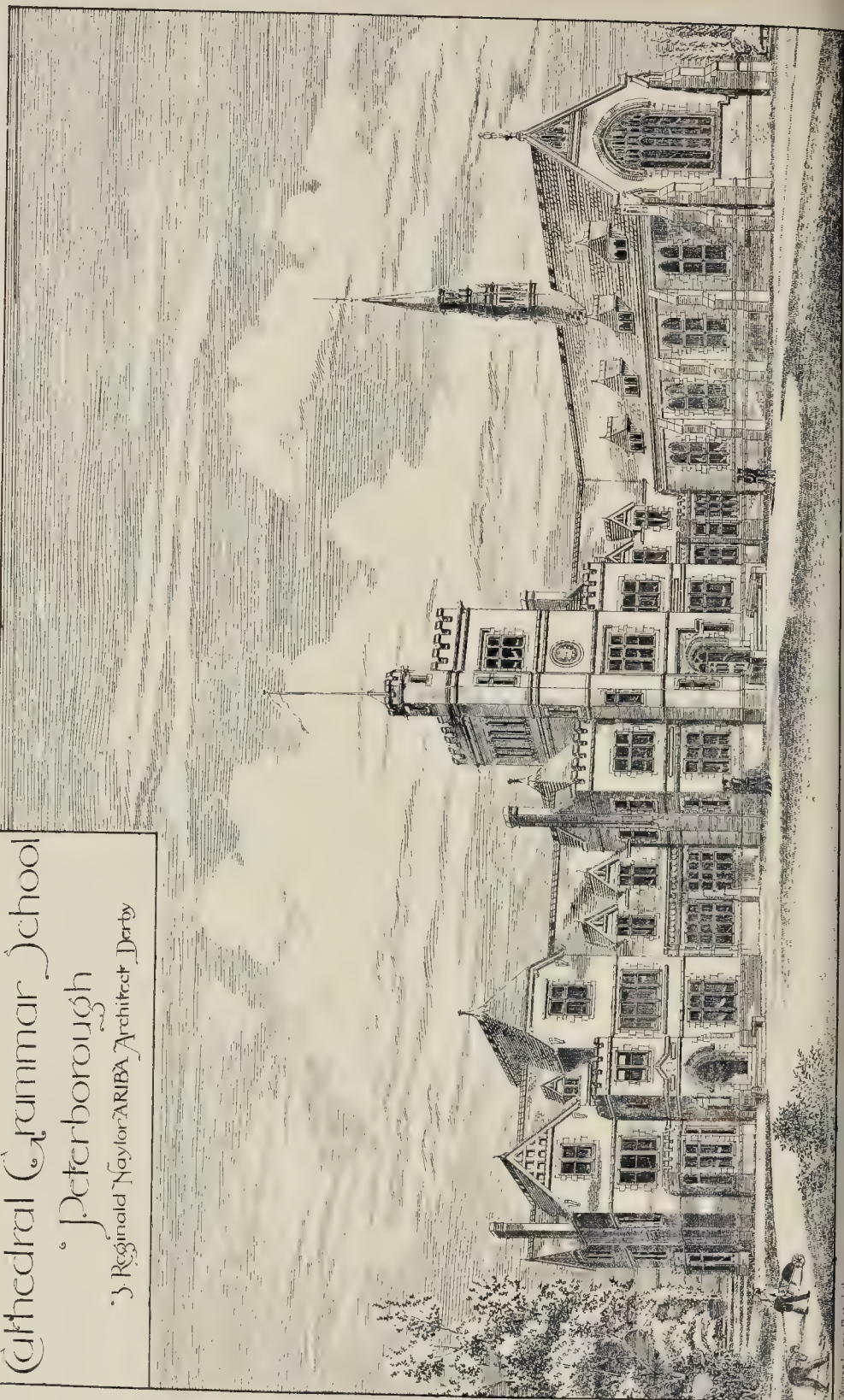
A BANK FOR A COUNTRY TOWN. DESIGN BY MR. ARNOLD D. MITCHELL.  
ARCHT. ASSOC. MEDAL AWARDED 1885.



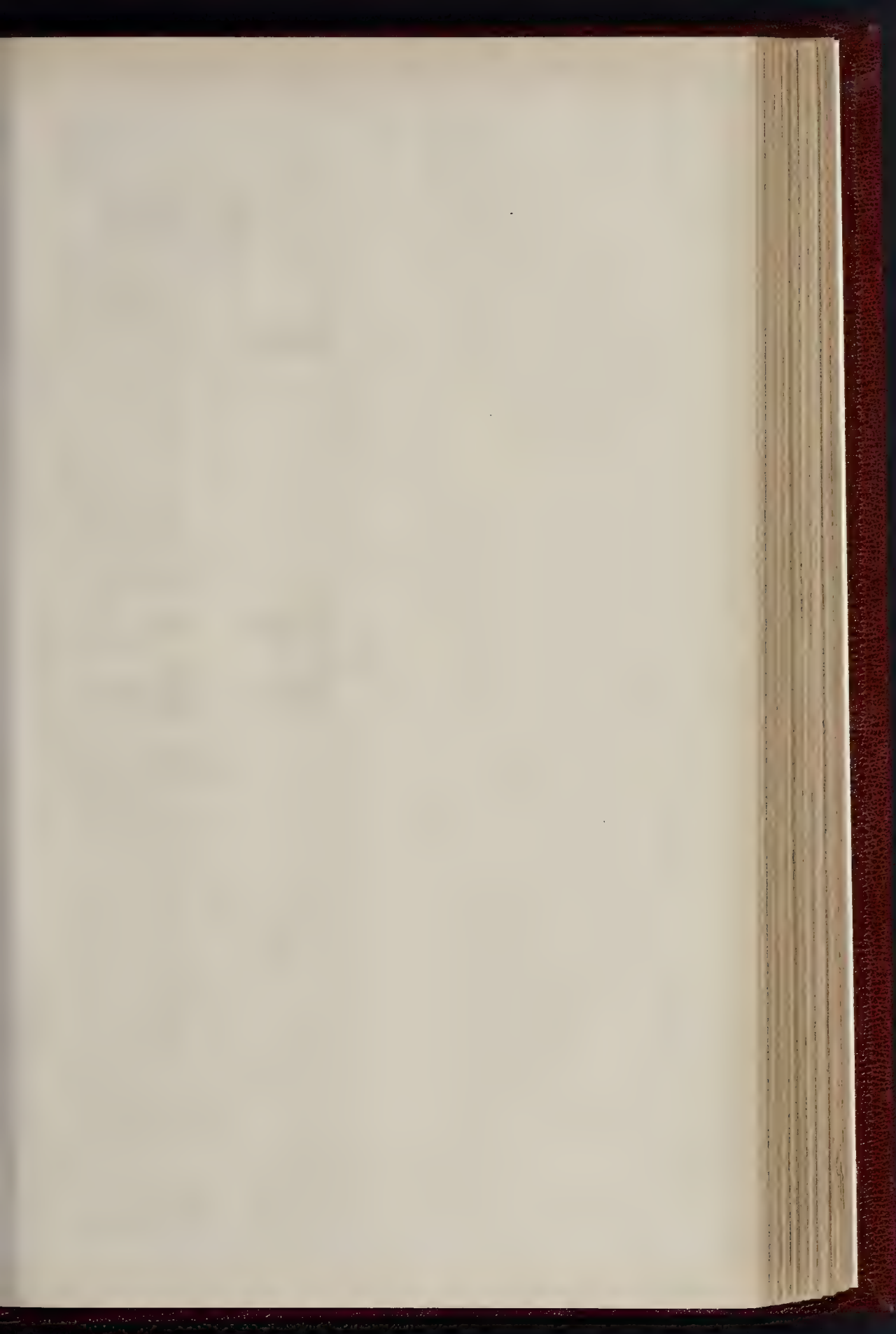


THE BUILDER, OCTOBER 31, 1885.

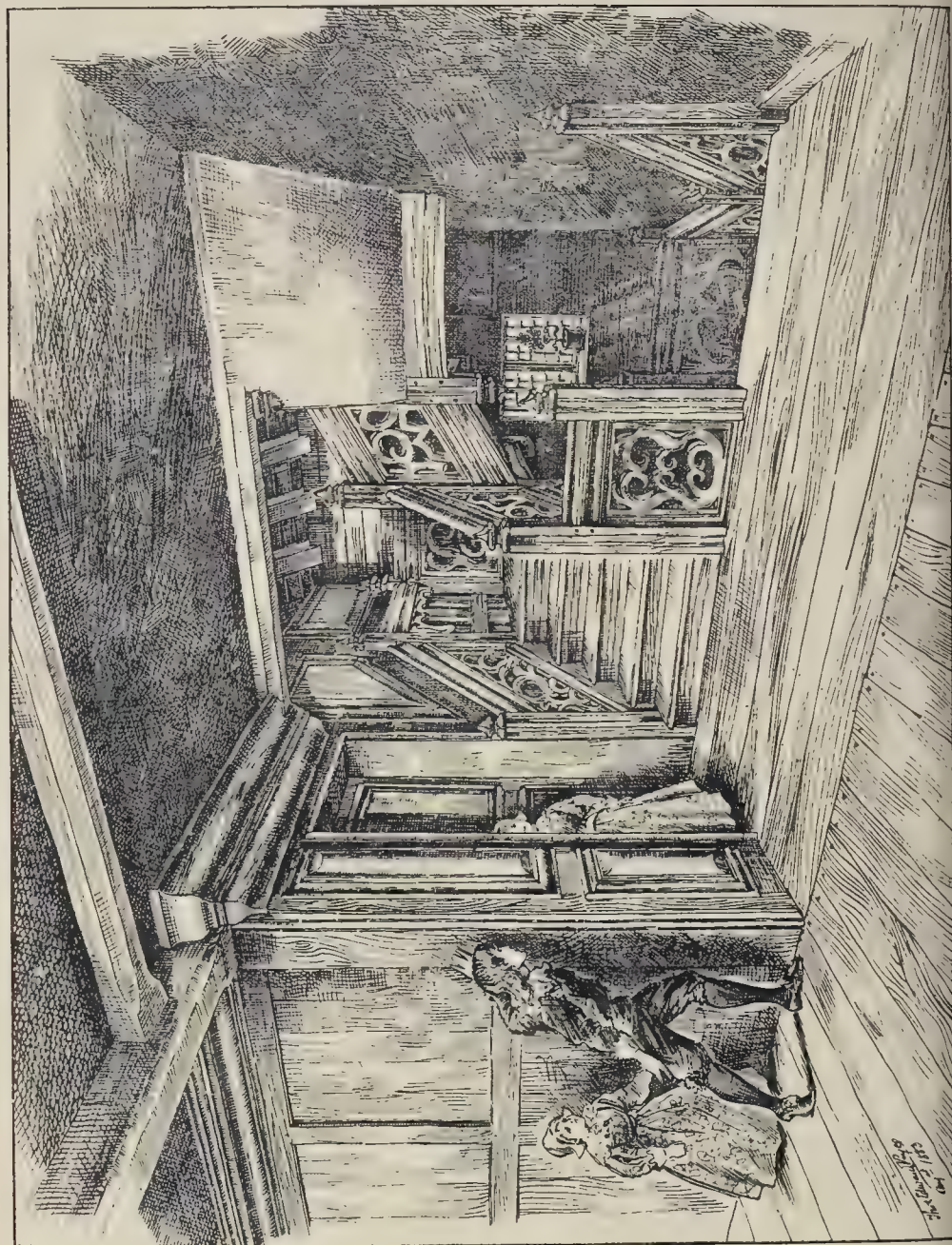
Cathedral Grammar School  
Peterborough  
By Reginald Nayler ARIBA Architect Derby



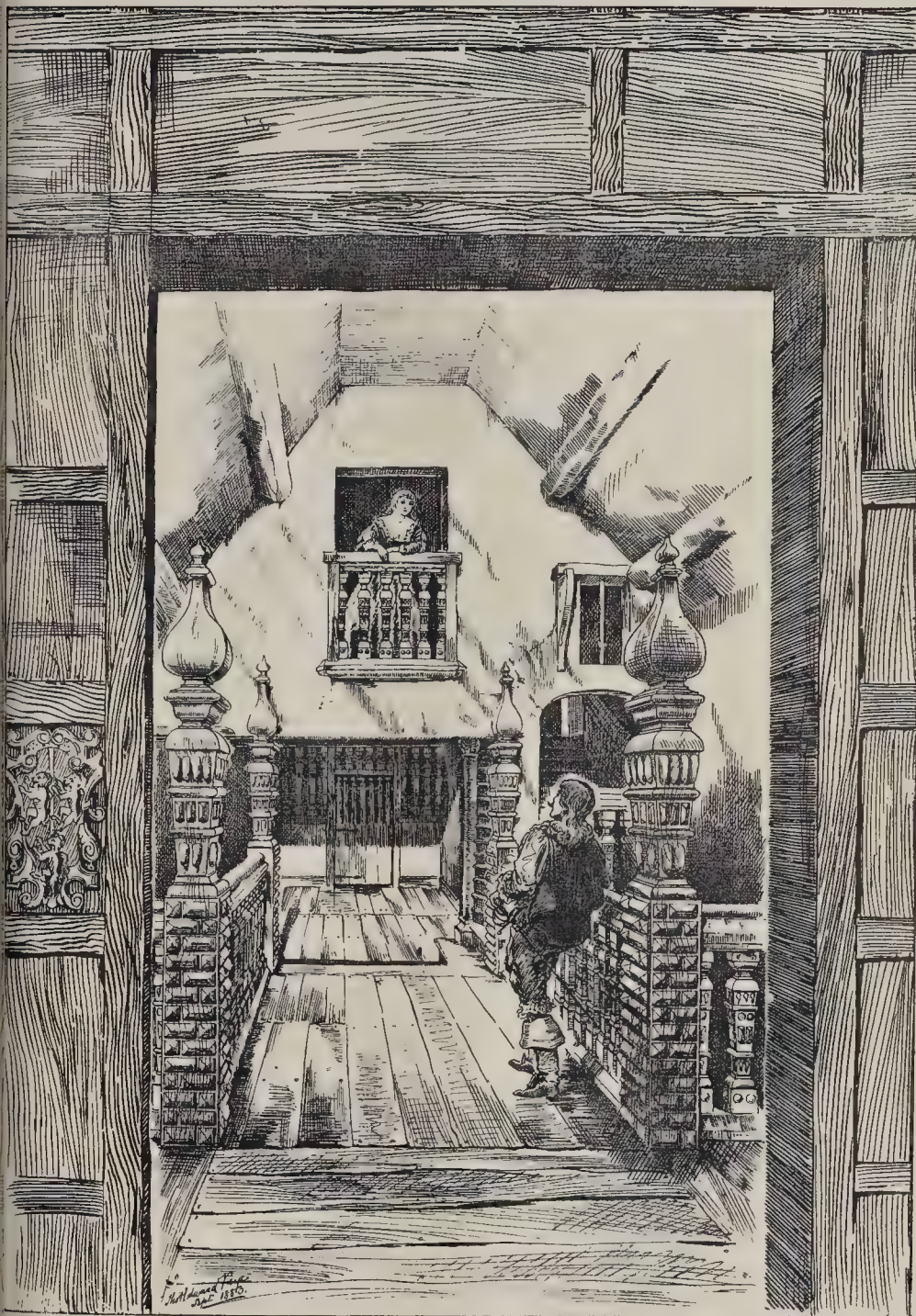




THE BUILDER, OCTOBER 31, 1885.







Whitman & Bass Photo Latho 236 High Holborn

Printed by Wyman & Sons, 6 Queen St. London, W.C.

PART OF STAIRCASE, LYMPSTONE HALL, MONTGOMERYSHIRE.—DRAWN BY MR. T. E. PRYCE.







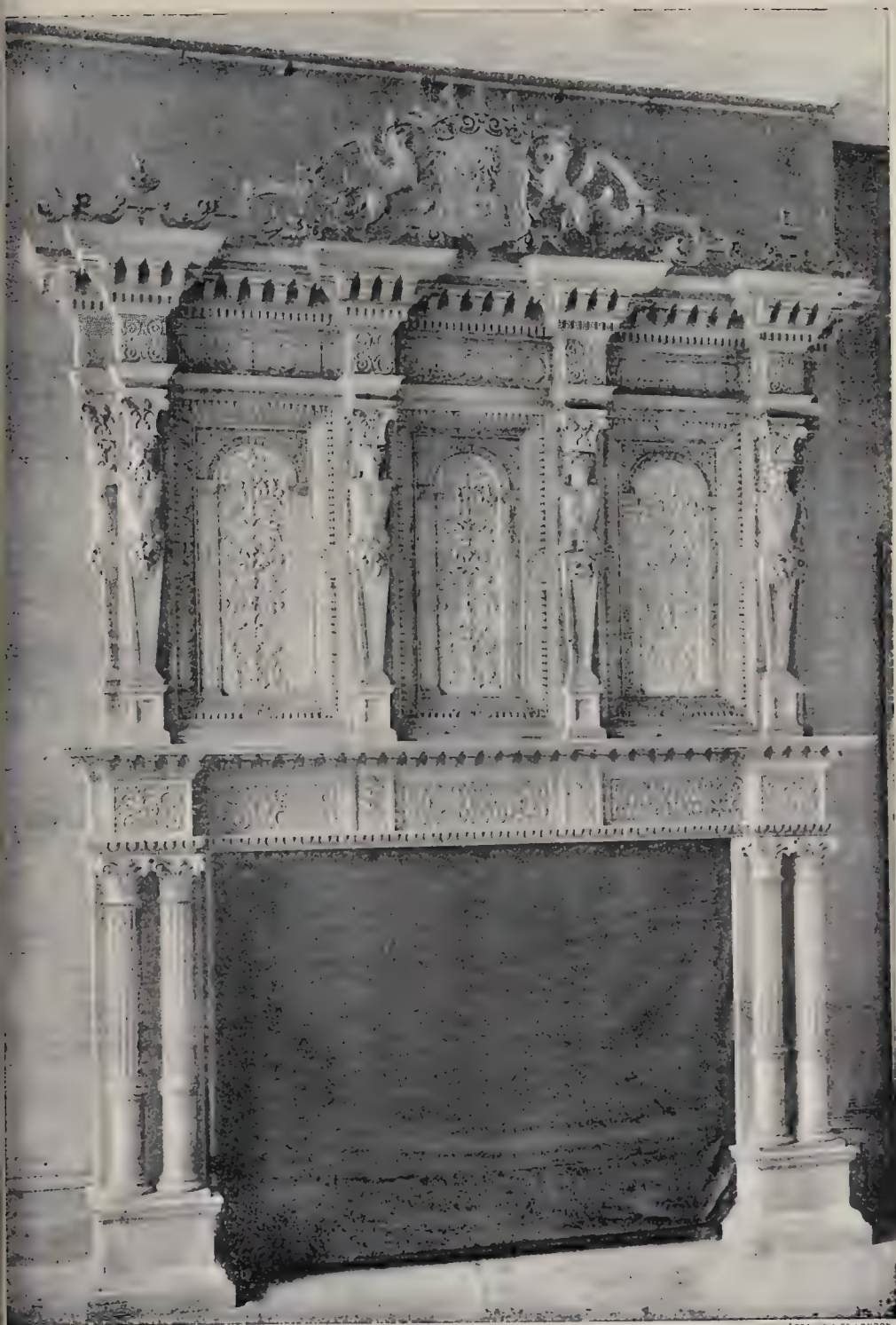
Whitman & Bass Photo Litho 256 High St. Aborn

Printed by W. & A. Wood, 15 Queen St. London W.

SHOPS AND OFFICES, EASTCHEAP.—MR. G. EDWARDS, ARCHITECT.







CARVED MANTEL FOR THE LIBRARY, INGESTRE HALL.  
EXECUTED AT THE SCHOOL OF ART WOOD CARVING,  
SOUTH KENSINGTON





### LYMORE HALL.

LYMORE HALL, or lodge, is a mansion belonging to the Earl of Powis, near Montgomery, rebuilt in 1673, by Edward, third Lord Herbert of Chirbury. It continued to form the chief residence of the family till 1714, since when, although kept in fair repair, it has not been regularly inhabited.

It is a large square timber-built house constructed of plain upright quarterings, with a low-pitched roof of three gables towards the front and small gables at the sides, surmounted by a good square lantern with a steep roof and wrought finial of eighteenth-century ironwork at top.

The house is panelled throughout the main rooms internally, some of the bedrooms being paneled with tapestry.

The kitchens were all pulled down about the end of the last century, and have never been rebuilt.

The illustration is taken on the main landing of the great staircase.

T. E. PRYCE.

### CATHEDRAL GRAMMAR SCHOOL, PETERBOROUGH.

The old school buildings in the Cathedral precincts having proved inadequate, the Dean and Chapter, as governors, decided to remove the school to a site on the Park-road, at a distance of about half a mile from the centre of the town. Advertisements were inserted in the several papers, and seven architects were chosen to compete for the post. The plan ultimately chosen was the work of Mr. I. R. Naylor, R.I.B.A., of Derby, who was given instructions to at once proceed with the work.

The new buildings provide accommodation for 40 boarders and 150 day boys. The plan is E-shaped, and has the master's house and administrative department on the left, the entrance being for access and masters' rooms, and the right end occupied by the school and class-rooms.

The house has three reception-rooms, two of which are respectively 25 ft. by 17 ft. and 20 ft. by 16 ft. and are divided by folding doors, spacious hall, nine bedrooms, dressing-room, bath-room, large kitchen, and pantries, rich basement for larder and storage purposes. The dining-hall, 35 ft. by 22 ft.; head-master's study, 18 ft. by 17 ft., commanding a full view of the playground; a spacious and well-ventilated hat and coat place, with slate-top lavatories, lined at the back with white tiles, forms the division between the boarders' and day boys' departments. The main corridor, 7 ft. wide, with class-rooms, each 22 ft. by 20 ft., on one side with north light; the entrance and masters' rooms to the front, and large school at one end. This room is 56 ft. by 25 ft., with provision for a library, which will open from the school with revolving shutters, and form a stage for speech-days and other occasions, and will add some 20 ft. to its length. It is 20 ft. to the plate, and 27 ft. to the ceiling at the collar level. The roof is open-timbered, and has moulded tie-beams and curved braces, resting on stone corbels. The dormitories can either be reached by an oak staircase near the main entrance, or at the house end near the dining-hall. They are arranged in the same line to admit of easy supervision. Each boy will have a cubicle of sufficient size to contain his furniture and belongings, except the bed, which will be placed outside, thus incorporating the privacy of the old cubicle system with the many advantages of the open dormitory. Bath-rooms, studies, clothes-rooms, and the blanket stores, all heated by hot water, also matrons' rooms, box-room, and rooms for the junior masters with full supervision of the dormitories, are on this floor. The complete scheme shows gymnasium, laboratory, workshop, bicycle and ricket stores, five courts, sanatorium, &c., though for the present only a part of this accommodation as intended has been supplied, though provided for in a temporary manner. Several alterations have also been made to the exterior of the building, detracting from its appearance, though not in any way interfering with its utility.

The materials used for the exterior are Whitish bricks and Westwood road stone dressings; the windows and other openings having jambs of specially moulded bricks. The roofs are covered with green slates, supplied by Messrs.

Ashton & Green. The glazed stoneware latrines are from Messrs. Bowes Scott & Reid, and have Field's flushing-tanks. The heating is by hot water by Mr. Jerram, of Derby; and the thorough ventilation of all parts of the building has been carefully studied. All the principal rooms, dormitories, and passages have double doors fitted with Adams's spring-hinges and lever apparatus to the fanlight over. Earthenware sinks and baths from Messrs. Stidder & Wilcox are used; also Twyford's "National" and "Unitas" water-closet apparatus, and Doulton's patent cisterns. The drainage is all kept strictly outside the building, all waste-pipes discharge over open traps. The drains are laid in straight runs from point to point, and at each change of direction manholes are provided, allowing of easy examination and removal of foreign substances without disturbing the pipes in any part. Weavers, Potts, & Mansergh's traps and Bellman's gullies are used. The cost of these buildings now completed has been about 8,500*l*. The builder is Mr. Thompson, of Peterborough.

### EASTCHEAP HOUSE.

This building has been erected for the A&R Ltd Bread Company, on land acquired from the Metropolitan and Metropolitan District Railway Companies, on the completion of the Inner Circle Railway. The frontage to Eastcheap is 50 ft., and a return frontage to St. Mary-at-Hill of 41 ft. There are eight floors, two being below the ground level; the upper floors are arranged for offices, the access to which is facilitated by a passenger-lift, worked from the Hydraulic Power Company's main. The whole



of the elevation is of Portland stone. Messrs. Martin, Wells, & Co., of London and Aldershot, are the contractors. The passenger-lift is being fixed by Messrs. Archibald Smith & Stevens. The carving has been done by Mr. J. Wormleighton. Mr. George Edwards is the architect; and Mr. W. Sharpington the general foreman. The contract sum was 7,599*l*.

### OVER-MANTEL, INGESTRE HALL.

This is an illustration of the carved wooden over mantel, executed at the School of Art Wood-Caving at South Kensington, which we referred to in a "Note" a few weeks ago. It is for the library of Lord Shrewsbury's residence, Ingestre Hall.

### DESIGN FOR A BANK.

ARCHITECTURAL ASSOCIATION MEDAL.

THE Association Medal has been this year taken by Mr. Arnold B. Mitchell for a design for a Bank for a country town, of which we give an illustration.

The conditions of competition were that the

building should comprise a basement and three floors, exclusive of attics, on a rectangular site, 50 ft. by 30 ft., level throughout, with two frontages towards a market-place and the remaining two closed by buildings; banking-room on ground-floor, manager's residence on upper floors. Endeavour has been made to make the design a practical working one and yet to give it some distinctive character of its own: the key plans given show the general arrangement.

### EGYPT EXPLORATION FUND.

A GENERAL meeting of the members and friends of this fund was held on Wednesday last, at the Royal Institute, Albemarle-street. Mr. C. T. Newton, C.B., presided, and there was a good attendance, including Mr. Flinders Petrie, Mr. Naville, Dr. Herman Weber, the American Minister, and Mr. John Evans, F.R.S.

The Chairman said their last season began in November, 1884, and first he would speak of Mr. Petrie's operations at Naucratis. They were aware that Mr. Petrie had discovered the site of Naucratis. It was with peculiar satisfaction he (the Chairman) had the honour to make this announcement, because some years ago, when the Oriental Congress met in London, he drew the attention of some very distinguished Egyptologists to the incalculable importance of researches to discover the site of Naucratis. Naucratis gave them the key to the relations between the Hellenic race and Egypt for the period of the beginning of the Ptolemæic, 650 B.C., or thereabouts. It was not an easy thing to find a site in a country where the position of the branches of the Nile and of the canals was liable to what might be called "alluvial changes," and where the remains of great cities were only indicated by vast mounds of rubbish. Mr. Petrie had discovered this site of Naucratis in spite of such difficulties. He would not anticipate what Mr. Petrie had to say, but would only remark that Herodotus and other ancient authors had told them that Naucratis was a place where the Greeks had great trade privileges, and where they were able to develop a great commerce under the protection of certain deities whose temples stood there. Naucratis, they found, had left certain remains, which, speaking as a palæographer merely, he considered most precious to the student of Greek archaeology. It was many years now since he (the Chairman) had discovered the statues at Branchida, which were inscribed with Greek dedications, and which he ventured long ago to assume ranged from 560 to 500 B.C. Now, Mr. Petrie had found numerous inscriptions, for the most part upon painted pottery, the character of which corresponded so accurately to the character of the palæography of the statues in the Archaic room of the British Museum, as to confirm his original assertion that their date was in the sixth century B.C. This alone was something like a result, but besides that, it afforded the means for the first time of putting upon a solid basis the history of Greek fictile art, because the specimens got in Greece itself of that period were, for the most part, without inscriptions. Mr. Petrie, however, had discovered such a number of inscriptions that for the future they would be able to speak with certainty instead of conjecture. This was only one class of the objects discovered. Mr. Petrie had unearthed Greek inscriptions and endless specimens of other arts which were known to be practised in Egypt, such as what were termed Egyptian porcelain and alabaster, and other classes of antiquities. Among these things had been discovered evidences not only of great Hellenic commerce in the sixth and fifth centuries B.C., but of great Hellenic commerce in the after-time, when Alexandria was thought, according to common belief, to have supplanted and dried up the sources of the trade of Naucratis. That this was not the case may be inferred from the enormous number Mr. Petrie had found of the well-known amphoræ with inscribed handles, from Rhodes, which were also discovered at Alexandria, and through which it was possible to track the line of Greek commerce all over the Mediterranean and the Black Sea. These amphoræ dated between the time of Alexander the Great and Augustus. A sample of the antiquities discovered by Mr. Petrie was now being exhibited in one of the Vase Rooms of the British Museum, and that evening some



small samples would be shown. This, however, was merely a small selection from the immense number of objects found by Mr. Petrie. Mr. Ernest Gardner, a young but distinguished Hellenist, has undertaken to proceed to the excavations at Naucratis, and to assist Mr. Petrie there. Mr. Gardner had given special attention to this question of the Greek paleographic work. With respect to the operations at Tanis, they had already received a quantity of heavy pottery from the place, but, as the exploration of that city dealt with matters with which he was unfamiliar, he would ask Mr. Poole to speak on the subject of the work being done for the Egypt Exploration Fund by Mr. Petrie, Mr. Griffiths, M. Naville, and others, with special reference to the Papyri.

Mr. Reginald Stuart Poole said that the large objects to be exhibited in the British Museum were those which could not be easily transported on previous occasions. These would add much to the knowledge of the mythology, geography, and importance of the city of Tanis during the Greek and Roman periods. Some of the documents found had been examined by the most learned authority on demotic papyri, and there was no doubt that they were of great interest. One of the documents contained certain calendar indications, and another a list of signs in hieroglyphic, with a kind of explanation in hieratic. Mr. Griffiths was preparing a careful paper on the subject of these documents. M. Naville would go more fully next evening into his work. No Egyptologist was more cautious in his statements of results and more anxious to present them to the learned world, so that it might deduce its own inferences. The identification of the land of Goshen by M. Naville was of the greatest significance in its bearing on the antiquity of the Pentateuch, and was only second in interest to his discovery of the treasure city of Pethora, built by the Israelites. M. Naville had placed the land of Goshen in the eastern part of Lower Egypt but further to the southward than other explorers, and, therefore, much nearer to Heliopolis and Cairo.

The Chairman then read the financial statement, which showed that during the past year donations and subscriptions had been received amounting to 1,431l., of which 546l. had been remitted from the United States, exclusive of the special fund collected there by the Rev. W. C. Winslow, of Boston. The Chairman referred to the valuable services rendered by the hon. secretaries, Miss Amelia B. Edwards and Mr. Poole, as well as by Mr. Winslow, the hon. treasurer in America.

Miss Edwards next gave an account of the Fowler Fund, founded by Mr. W. Fowler, M.P., and appealed for subscriptions to complete it. Miss Edwards announced that Mr. Petrie's work on "Tanis" was ready for issue. In spite of M. Naville's devotion to the work of editing "The Book of the Dead," she believed he might be induced to proceed with his exploratory work.

The Chairman added that it was proposed next season that Mr. Petrie should instal Mr. Gardner at Naucratis.

On the motion of Sir Charles Nicholson, seconded by Dr. Hermann Weber, a vote of thanks was passed to the Trustees and the Principal Librarian of the British Museum, and it was resolved to grant a selection of the antiquities discovered by Mr. Petrie and M. Naville to the Museum.

Mr. E. A. Bond, Principal Librarian, acknowledged the vote. Although the Trustees were unable to use the funds for the purpose of aiding this Society, he thought they might apply to Government on their own behalf, as such a course was justified by the great results of their three years' operations.

Mr. J. S. Evans proposed, and Miss A. B. Edwards seconded, a similar vote of thanks and grant of antiquities to the Arts Museum at Boston, U.S.A.

The Chairman, referring to this motion, said that archaeology, of all subjects, was the most strictly international. It was by the study of archaeology that they fulfilled the saying of Pericles, "that of illustrious men all earth is the tomb." The memory of the ancient races and what they had contributed to civilisation would outlive their misdeeds, and through the combined efforts of many men and schools of archaeology great results would be attained.

The American Minister replied on behalf of the Boston Museum. They might rest assured that these objects would be prized in Boston of

all cities, "the Athens of America" as it had been termed. He hoped the time was fast approaching when every good enterprise for the extension of human knowledge and for the improvement of the general condition of mankind would find its co-ordinate branches on both sides of the Atlantic.

A special vote of thanks was also passed to Professor Maspero, coupled with a grant of antiquities for the Louvre. A grant of antiquities to the Royal and Imperial Museum of Berlin was also agreed to.

After passing the usual complimentary votes of thanks the meeting separated.

#### THE ARCHITECTURAL ASSOCIATION.

The opening meeting of the session was held on Friday, the 23rd inst., at 9, Conduit-street, Mr. C. R. Pink (President) in the chair. There was a very large attendance.

The following new members were elected, viz.:—Messrs. A. B. Yeates, Harold Luck, B. N. Southall, A. Gadsdon, J. W. Little, H. C. A. Colville, C. Palmer, T. L. Worthington, W. H. Hewish, W. E. Johnson, F. Wood, H. E. Knight, F. R. Barlow, E. C. Brown, C. A. Battie, Alfred Cooke, E. C. Frere, A. W. Mills, and W. L. Evans.

The report and balance-sheet for the year were unanimously adopted. The report, as printed in the "Brown Book," records in detail the work of the past session, and details the changes which have been made in carrying on the work of the Association. As these matters have all been fully reported in our columns during the past year, it is not necessary to recapitulate them. It may be mentioned, however, that the Association now numbers upwards of a thousand members (1,013, to be exact), of whom 802 are resident in London, and 211 elsewhere. The balance-sheet, signed by the Treasurer (Mr. J. Douglass Mathews), and audited by Messrs. Horace Cheston and M. Fawcett, shows a gross income for the year of 953l. 15s. 4d., a balance of 152l. 4s. 8d. remaining in the Treasurer's hands.

The Chairman next presented the prizes (for list of which see *Builder* of the 17th inst., p. 549).

The Chairman then delivered his opening address, which we print on page 599.

Professor Kerr, in proposing a vote of thanks to the President for his able, instructive, and suggestive address, said:—I have been speaking to this Association for a great many years, off and on. You will scarcely believe me when I say that it is thirty-eight years since I was President of this Association,—in the year 1847. I may be excused, therefore, if I say that I still retain a strong affection for this society, and that I am always most pleased to attend any of its meetings. There is a special pleasure in addressing this Association. When one is under the necessity of speaking upstairs, it becomes painfully apparent, to those who are blessed in mature life with a little enthusiasm, that they are addressing a number of men who wish to be let alone, and who have a great objection to be spoken to at all. The state of things which exists will last their time, and that is quite enough; anything like energy, therefore, as prompting you to stir them up with a long pole, is voted a bore, and anything like enthusiasm is an unmistakable nuisance. When one comes down here, on an occasion like the present, one speaks to those whose minds are young, fresh, and ardent, who can look forward, and not backward, and who can take an interest in that which is beyond the mere consideration of solid pudding. You have said that there are large and burning questions, upon which, at the present moment, you have been unable to touch; and perhaps you will allow me to interest the young men here present in the work which I think the Institute is doing. It is not our province here to enter into what may be called Institute politics, but these young men do not require to be members of the Institute, in order to be justified in taking an interest in its affairs, and they do not all require even to be prospective members in order to entitle them to demand at the hands of those who form the representative society and guild of this great and noble profession, such a policy as is calculated to advance its interests. Therefore, sir, without in any degree trenching upon that particular field which belongs entirely to the meetings of the Institute I am sure you will excuse me if I en-

deavour to awaken a certain interest in the position of affairs which I fancy exists at the present moment,—a most critical position of affairs. The most unobtrusive of us must have noticed that the air is full of political enfranchisement. Not only is Parliament about to be changed,—and eminent and non-eminent are the candidates for seats in the new legislature, which I earnestly hope some of them will not obtain,—but there is a grand principle before men's eyes, whether for good or evil it is difficult to say. That principle is,—"The broader the base, the firmer the structure." O that, I take it, the franchise of the country being extended, and that is the principle we have now to apply to our own professional world. In order to understand the true position of the new draft charter, in the light in which those who are not members of the Institute may wish to understand it, it is necessary to go back some ten or a dozen years. At that time Professor Donaldson,—a most estimable and excellent man, most enthusiastic in following every possible road to the advancement of the art and science of architecture,—this very excellent person, then getting into extreme old age, had managed, I may say, individually, the Institute of British Architects for forty years, and had managed it with honour in every particular. He had started it, had elevated it to distinguished place, and had maintained it at that place throughout the whole of that long period of time. The principles which he followed were exactly expressed in the admirable extract you read,—the principles of broad and generous liberal feeling, the absence of jealousy, of restriction, and coercion; the presence of universal, kindly, and honourable fraternity. He looked on the charge he had undertaken in establishing and maintaining the Institute, as a most noble enterprise, in the form of the highest class of a learned society, and during the whole of those forty years maintained it in gradually increasing dignity upon that high level. But there were some whose views were different from his, and they were perfectly entitled to hold their own view. They were more of trade-unionists, and a certain movement was set on foot, and successful, carried through, whereby,—I will not say the trade-unionism was upset and a system of generous system was established,—but a system was brought to bear upon the government of the Institute, whereby it was supposed, by the creation of a superior or privileged class, the dignity of the profession would be enhanced in the eyes of the public. Now this privileged class was to be identified with what is called the governing body of the Institute. They printed their names in the largest capitals which were permissible, and it was generally understood that an attempt was being made to create an honorable impression in the public mind by the establishment of an aristocracy of "Members of the Council." This was done, I have no doubt with the best intentions, but it has not succeeded. It is in connexion with this state of things that the present reform is about to take place, and that reform is one in which every man ought to take an interest who even directly or indirectly to the profession. The new charter is promoted for enfranchisement, to be chiefly bestowed upon the provincial members. Now the battle is virtually over, one may speak of it without the least risk of giving offence, and it must seem an extraordinary thing that one-half of the members of the Institute, when it was not convenient for them to attend the meetings in London, should have no voice in its affairs. The Chairman has said that the Council felt themselves restrained by the charter; that is not the view I hold of it at all. I do not believe King William ever intended that the provincial members should have no voice in the affairs of the Institute, and I believe it would be easy at this moment, without altering the charter, to find a certain way to liberate the provincial members from the position of having no means of evincing an interest in its affairs. But we will interest this meeting more is, that, in the course of the discussions which have arisen in reference to this so-called new charter, the Associates of the Institute have most peremptorily and emphatically demanded a voice in its affairs, and not only a voice, but an equal vote. Whether that is to be granted or not I cannot tell. I do not mind saying that I stand in as the advocate of absolute liberty, equality, and fraternity in all our professional guild, every possible respect. I will tell you v-



have often said upstairs there is no man qualified to be a member of the Institute, he is not equally well qualified to be a member of the Council. We are no trade of cheese-mongers, but a profession of highly intellectual and cultured men, each of whom is perfectly qualified to engage in all the business which the society can possibly require. And so the youngest Associate, in the peculiar circumstances in which our profession is placed, is fully equal to the work. I, therefore, recommend the young men here to take an interest in the matter, remembering, as the Chairman has said, that this is a democratic association, adopting the principle of widening its basis, judiciously and within reasonable limits. The basis has been narrowed in the case of the Institute, and no good has come of it. But I may call to your recollection that a much more important enterprise, as I venture to think, is on foot up-stairs. A committee has been sitting, which I have the pleasure to be a member of, in the problem, how to advance, not the enrichment of voters, but the higher work of his illustrious profession, by means of what we call departmental action. At present for want of organisation very little is done. I am of opinion that a great deal might be done in the direction of the advancement of the art, the science, and the literature of architecture, and for my own part I care nothing about voting and enfranchisement if I can see these great objects adequately served. This committee has not yet reported, and it is not competent for me to make any definite allusion to what has taken place, but I think I may say we have arrived at conclusions which are liberal and generous, and we have arrived at these conclusions thus far in a spirit which we hope will inspire very considerably the interest which outsiders will feel in the movements of the Institute. If I could persuade men outside and inside the Institute to look at the work that is to be done rather than the dignity which is to be attained in pretending to do it, I think I should be able to secure a most important object. I care not a fig for their dignity or their honours, but I want to see the business done. This is a great country, and the Institute is by far the most important and prominent architectural society in the world. Its work is the widest possible field. The old men are of no use, believe me. No man is of much use in the work of the Institute who is over fifty years of age; that I have learned from experience. At all events, I hope to see the introduction of younger men and a broader position taken up before long, and I hope you will assist those who are working in that direction by giving them your full support. I am glad to see you, sir, in the chair, and I am glad to see a large meeting, and I am glad to hear and see so many evidences of the prosperity of this society. I hope it will flourish for ever.

Mr. William White, F.S.A., seconded the vote of thanks. Too much, he added, could not be made of the educational advantages offered to students at the present day; at the same time I did not do to rely entirely upon the existence of these. The great advancement to be made was by the use of these advantages, otherwise they would go on in mere mediocrity. For his own part, he wished he had had such educational facilities in his day. When, forty-five years ago, he entered the office of a country architect and surveyor, he was certainly taught one of the principles of construction, of quantities, and of the supervision of work, but little in the way of design or drawing, and he had, therefore, to depend greatly for his knowledge on the studies which he followed out on his own account. The President had stated that the teaching of design was a most important matter, but he would maintain that the careful study of what had gone before, be it good or bad, was of the greatest consequence. He well remembered a literary man, who had to address a number of people periodically, saying that unless he laid in a store of good literature, he found himself simply plodding away in his old raiment, and repeating himself over and over again. This was a lesson which architects could lay down as most expressive of their vital needs. They should not limit themselves, as perhaps he had too much done, to one course in the study of architecture, for the younger he lived the more he had seen the necessity of studying the architectural expressions of all countries.

Mr. Cole A. Adams supported the motion, and referred to the amended scheme of work as

given in the Brown Book. One of its main features was that the work was now divided into two distinct classes, so that a student, on reference to the book, was able to see at once the various openings for study. It had been prophesied by some that in the class where the work was to be pure and simple copying they would never get ambitious students to do this, but he hoped that opinion would be falsified by the actual facts. Another departure has been made in the matter of quantities, and he believed a great deal of good would result from it. By teaching exactness and method they would have facts to correct faucies, and the students would become better "all-round" architects.

Mr. Aston Webb hoped that the Committee of Advice would be largely applied to, as they were anxious and willing to afford every assistance to the student. Should the proposed new Charter of the Institute become law, it would be absolutely necessary for all who wished to belong to the head society of the profession to pass the Institute Examination. Although the ordeal was not an unduly severe one, it yet required careful reading in many subjects, and unless members on first joining the Association entered upon a regular course they would find it difficult to pass with credit. He was surprised to find so small a proportion of London men in the last Examination, and believed that a great many of the young students did not sufficiently realise its importance. Modern architecture should be attended to as well as that which had gone before. Mr. Sedding had notably referred to this in his paper at the Church Congress, in urging that the decorative portions of Church work should be laid down more on modern feeling and principles. That the student should learn the grammar of his work was a truism, but that he should neglect the thought and movement of to-day was absolutely fatal to progress or reality in architecture. The certain lack of admiration or feeling amongst modern men for their own work was also to be lamented, and mutual sympathy for each other's work ought to be cultivated. It had often been said that painters liked, sculptors disliked, and architects hated each other's works. This was not quite true, but in passing through towns and seeing new buildings they should endeavour more to pick out what was good in the new buildings, and be able to enter into and sympathise with them.

Mr. J. Douglas Mathews had always looked upon the Association as a conservative and not a democratic body. Certain laws had been laid down at its foundation, and notwithstanding some changes, the Association was now substantially what it had been for the last thirty or forty years, its objects being to assist the members to advancement in their profession. He hoped that in the future some means would be found of extending its usefulness more to the country members.

Mr. John Slater, B.A., remarked that the subject of education could not be too strongly insisted upon. A new sphere of action was, to a certain extent, commencing; he would like to see a closer connexion between the Institute and the Association in the educational work of the profession. Great good would be done if some scheme could be devised by which more lectures could be given, and by which the older body could assist the younger in increasing the means of obtaining knowledge. The Examination ought to be a goal to which all students should direct their endeavours. It was not yet all it might be, and a great deal remained to be done in the way of a thorough architectural education.

The vote of thanks was then carried by acclamation.

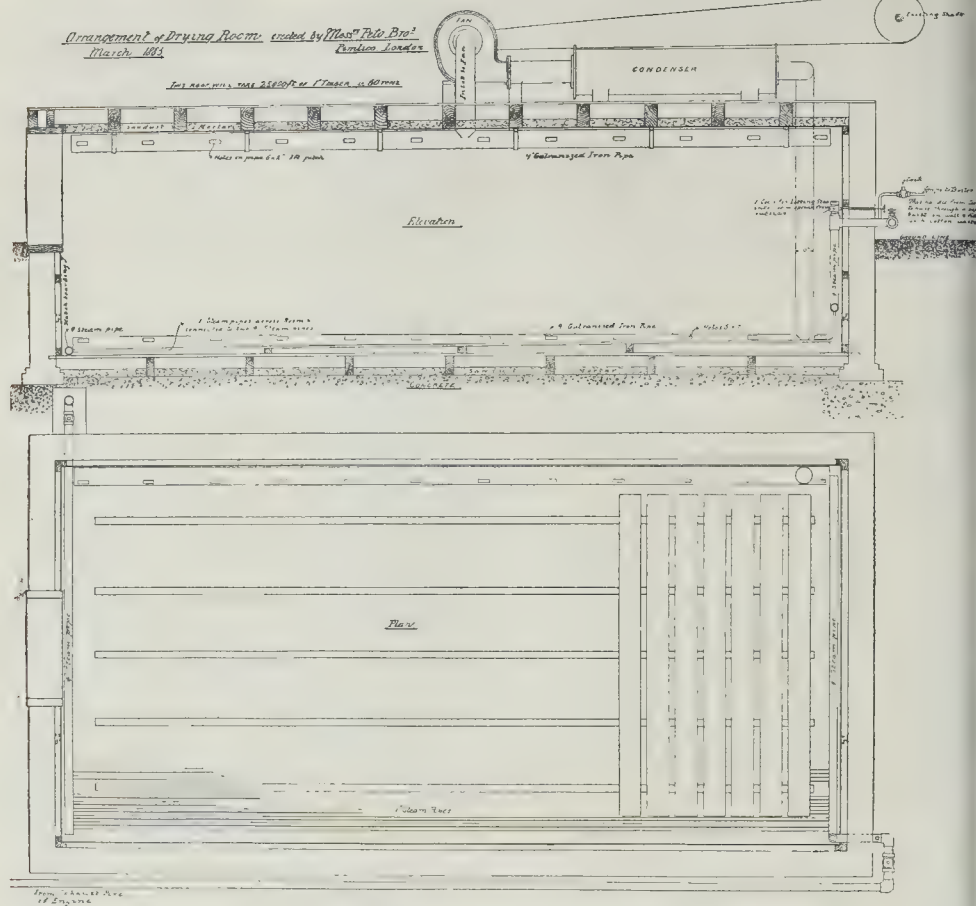
The Chairman, in replying, remarked that Professor Kerr had gone even further than he had in regard to equal voting. With respect to the use of the term "democratic," he had simply meant that the executive of the Association was based on the votes of each and every member.

The proceedings then terminated.

**Builders' Benevolent Institution.**—We may again remind our readers that the thirty-eighth annual dinner in aid of the funds of this Institution will be held in Carpenters' Hall, London Wall, on Thursday evening next, Mr. Arthur C. Lucas, J.P., President, in the chair.

#### SANITARY INSPECTION.

THE importance of periodical house-to-house visitation for the purpose of sanitary inspection, as a means of improving and maintaining the sanitary condition of a parish; and, as a consequence of decreasing the death-rate, is generally admitted. But comparatively few of our local sanitary authorities possess the energy and enterprise to carry out this step regularly and systematically. Much is taken from the invariably beneficial effect of an efficient general drainage system if the sanitary arrangements of the houses are based on a bad principle, or are in an unsatisfactory condition; if, for instance, the soil-pipes are not ventilated; if the waste-pipes are connected with the main sewer; and if the water-supply to water-closets come direct from the domestic supply cistern. A house-to-house inspection, where it has been conducted, only too truly brings out the imperfections in the sanitary arrangements of a surprisingly large number of houses in our best-drained parishes. A good drainage system lessens, no doubt, the evils which naturally arise when the pipes from sinks, baths, lavatories, &c., are in direct connexion with the main sewer; but a local sanitary authority which has spent, perhaps, from 40,000l. to 100,000l. on the construction of an improved drainage system would obviously be lacking in its duty if it allowed to exist in the interior of the houses a condition of things which prevented the full beneficial effects of that system being derived. Among some of the few parishes which have adopted the periodical house-to-house inspection is Chiswick, which is already rather noted for its complete and most approved drainage system (with sludge presses and automatic sewer-flushers), and its low death-rate. The inspection has been made of several hundred houses in that parish, and although in some of the most residential and therefore unexpected parts of it, the sanitary condition of the houses, in a large number of cases, has been far from satisfactory, the owners are complying readily with what can only be regarded as the reasonable requirements of the Board, namely, the carrying of a pipe, the same size as the soil-pipe, up through the soil from that pipe above the roof, so as to act as a ventilator, disconnecting the waste-pipe from the main sewer, and the drawing of the water supply of the closets from a separate cistern. This work of house-to-house inspection is greatly facilitated by the use of a useful pocket inspection book which has been prepared by Mr. Ramsden, Surveyor to the Chiswick Local Board, and which details all the points upon which observation has necessarily to be made, so that the inspector, instead of having to write out all his notes in full or nearly so has, in most cases, only to say "yes" or "no" under the heading to which his attention is for the moment directed. In this book, which tends to expedition and completeness in the preparation of these reports, we have, for instance, under the heading of "Drainage," such points as "If connected to sewers," "No. of w.c.'s in basement, ground-floor, and first floor," "sort of pans in w.c.," "if supplied with water," "is soil-pipe ventilated?" "if inside house and where situated," "is sink disconnected?" "are bath and lavatory disconnected?" "is there ventilating syphon in front of the house?" "is there a ventilating-pipe at back?" Under the heading of "Water Supply" we have:—"What company?" "constant or intermittent?" "is w.c. supply separate?" Under "Dust Bins" occur such points as:—"Distance nearest window or door," "if covered," "if in an offensive state," "whether garden or yard to house." Then follow two spaces, one for "remarks" and the other for "sketch-plan, showing drain." These notes are all transferred to a large book with similar headings, and the sanitary condition of every house in the parish is here easily recorded and referred to. The large or office book has, in addition to the above points, the following:—"Suggestions for remedy by the surveyor," "Date of meeting of Local Board when report read," "Decision and order of the Local Board." Then follows space for plan, showing the drain. All these precautions, as to disconnection of waste-pipe and water supply, &c., from the main sewer are not specifically mentioned in the Public Health Act; but the Local Board find warrant for action in the fact that such connexions with the sewer creates, or tends to create, a nuisance injurious to health;



The "Common-Sense" Timber Drying Apparatus.

for the abatement of which they can call in the aid of the provisions of the above-named Act, which means summoning and fining in cases of proved default. The ignorance among some occupiers of houses as to the real use of these disconnections is indeed very great. A case came recently under the writer's observation, where the occupier (who was also owner) was under the impression that the arrangement of allowing the waste-pipe from the bath to flow into an open receptacle outside the house, at the top of the pipe which led into the sewer, was for the purpose of permitting the inspector of the water company to see when and how much water was unnecessarily wasted; and when the occupier in question was interrogated on the subject, he said he was informed by his jobbing plumber that these open receptacles were required by the water company to facilitate an inspection in their interest. It may be mentioned that the Grand Junction and West Middlesex Water Companies have offered, and the terms have been accepted, to supply from the main the sixty automatic sewer flushers in Chiswick at 4*l.* 4*s.* each for a year. Notwithstanding this charge, it is calculated that the Chiswick Local Board will make a clear saving of nearly 300*l.* by the new system of sewer-flushing over the old one of putting the hose down the manhole, and waiting till several hundred gallons have been run into the sewer.

**The Working Lads' Institute**, White-chapel (opposite the London Hospital), is to be opened by H.R.H. the Princess of Wales, this Saturday, the 31st, at four p.m. Mr. Geo. Baines, jun., of Great Winchester-street, is the architect.

#### THE "COMMON SENSE" TIMBER DRYING APPARATUS.

IN our issue of the 18th April, 1885, we noticed the "Common Sense" Timber Drying Apparatus, a machine which has lately been introduced into this country. We then said: "It seemed to us to be as perfect a system as can be needed or desired," and we now give an illustration of the plan and elevation of a drying-room erected some months ago by Messrs. Peto Brothers, the well-known builders.

The process includes the following conditions necessary to a proper application. An apartment, or several compartments connected, so constructed that they can be tightly closed and heated to the temperature required,—the heating agency being exhaust or live steam. Where the former is used connexion should also be made with the boiler, so that when the works are closed at night, by opening a valve, steam from the boiler may pass into the drying-room's pipes and thus preserve the temperature in the rooms over-night. Uniform temperature as well as uniform action is essential. Sweating the timber is the first step in drying, and is done at the start by opening a valve ejecting a spray of steam on to the timber. The action is similar to that of immersing timber in water, or of floating logs. It dissolves the sap, which is of a glutinous or spongy nature, and the natural moisture at the centre escapes freely, and the wood comes together more compactly and firmer than if sap is allowed to dry down as in seasoning ordinarily.

An exhaust fan is now used to draw the heated moisture-laden air from the room and force it through a condenser back to the room.

The condenser extracts from the air the moisture drawn out of its moisture, which, liquified, discharged through a waste-pipe, while the air, now dry, passes back to the room, being rapidly heated by the heat radiating from the steam-pipes at the bottom, the capacity for moisture is thereby increased and the moisture is more freely extracted from the timber in its circulation through the apartment. The air, again charged with moisture from the sweating timber, is drawn out, thus the circuit is continually made until the timber is thoroughly dry, which takes from two to nine days to season wet boards and planks the same proportion, according to their thickness. This is simple, most effectual, and speedy.

First, heating the material to a mean temperature of 125 deg., and maintaining it, none of the detrimental effects of sudden atmospheric changes. Secondly, circulation of air by means of the fan. Thirdly, condensation, or removal of the moisture.

#### NON-ACCEPTANCE OF THE LOWEST TENDER.

ALL over the country complaints are made by builders of the abuse of a clause in invitations to tender, the use of which, within proper limits, is not only justifiable, but absolutely necessary.

That some such saving clause is necessary are free to admit. It would be altogether absurd to think for one moment that had advertised for tenders one should be bound to accept either the lowest, even to recompose in any way the tenderers.



Again, it sometimes happens that although man may be willing and wishful to build, yet he finds the cost of his proposed works is much greater than he anticipated or had been led to believe, and therefore the insertion of the clause in his invitation is a wise provision against responsibilities. Or it does sometimes happen at the proprietor, from unforeseen circumstances, is prevented from carrying out his intentions, and that unwillingly; and then again the clause has its proper use.

But, looking at the misuse of it, we say unhesitatingly it is plainly dishonest that services rendered by fifteen or twenty builders should be rendered for the purpose of learning the exact sum at which the contemplated works may be placed in the hands of this proprietor's friend or that architect's favourite.

If such a system as has recently been adopted continued to obtain there would be an end to all one-side tendering, as no man who cared one jot for his reputation or had regard for his time could spend money, time, and brains, without the knowledge that his tender would be received and treated with perfectly good faith. It seems enough to us that he should be willing to send a tender on the faith that it will be fairly treated, and not that after the cost of its production it should be used to his disadvantage.

We have been thinking chiefly of those tenders which are necessarily advertised, but much more intensely do our remarks apply to those gentlemen who, asking a certain number of tradesmen to tender, even then refuse to accept the lowest. These cases are numerous, and we cannot but repeat that this means is used to keep the friend or favourite honest.

The remedy, if the disease increases, must rest in the builder's own hands. It seems to us very simple. Ask the question,—Should any tender be accepted, and mine is the lowest, will it be accepted? This may apply both to invitations public or private, and if a satisfactory answer is not given the builder must be content to forego his chance, or he tenders with the knowledge that probably he will be demanded of his money and knowledge. We call to mind one architect's invitation, which is always couched thus:—"Mr. A. B. does not intend himself to accept any tender, but if either is accepted it will be the lowest." In his gentleman's hands a builder may feel himself perfectly safe, and we commend his example to those of his brethren who use other forms.

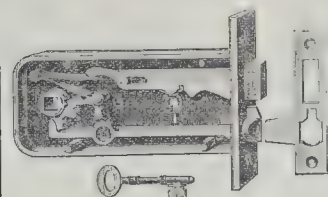
We have, we think, pointed to what is felt by builders to be a great and growing evil, but we hope it will be only necessary to call attention to the matter, and trust firmly that the well-known honesty of English gentlemen will, without resort to any extreme means, be sufficient to remedy the wrong.—*The Builder's Blue-Book.*

#### A NEW PATENT LOCK.

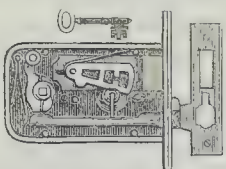
We have had submitted to our notice samples of a new lock, which seems to possess great merit, and concerning which its introducers write—

"Many attempts have been made of late years to avoid the constant source of annoyance caused by locks being the wrong hand for the work required. The error of ordering locks right hand instead of left is well known. The builder's right is often, to the ironmonger's view, a left-handed lock. A workman is sent into the country to replace a lock, and finds he has been improperly instructed as regards the hand; in fact, this difficulty is proverbial. It is not surprising, therefore, for these reasons, and also the necessity for keeping double locks, that much thought has been given to the question. Numerous locks, with loose reversing bolts, have been introduced. The general difficulty with these has been the liability of the bolts to become defective and loose in consequence of the play given to this important part of the lock. In nearly all these cases the chisel-head bolt has been adhered to, an attempt has been made to alter the position of the chisel-head on one side of the bevel of the square head, this has never made any headway. In 1873, Mr. J. Green introduced his well-known cylindrical bolt reversible double-headed lock, which had a fair sale, but among its defects was the bolt being loose, and also the difficulty of explaining the mode of reversing. In 1884, Messrs. J. Green and J. T. Green apparently hit upon the method which is here illustrated.

The illustrations represent the tumbler and the lever locks, showing the cylindrical head and double bevel, in combination with a rib or ribs, thus giving the double-headed lock without any apparent drawback.



Tumbler Mortise Lock.



Lever Mortise Lock.

The bolt strikes easily on the plate, and takes a firm hold, suitable for either right or left hand. The locks are all hand-made. The price does not exceed that of ordinary square head bolt locks."

Messrs. F. W. Reynolds & Co., of 73, Southwark-street, have secured the sole right of sale of this patent lock.

#### WHAT IS A NEW STREET?

At Worship-street Police Court on Wednesday last, Messrs. Lawrance & Sons, builders, of Wharfedale, City-road, appeared to answer three summonses granted at the instance of the Metropolitan Board of Works for three offences under the Metropolitan Management and Building Acts (Amendment) Act, 1882, in respect of some blocks of artisans' dwellings erected by them and known as Chatham-gardens, Nile-street, Hoxton. Mr. Ivory, barrister (instructed by Mr. Thomas Burton), appeared for the Metropolitan Board of Works; and Mr. Grain, barrister, represented the defendants. Only one summons was now entered into, viz., that for failing to give notice of the intended formation of the way or passage, under the 7th section of the Metropolitan Management and Building Acts (Amendment) Act, 1882 (45 Vict. cap. 14).

Mr. Ivory stated the case, and read the section of the Act in question, which is as follows:—

"Where after the passing of this Act it is intended by any person to form or lay out any road, passage, or way for building as a street for the purposes of carriage traffic or of foot traffic only, in such manner that such road, passage, or way will not afford direct communication between two streets, such person shall, at least three months before such road, passage, or way is begun to be formed or laid out, make an application to the Board giving notice of such intention, and setting out a plan of the proposed street, with such particulars in relation thereto as may be required by the Board, and if it appears to the Board that it is expedient that such road, passage, or way should not be formed or laid out in manner aforesaid, or that such road, passage, or way should be formed or laid out in manner aforesaid subject to any conditions which the Board may prescribe, the Board may, by order made at any time before the expiration of the said period of three months, decline to sanction the formation or laying out of such road, passage, or way in manner aforesaid, or may sanction the formation or laying out of such road, passage, or way in manner aforesaid subject to such conditions as they may prescribe, and thereupon, and until the Board shall otherwise direct, such road, passage, or way shall not be formed or laid out for building as a street in manner aforesaid where the Board have declined their sanction, or shall not be formed or laid out for building as a street in manner aforesaid, except in accordance with the conditions prescribed, where the Board have given their sanction subject to such conditions. Any person forming or laying out, or commencing to form or lay out, or keeping open any road, passage, or way so formed or laid out in manner aforesaid contrary to the provisions of this section, shall for every such offence be liable to a penalty not exceeding forty shillings, and to a further penalty not exceeding twenty shillings for every day on which the offence is continued after the day on which the first penalty is incurred. Provided always, that in case the said person so intending to form or lay out any road, passage, or way as aforesaid, considers that any of the conditions prescribed by the Board are unreasonable, then the said person so objecting to the said conditions may appeal to the police magistrate for the district in which the said road, passage, or way is situate, and his decision shall be final upon the question."

Mr. Ivory having explained the nature of the scheme, which was described in Mr. George Godwin's letter to the *Builder* for Oct. 3, p. 478, and again referred to in last week's *Builder*, p. 502, Mr. Charles Fowler, the District Surveyor, was called to deprecate the width of the passage between the buildings; and Mr. John Hebb, the Assistant Architect of the Board, was also called. Mr. Hebb,

in answer to questions put to him in cross-examination, said that, whatever may have been the character of the cottage property formerly occupying the site, the new buildings (consisting of two lofty blocks of artisans' dwellings, each 509 ft. long, being only 24 ft. apart, and each 35 ft. high to the eaves, with no outlet at the far end, thus forming a *cul-de-sac*, and closely hemmed in by surrounding properties), owing to insufficiency of light and air, would be the reverse of an improvement from a sanitary point of view.

For the defence, Mr. Grain admitted that notice had not been given, but contended that such notice was not necessary, inasmuch as the passage or way between the two blocks of buildings was not a new street within the meaning of the section. He said that when the buildings were completed it was intended to put up a pair of gates at the entrance to the passageway between the dwellings, and to station a gatekeeper there.

The Magistrate (Mr. Hosack) dismissed the summonses on the ground that the case did not come within the terms of the section relied upon, and he allowed the defendants 5l. 5s. costs.

#### ILLICIT COMMISSIONS.

SIR.—The practice of offering, I will not say receiving,—commissions to surveyors and other officials employed under the Public Health Act has, in my experience become so general that I venture to address you on the subject, in the hope that through the publicity of your columns some means may be found of preventing such dishonest practices.

The 38th and 39th Vict., c. 55, sec. 189, provides that "Every urban authority shall from time to time appoint fit and proper persons to be Medical Officer of Health, Surveyor, Inspector of Nuisances, Clerk, and Treasurer." And sec. 193 enacts that "Officers or servants appointed or employed under this Act by any Local Authority shall not in any wise be concerned or interested in any bargain or contract made with such authority." "If any such officer or servant" "exact or accepts any fee or reward whatsoever other than his proper salary, wages, and allowances, he shall be incapable of afterwards holding or continuing in any office or employment under this Act, and shall forfeit and pay the sum of fifty pounds." It might be thought that the above sections would amply protect the ratepayers public from fraudulent practices, but from experience I can testify that it is not so. Commissions have from time to time been brought, sent, or offered to me. Within the past week no less than three such offers have been made to me, which, if accepted, would more than equal my annual salary. Why should firms claiming respectability stoop to such underhand practices? Simply because of the keen competition in trade, and the willingness of some unprincipled officials to accept such commissions. Why do surveyors or other officers run the risk of loss of office and fine? For two reasons. Firstly and mainly, owing to the smallness of the salaries offered by many local authorities, which no qualified (I do not include medical officers) man of integrity and experience could possibly subsist upon. Secondly, the practice, common in many places, owing to the constitution of the local authority, to "pitchfork" into office of responsibility and trust the "local practical man," the "jerry-builder," or others of a similar class. Without further encroaching on your valuable space by enlarging on the vast sum annually expended by the local authorities, which passes either directly or indirectly through their surveyors' hands, I beg to offer the following suggestions with a view of remedying the evils complained of:—

1. That any person offering or attempting to bribe an officer of the local authority should be liable to a substantial penalty. 2. That none but properly-certified men should be eligible for the position of Surveyor or Inspector of Nuisances. A LOCAL SURVEYOR.

**Leicester Water Supply.**—The town of Leicester now draws its water supplies from two streams flowing from Chanwood Forest, with impounding reservoirs at Thornton and Bradgate. A further supply having become necessary, Messrs. T. and C. Hawksley, of Westminster, the consulting engineers to the Corporation, advised that another stream upon Chanwood Forest, the Blackbrook, should be acquired. This advice having been confirmed by a report from Mr. J. B. Everard, of Leicester, who was appointed to make an exhaustive inquiry into the whole question, has been accepted by the Town Council.



### OLD OAK ROOM, FORMERLY AT NUREMBERG.

SIR.—In your last issue you were kind enough to insert an engraving of this fine room, and in your article thereon you say that its fate is unknown to you. It may be of interest to you and readers to know that I have re-erected it in the mansion of Mr. C. D. Kemp-Welch, at Broadlands, Ascot, and I can assure you that its present owner really appreciates it and highly prizes his acquisition. In the re-erection we followed the old lines exactly, and I received the most valuable and efficient assistance from Mr. Kemp-Welch's architect, Mr. W. West Nave.

J. CHENBAUSER.

\*\*\* A correspondent has written to us in regard to the discrepancy between the style of this room and the date claimed for it,—which, indeed, struck us as remarkable at the time. We simply gave the history of the room as furnished to us by those who professed to have it from authentic sources. But the penetration into Germany at that date (say circa 1510) of Renaissance details in so advanced a shape is next to impossible, if we are to regard it as the work of a German artist. We omitted to note this at the time.

### VENTILATION OF SEWERS BY SMOKE STACKS.

SIR.—For the information of your correspondent of last week (L. Brown), I beg to say that this system has been carried out in some of the highest parts of the town of Darlington, viz., in the east and north wards. It was adopted at the instigation of Mr. G. C. Hoskins, F.R.I.B.A., who is a member of the Town Council, and I believe with the best results.

I enclose my card, and remain,

Oct. 23, 1885.

DARLINGTONIAN.

SIR.—Your correspondent, Mr. L. Brown, will find a list of eighteen towns where this method of ventilation has been and is now in use, with the opinions of several surveyors on this subject, if he will refer to the book (advertised in the *Builder*), by Messrs. Bancroft, on "Tall Chimney Construction," pp. 134-35.

H. S. & Co.

### GAS COILS.

SIR.—Will any reader of the *Builder* kindly give an opinion as to the gain (if any) in the amount of heat given off from a coil heated by gas, and if it is greater than would be given off by the naked gas flame,—the same burners being used in each case, and a similar arrangement for taking away the fumes?

A. B.

### RECENT PATENTS.

#### ABSTRACTS OF SPECIFICATIONS.

8,259, Glazing. F. Primrose and J. Mel-  
lows.

The glass is supported in turned lead bars grooved at the sides to receive it. These bars are sometimes made to fit over a bar of iron. The purlins are grooved to carry off water condensing on the under side of the glass, and channels are cut from the grooves to the outside to conduct the water. To enable planks to be supported over the glass for cleaning or repairs, iron brackets are secured to the rafters. The brackets are bent up at the ends, and carry iron bars, upon which the planks may be laid.

9,793, Plumb-line. T. Wright.

A plumb bob is fixed to a rod pivoted at the upper end, a pin at the other end controls a pivoted index finger showing when the rule is exactly vertical. The working parts are covered by a casing to protect them from wind and weather. A spirit level and thermometer may be attached.

10,801, Door-knob. H. Owens.

The knob is attached to the spindle by a screw passing right through. Holes are bored in the neck of the knob at right angles, and in different positions, for better adjustment. The screw is held in place by a rose, which is turned and fixed to the door. The rose fits over the knob, and is secured by a collar which screws on to the neck of the rose.

11,668, Fireproof Doors. J. Edwards and A. Rogers.

Fireproof doors are made hollow and filled with asbestos or other suitable material, and supported on rollers or pulleys. A space within the door contains the mechanism for moving it, consisting of a screw working into a long nut fixed to the wall, and, at the other, worm and worm-wheel. A pair of bevel wheels enable the screw to be turned by a handle from either side of the door, or from the end.

1,590, Horticultural and other Buildings. W. Page.

Cast-iron columns, adapted to retain the brickwork and side-lights of the building in position, are erected at suitable intervals. They are formed with flanges extending from the ground to the top, between which the ends of the brickwork enter. The

portion in the ground is cast with a foot, strengthened by four ribs. Ears are formed at the upper ends by which opposite columns may be tied together, and a wall-plate is bolted along the top of the wall to flanges cast on for the purpose.

12,614, Nosing for Stair-treads. F. Hembry.

On a backing of indiarubber is laid a perforated metal plate, or a sheet of wire gauze, to which is cemented a second sheet of indiarubber. The cement passing through the perforations unites the whole firmly together. Instead of using cement the sheets of rubber may be placed on a plate on an uncured state, and afterwards attached to it by vulcanisation.

11,960, Glazing. H. Crewe.

The rafters or sash-bars are grooved to carry off water, and the glass rests on the edges of the grooves. The glass is secured by a clip fastened by a screw. The hole through which the screw passes is elongated so that the clip may be slid along to release the glass if desired.

#### NEW APPLICATIONS FOR PATENTS.

Oct. 16.—12,322, F. Smith, Wind-baffling Chimney Top.—12,323, E. Lee, Construction of Fireproof Pillars and Columns.—12,339, H. Sloane, Chimney Cap.—12,370, F. Wordley, Improvements in Electric Bells.—12,379, G. Wynne, Fastenings for Doors, &c.

Oct. 17.—12,383, A. Campbell, Manufacture of Artificial Stones and Concretes.—12,390, J. Armstrong, Improvement of Building Materials.—12,391, H. Wiesen, Manufacture of Bricks.—12,392, C. Fellows, Safety Sash Fastener.—12,393, J. Northwood, Construction of Ventilators.—12,397, T. Cleathers and Others, Kitchen Ranges.—12,402, C. and R. Marshall, Casements or Window Sashes.—12,403, J. Desley, Flushing Cisterns.—12,405, J. Allen, Brick and Tile Making Machinery.

Oct. 18.—12,448, H. Wood and Others, Sash Fasteners.—12,458, E. Preston, Spokeshaves, Planes, &c.—12,468, J. Cushing, Improved Water-closet Basin.—12,470, T. Murphy, Whitewash or Distemper Brush.—12,471, S. Johnson, Flushing Apparatus for Closets, &c.—12,477, G. Smith, Combination Comb or Ventilator.

Oct. 20.—12,505, W. Allen, Construction of Self-flushing Water-closets.—12,507, H. Lory, Bolt, with Plate or Plates for Lavatories or Water-closets.—12,508, A. Kerr, Water-closet Cistern.—12,525, W. Scrymgeour, Construction of Floorings, Roofs, and other Structures.—12,529, J. Collier, Opening Fanlights, Hinged Windows, &c.—12,539, W. Merryweather, Closet or Room Indicator.—12,541, G. Heinsius, Door Bolts, &c.—12,542, E. Ferrari, Improvements in Ladders.—12,547, E. Verity and B. Banks, Opening, Closing, and Regulating Fanlights, &c.—12,550, F. Austin, Antiseptic Basin for Closets, &c.—12,563, T. Castle, Machinery and Kilns for the Manufacture of Cement.

Oct. 21.—12,580, S. Smith, Automatically Flushing Closets and Drains.—12,584, A. Gunn and T. Caisley, Imitation Inlaid Work.—12,585, R. Leigh, Fireproof Ceiling Laths.—12,605, G. Thornton, Improved Door Silencer.—12,620, F. Morris and J. Fox, Apparatus for Securing Sling Sashes.—Oct. 22.—12,634, J. Higginbotham and H. Holland, Window-sash Fasteners.—12,637, J. McMurtrie, Improvements in Water Fittings.—12,662, J. Greenwood, Automatic Disinfecting Apparatus.—12,672, J. Cornish, Tiles for Floors of Malt and other Kilns.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

10,480, W. Margetts, Loading or Charging Cement Kilns.—10,659, H. Sainsbury, Spring and Air Apparatus for Closing Doors and Gates.—10,772, J. Johnson, Ventilators and Chimney Cowl.—10,886, W. Wilkinson, Construction of Footpaths and other Floorings or Pavings.—10,903, W. Wood, Decking for Bridges.—10,928, J. Tott, Treads for Staircases, Passages, &c.—11,408, H. Milson, Faring Heads and Cutters for Woodworking Machinery.—11,441, G. Glanville, Improvements in Screws.—11,549, J. Parker, Manufacture of Fireclay Bricks.—11,677, H. Shaw, Attachment for Screw-drivers.—9,208, C. Rowlands, Machine for Sawing, Mortising, Moulding, &c.—10,347, G. Blake, Turn Bockle Lead Fastener.—10,864, T. Miffo, Door Knockers.—10,915, H. Hartung, Door Checks.—11,001, W. Hassall, Composition or Cement for Jointing Stone-ware, Concrete, and other Pipes.—11,174, J. Watson, Manufacture of Cement.—11,471, F. Druce, Lock or Catch for Securing Fenders to Mantelpieces, Walls, &c.—11,690, E. Lucas, Improvements in Water-closets.—11,811, J. G. Carr, Joining Bench Knife.—12,145, W. Holman, Improved Lock.

#### COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

9, J. Hill, Improvements in Rim Locks, Drawback Locks and Latches.—217, W. Court, Woodblock Flooring.—11,101, W. Dupré, Cows to Prevent Down-draught.—16,951, S. Hazeland, Machinery for Planing Wood.—339, D. Dickinson, Device for Preventing the Over-sliding of Drawers, Shelves, Sliding Doors, &c.—9,642, J. Teyorouid, Improvements in Cooking Stoves.—10,813, W. and G. Barker, Improved Mantel-piece, Chimney-piece, and Over-mantel.—10,294, C. Roberts, Apparatus

for Collecting Rain Water.—11,171, S. Richard, Apparatus for Facilitating the Painting and Repairing and Cleaning and Window Frames.—11, F. Biggs, Tubular-cased Mortise Locks.

### RECENT SALES OF PROPERTY. ESTATE EXCHANGE REPORT.

Oct. 15.

By DEBENHAM, TEWSON, & Co.  
Brompton, near—Freehold cottage and 6s. 1r. 29p.  
Two enclosures of land, 11s. 1r. 37p.  
Freehold cottage and 6s. 1r. 1p.  
Freehold cottage and 11s. 6r. 12p.

Oct. 20.

By W. H. MOORE.  
Regent's Park—104, Onaughurst-street, 39 years, ground-rent 28l.  
Brunswick-square—15, Grenville-street, 7 years, ground-rent 10l. 10s.

By C. W. DAVIES.  
Dalston—39, 41, and 43, Holly-street, 52 years, ground-rent 15l.  
23, 25, 27, and 29, Shrubland-grove, 57 years, ground-rent 16l.

56 and 68, Parkholme-road, 51 years, ground-rent 2l. 15s.  
Gowland-road—No. 33, 42 years, ground-rent 70s.  
Aldersgate-street—28 and 29, Glasshouse-yard, freehold.  
Golden-lane—The Bathfield-street Schools, freehold.  
Old-street—14 and 15, James-street, leasehold rental, 22 years.  
City-road—19, Leonard-street, rental of 40l., term 8 years.  
Lower St. Giles—Freehold ground-rent of 48s. reversion in 90 years.  
Freehold ground-rent of 9l., reversion in 84 years.  
Freehold ground-rent of 6l. 10s., reversion in 84 years.

By DEBENHAM, TEWSON, & Co.  
Rotherfield, Sussex—Part of Sandhill Farm, 20s. 2r. 14p., freehold.

By BAXTER, PAYNE, & LEPPER.  
Foot's Cray, Kent—The lease of "The Cat" beer-house.

Battersea—6 and 7, Park-place, 47 years, ground-rent 10l.  
Walworth—43 and 47, Mann-street, 66 years, ground-rent 7l. 6s.

Battersea—90 to 96 even, Hanley-street, 83 years, ground-rent 20l.  
By RANDALL & BRAD.

East Finchley, Western-road—"Hestfield Lodge," 95 years, ground-rent 7l.

Oct. 22.

By HARDS & JENKINSON.  
Bermondsey—Ground-rent of 60l. a year, reversion in 99 years.  
Peckham—67, Clifton-crescent, freehold.

By C. C. & T. MOORE.  
Dagenham—Four freehold cottages.  
The freehold chapel and adjoining site.

By FRERE, FAIR, & FRERE.  
King's-cross—21 and 23, Manchester-square, 69 years, ground-rent 10l.

By B. BROWN.  
Poplar—Improved ground-rents of 123l. 4s. 4d., term 67 years.  
Improved ground-rents of 28l. 10s., term 67 years.

Bromley—Improved ground-rents of 18l., term 64 years.  
Canning Town—The "Lord Nelson" public-house, freehold.

Barking-road—78, The Elmora, a public-house, term 78 years.  
Poplar—Ground-rent of 13l. a year, reversion in 39 years.

No. 7, Stainby-street, 10 years, ground-rent 5s. 6d.  
By WILLIAMS & SON.  
Brighton—60, Montpelier-road, freehold.

No. 4, Clarendon-terrace, freehold.  
Redhill, Surrey—The "Hermitage," 78 years, ground-rent 11l.

Oct. 23.

By R. B. BIGGS.  
Tottenham—Ground-rents of 65l. a year, reversion in 94 years.

### MEETINGS.

MONDAY, NOVEMBER 2.

Royal Institute of British Architects.—Opening Meeting of the Session. Address by the President, Mr. E. Christian, 8 p.m.

Society of Engineers.—Mr. J. B. Redman on "Approaches and Deep-water Entrances," 7.30 p.m.  
"The Sanitary Work of Two Houses lately Erected," 7.30 p.m.

Liverpool Architectural Society.—Mr. Thomas M. "On Stone: Its Properties and Adaptability," 7 p.m.

WEDNESDAY, NOVEMBER 4.

Builders' Foremen and Clerks of Works Institution Ordinary Meeting, 8.30 p.m.

THURSDAY, NOVEMBER 5.

Builders' Benevolent Institution.—Thirty-eighth Annual Dinner, Carpenters' Hall, London Wall, 6 p.m.  
Royal Archaeological Institute.—(1) Mr. Flinders Petrie on "Monuments of the Egyptian Civilization," 4 p.m.

FRIDAY, NOVEMBER 6.

Architectural Association.—Mr. T. Blashill on "The Students," 7.30 p.m.  
University College.—Professor C. T. Newton on "The Inscriptions," (114.) 4 p.m.

SATURDAY, NOVEMBER 7.

Association of Public Sanitary Inspectors.—Mr. G. Jerran, Chairman of the Council, will deliver his Address, 8 p.m.



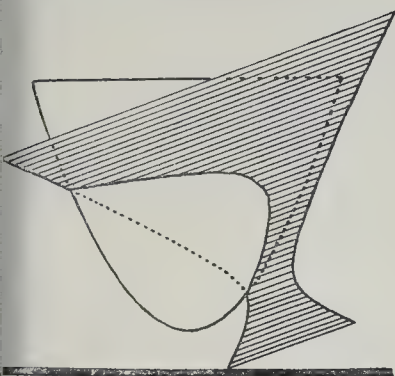


Fig. 191.

## The Student's Column.

DESCRIPTIVE GEOMETRY.—PART II.

XXII.

To find the tangent to the curve of intersection in the point  $m$ .

As we have always done before we shall now find the tangent to the curve of intersection in the point  $m$ . To do this we shall use the method of the normals, which have explained in fig. 169. The reader remembers that this method is based on the fact that the tangent to the intersection in a given point is perpendicular to the plane which contains the normals to both surfaces in that point.

The normal to the paraboloid is found in the ordinary way. By a perpendicular to the elliptical outline drawn from  $c^v$  we find the point  $t^v$ , where the normal from the point  $m$  cuts the axis of the paraboloid. The normal is, therefore, the line  $mt^v$ .

The normal to the hyperboloid cannot be found the same way, for we have not got the outline of that surface. The plane tangent to the surface in a given point contains all the tangents to that surface; therefore, if we draw on the end-down section the tangent  $\beta_2 t^v$ ; this tangent (when the section is brought back to its original position) will be contained by the plane tangent to the hyperboloid in the point  $\beta$ ; and, on the other hand, the tangent will also contain the generator  $G$  of the hyperboloid. The first tangent (which we call  $t^v$  in its position in space) cuts the meridian line in the point  $t$ , and the generator  $G$  is the same meridian plane in the point  $\beta$ ; therefore the line  $t^v s^v$  is the elevation of the plane where the tangent plane to the hyperboloid in the point  $\beta$  cuts the meridian plane. We know that the vertical projection of the normal in the point  $\beta$  will be perpendicular to the trace  $t^v s^v$  of the tangent plane, we can draw  $\beta^v n^v$  perpendicular to  $t^v s^v$  and get thereby the point  $n^v$ , where all the normals along the curve parallel will cut the axis of the hyperboloid. The line  $m n^v$  is, therefore, the normal to the hyperboloid in the point  $m$ .

On the meridian plane, the line which contains the points  $r$  and  $n$  is a trace of the plane of the normals (the plane of the normals is represented by the triangle  $m n r$ ), the elevation of the tangent  $m^v \theta^v$  will, therefore, be perpendicular to the line  $n^v r^v$ . Likewise, if we prolong the line  $n^v r^v$  until it cut the plane  $P$  in the point  $p$ , we find that the plane of the normals cuts the horizontal plane  $P$  along a line projected on the plane in  $m^h \rho^h$ , and therefore, the plane of the tangent  $m^h \theta^h$  is perpendicular to the line  $m^h \rho^h$ .

Observe, that as we only required the direction of the traces of the plane of the normals, we have operated by means of the traces of the plane on planes parallel to the projection planes such as the meridian plane and the horizontal plane  $P$ ; for these traces are parallel to the traces made on the original projection planes, and are more readily found.

The reader will get a clearer idea of the difference of these two surfaces and their

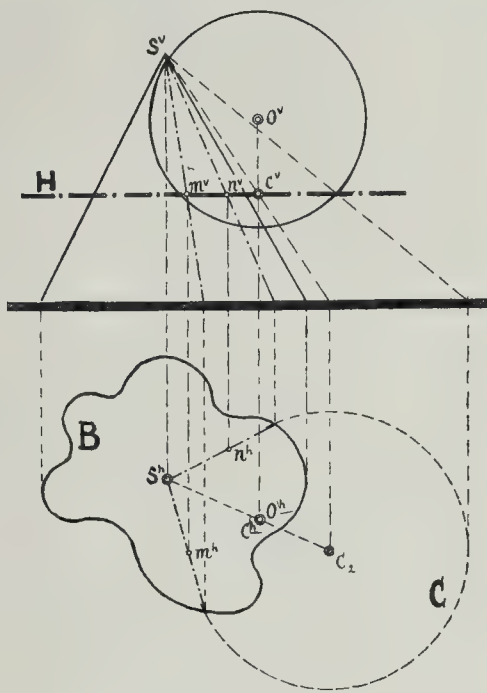


Fig. 192.

intersection by the fig. 191, where we have given the outlines of both surfaces. The hyperboloid has been shaded and the paraboloid left white.

The outlines of each surface, which are hidden inside the other surface, are marked by dotted lines only.

Note.—The section of the Greek Doric capital is a portion of a conic section sometimes a parabola, sometimes a hyperbola, but yet the capital is not either a paraboloid or a hyperboloid of revolution; because, although it be a surface of revolution, the axis of revolution does not correspond with the axis of the conic section, which forms the meridian of the capital.

We have now given special methods of finding the intersection of certain surfaces; but we can always get the intersection of any two surfaces by means of sections made in both surfaces by horizontal planes. This method is sure, but often very long. In some cases there is an artifice of construction which very much shortens the work. We refer to the method of

Conic Projections or Perspective Projections.

Suppose we have a cone of vertex  $s$  (see fig. 192), the base of which is a sinuous irregular line  $B$ , and we require the intersection of that cone by another surface, such as a sphere, the horizontal section of which is always a circle.

According to the regular method of finding intersections, we cut both surfaces by a horizontal plane,  $H$ , and where the two plane sections meet we shall have points of the section required.

The section of the sphere is a circle of centre,  $C$ . This is easily got; but the section of the cone will in this case have to be carefully delineated point by point, and will take a very long time to draw. We can dispense with this tedious labour by the following artifice:—

We produce a second cone, the vertex of which is the point  $S$ , vertex of the cone given, but the base of which is the circular section made in the sphere by the plane  $H$ . If we prolong that second cone, it will cut the plane of the plan according to a circle,  $G$ , the centre of which is  $C_2$ . The two cones having the same vertex cut one another along generators;

and where the circle  $G$ , base of the second cone, meets the sinuous base  $B$  of the first cone, we have points belonging to the generators common to both cones. We can, therefore, draw the generators, and find the points  $m$  and  $n$  where they intersect the horizontal plane  $H$ ; these points  $m$  and  $n$  belong to the curve of intersection of the cone by the sphere. The complete curve is drawn by operating on a series of horizontal sections.

Note.—This method applies to all surfaces, the horizontal sections of which are circles. This comprises a great variety of surfaces, some of which we have not yet seen; for instance, a surface engendered by a horizontal circle of varying radius, the extremities of which are bound to touch two lines in space as the circle moves up and down.

## Proposed Widening of the Strand.—At

the meeting of the Metropolitan Board of Works last week, Mr. J. Jones introduced a deputation from the Strand Improvement Association, who presented a memorial urging the Board to take steps to widen the Strand between the churches of St. Clement Dane's and St. Mary-le-Strand. The deputation consisted of Mr. A. W. Lightbody, Mr. T. H. Cole, Mr. Freeman, Mr. R. Davies, Mr. J. Seymour, and others. Mr. Lightbody, who spoke for the deputation, appealed to the Board to give the subject matter of the memorial their early and careful consideration, as they felt assured that such consideration could not fail to impress the Board with the absolute necessity of dealing with this question without further delay. In June, 1882, a similar memorial was presented to the Board, which met with such favourable consideration that a draft Bill was prepared to carry out the needed alteration. The traffic of the Strand had increased enormously of late years between the two churches at the eastern end, where both the roadway and the footways were much narrower than at any other part of the thoroughfare; the congestion of traffic was such as to cause serious inconvenience to the traffic and the traders, while there was also grave danger to life and limb. On the motion of Mr. J. Jones, the memorial was referred to the Works and General Purposes Committee for consideration and report.

## Miscellaneous.

**Glasgow Institute of Architects.**—The annual general meeting of this Institute was held last week in the Religious Institution Rooms, Buchanan-street, Mr. James Sellars, President, in the chair. Mr. William MacLean, writer, secretary, submitted the annual report, and Mr. William Landless, the treasurer, read the financial statement. The President, in moving the adoption of the report and treasurer's statement, referred to the shelved Burgh Police and Health [Building] Bill for Scotland. He also mentioned that the new rules for the measurement of mason work have been completed. They are the joint production of this Institute, the Institute of Measurers, the Master Masons' Association, and the Incorporation of Masons. Many points regarding which there was much diversity of opinion and practice have now been settled, and the President has no doubt that the new rules will be found to work well and beneficially in the interests of both proprietors and contractors. Mr. James Thomson, late President, seconded the motion, which was adopted. Thereafter the following were elected as members of Council for next year, viz.:—Messrs. T. L. Watson, David Thomson, James Thomson, Alexander Skirving, William F. McGibbon, James B. Lamb, Paisley; William F. Salmon, James Sellars, William Landless, Hugh Barclay, John Gordon, Messrs. George Bell, jun., architect, 212, St. Vincent-street; and Malcolm Stark, jun., architect, 167, St. Vincent-street, were elected members of the Institute. At a meeting of the newly-elected Council, held immediately afterwards, the following office-bearers were elected, viz.:—Messrs. James Sellars, President; Hugh Barclay, Vice-president; Wm. Landless, 227, West George-street, treasurer; John Burnet, auditor; Wm. McLean, writer, 81, Bath-street, secretary.

**The Institute of Builders.**—The Institute of Builders has now removed to its new rooms which have been provided for its use at 31 and 32, Bedford-street, Strand, and it is believed that the increased facilities thus available for intercourse between the members will prove of great advantage. The following are some of the objects of the Institute:—To give the Legislature and public bodies facilities of conferring with persons engaged in the building trade, as regards matters affecting that trade. To improve and elevate the technical and general knowledge of persons engaged, or about to engage, in the building trade, and, with a view thereto, to provide for the delivery of lectures and the holding of classes, and to test by examination or otherwise the competence of such persons, and to award certificates and distinctions, and to institute and establish scholarships, grants, rewards, and other benefactions. To promote excellence in the construction of buildings. To encourage the discovery of and make known the merits of inventions of use to persons engaged in the building trade. To establish, form, and maintain a library for the use of members, together with a collection of models, designs, drawings, &c. To promote the consideration and discussion of all questions affecting the building trades. The President is Mr. Stanley G. Bird. Mr. Howard Colls, Mr. George Burt, J.P., Mr. F. May, and Mr. T. F. Rider, are the Vice-Presidents; and Mr. George Plucknett, J.P., is the Treasurer.

**The Improvements at the Guildhall.**—The scheme for the improvement and rearrangement of the offices at the Guildhall has assumed more extensive proportions than was at first proposed. Of the present buildings the great hall, the library, and the new Council Chamber will alone remain untouched, a clean sweep being made of everything else north of the great hall. Even the aldermen's court, with its beautiful ceiling painted by Sir James Thornhill, will have to be pulled down, as it has been determined to raise the level of the floor of all the offices to that of the new Council Chamber. This will necessitate the addition of about five steps to the flight at present leading from the great hall to the offices. The present offices of the Commissioners of Sewers, part of which were only built in 1864, are to be rebuilt in a style in keeping with the library, between which building and the new offices a carriage-drive to the new Council Chamber will be made. The sites at present occupied by the Guildhall School of Music and the Secondary's Office, in Aldermanbury, will be cleared, and will be used in the scheme of reconstruction.—*City Press.*

**The Mural Paintings in the Town-hall, Manchester.**—Mr. Ford Madox Brown has just commenced another of the series of mural paintings, relating to the history of Manchester, with which the panels in the great hall of the Town-hall are gradually being embellished. The subject of the picture is "Chetham's Life Dream, A.D. 1640." The boys' school in Manchester which still bears the name of its founder, Humphrey Chetham, was established in accordance with the terms of his will in 1656. The school (combined with the library, also his gift) forms, no doubt, a precursor in the seventeenth century of those schemes, educational and philanthropic, which so prominently distinguish the nineteenth. Like his fellow-townsmen Crabtree, Chetham was a "drapier" or cloth merchant, but his wealth, great for those days, was largely supplemented by financial transactions of a nature kindred to banking or money-lending. During his life he boarded out and educated twenty-two poor boys; after his death the number was to be augmented to forty,—a number which is now doubled, owing to the increased value of the bequest. In the painting, Chetham is represented as studying his will in the garden of the college, which, in imagination, he had peopled with his "forty healthy boys" and their pedagogues. The school cook is impatiently awaiting the butcher. The scholars are engaged in drilling, reading, leap-frog, wrestling, and a game called "stools,"—apparently the forerunner of cricket. The panel occupied by the new work is on the south side of the hall, and is next to the one in which is represented "Crabtree observing the transit of Venus." On the other side of the room, five of the six panels are filled in with the following subjects:—"The building of a Roman fort," "Baptism of Edwin, King of Northumbria," "Expulsion of the Danes," "Establishment of a Flemish weaver," and "Proclamation regarding Weights and Measures."—*Manchester Courier.*

**New Town-hall, Edmonton.**—The new Town-hall at Edmonton, recently erected, was designed to accommodate the Local Board, the Vestry, and the magistrates. The principal entrances are in Lower Fero-street, that leading to the ground-floor and principal staircase opening into a corridor, on each side of which are the offices of the Local Board and the Vestry; the offices of the Clerk to the Board and the Board-room being on one side of the corridor, and the engineer's offices and the offices to be used by the Vestry on the other side. At the end of the corridor are offices for the medical officer and the inspector of nuisances, and for the collectors. There are also rooms which were provided for male and female prisoners, should the magistrates make use of the building. For these there is a separate back staircase and a separate side entrance. The large hall is 94 ft. long and 38 ft. wide, and about 24 ft. high. The style of the building is Perpendicular Gothic. The cost, including furnishing, has been under 9,000l. The whole of the building is heated by hot-water pipes, worked by separate apparatus for the ground and first floors, the ground-floor being heated on Jones's low-pressure system, and the first-floor on Perkins's high-pressure system. The hall is illuminated by Sugg's burners, and ventilated by Boyle's apparatus. The building was designed by Mr. Eachus (the Engineer to the Local Board), with Mr. E. A. Ram as architectural assistant and Mr. Hammett Furner as clerk of works, Mr. W. Tongue, of Woolwich, being the contractor. The railings round the buildings have been supplied by Mr. Rowe, of Edmonton. The fire-proof flooring on the first floor was laid by Messrs. Homan & Rodgers, and the concrete paving and stairs were provided and fixed by Messrs. Wilkins, of Newcastle.

**A Military Memorial.**—A large memorial tablet in memory of the officers who have fallen in battle while serving with the 22nd Regiment has just been placed in the south transept of Chester Cathedral. The tablet occupies the whole of the space from the floor line to the string course, and is executed in "opus sectile." The work was designed and executed by Messrs. Heaton, Butler, & Bayne, under the supervision of the architect, Mr. A. W. Blomfield.

**Hyde Park Mansions.**—With regard to the block of residential flats illustrated in the *Builder* for the 17th inst., Messrs. W. H. Lindsay & Co., of South Wharf, Paddington, ask us to state that they executed the whole of the iron-work.

**Robert Boyle & Son (Limited).**—We received the prospectus of this company, is being formed to take over, and appears to greatly extend, the well-known and established business hitherto carried on in London and Glasgow by the firm of Robert Boyle & Son, ventilating engineers. Mr. Robert Boyle retains a large interest in the company, and continues the active management and direction of the concern during the next five years, the capacity of managing director. As will be said by the prospectus, which is printed in the back page of this week's *Builder*, it is proposed that the new company shall extend operations not only as ventilating engineers, but as heating and sanitary engineers, branches of work which, it need not be said, are all more or less intimately related to and dependent upon each other. Messrs. Boyle & Son have achieved success as ventilating engineers, their Patent "pump Ventilator" and other appliances having been very largely used; and the company, with an extended field of operation before it, seems very likely to carry on and increase the success over a wider area of usefulness. In addition to its use in buildings, churches, dwelling-houses, and factories, Messrs. Boyle's system of ventilation has been extensively used of late years on board, and in this connexion we see that J. Reed is to be associated with the company as Consulting Naval Engineer. Our own country has from time to time borne testimony to the wide use of Messrs. Boyle & Son's appliances, and we have chronicled the many high awards which they have received in various exhibitions. From figures which have been placed before us there appear to be excellent prospects as to the commercial success of the company.

**Burrowbridge.**—A report has recently made by Mr. J. H. Spencer, architect, Taunton, respecting the church in the village of Burrowbridge (near Bridgwater). It is built by the late Mr. Carver, about forty years ago. Mr. Spencer states that it is substantial, but that the appearance of the interior is cold and displeasing, the chancel arch especially being poor and ill-proportioned. Amongst the alterations suggested are the insertion of a new west window of Early English style, the enlargement of the chancel by erection of suitable arches, the re-lining of the walls with coloured brick, arranged in various patterns, new pews, reredos, and pulpit. The report was read at a recent vestry meeting, and resolutions were carried approving of the same, and a committee was formed with a view to collecting funds. The amount required is £1,000.

**A Revised Award at the Invention Exhibition.**—Messrs. J. Defries & Son, Hounditch, who were a few months ago awarded a silver medal for their safety lamp for the use of mineral oils as illuminants, domestic and other purposes, feeling dissatisfied with the award, brought the matter before the Jury Commission, who have, by their secret written to Messrs. Defries to say that, after careful consideration of the circumstances, the Commission have decided that the award is to Messrs. Defries should be raised from a silver to gold.

**Eastbourne Sanatorium Competition.**—We are informed that at the council meeting of the 26th inst., it was decided that the design having as motto "Compliance" be accepted. The successful competitor is Mr. Alfred Oakden, of Eastbourne. The accommodation provided is for forty beds, and the estimated cost is 5,500l.

**Horsforth, Leeds.**—Messrs. Powell Brothers of Leeds, have just filled one of the windows at the west end of the Wesleyan Chapel with stained glass by way of memorial to the late Mrs. Sackett, of Horsforth.

## PRICES CURRENT OF MATERIALS.

|                   |               | £. | s. | d. | ¢. |
|-------------------|---------------|----|----|----|----|
| TIMBER.           |               |    |    |    |    |
| Greenheart, B.G.  | .....ton      | 6  | 10 | 0  | 7  |
| Teak, E.I.        | .....do       | 12 | 10 | 0  | 15 |
| Sequoia, U.S.     | .....ft. cube | 0  | 2  | 6  | 0  |
| Ash, Canada       | .....do       | 3  | 0  | 0  | 6  |
| Birch             | .....do       | 3  | 0  | 0  | 4  |
| Elm               | .....do       | 3  | 10 | 0  | 6  |
| Fir, Dantzic, &c. | .....do       | 1  | 13 | 0  | 6  |
| Oak               | .....do       | 3  | 0  | 0  | 6  |
| Canada            | .....do       | 3  | 0  | 0  | 7  |
| Pine              | .....red      | 3  | 0  | 0  | 4  |
| .....yellow       | .....do       | 3  | 15 | 0  | 6  |
| Lath, Dantzic     | .....fathom   | 6  | 0  | 0  | 0  |
| St. Petersburg    | .....do       | 6  | 0  | 0  | 0  |
| Wainscot, Eiga    | .....log      | 3  | 0  | 0  | 4  |



| TIMBER (continued).               |           | £. s. d.  | £. s. d. |
|-----------------------------------|-----------|-----------|----------|
| Finland, 2nd and 1st...std. 100   | 8 0 0     | 9 0 0     |          |
| 4th and 3rd .....                 | 8 10 0    | 7 10 0    |          |
| 1st .....                         | 7 0 0     | 8 10 0    |          |
| Petersburg, 1st yel. ....         | 10 0 0    | 17 0 0    |          |
| 2nd .....                         | 8 0 0     | 9 15 0    |          |
| white .....                       | 8 10 0    | 11 0 0    |          |
| wooden .....                      | 7 0 0     | 17 0 0    |          |
| White Sea .....                   | 8 10 0    | 19 0 0    |          |
| Canada, Pine 1st .....            | 18 0 0    | 32 10 0   |          |
| 2nd .....                         | 12 0 0    | 18 0 0    |          |
| 3rd .....                         | 9 0 0     | 10 10 0   |          |
| Spruce 1st .....                  | 9 0 0     | 12 0 0    |          |
| 3rd and 2nd .....                 | 8 10 0    | 8 0 0     |          |
| low Brunswick, &c. ....           | 5 0 0     | 7 10 0    |          |
| teins, all kinds .....            | 4 0 0     | 13 0 0    |          |
| Preserving Boards, sq. 1 in.—Pre- | 0 9 0     | 0 13 0    |          |
| pared, first .....                | 0 7 0     | 0 8 0     |          |
| other qualities .....             | 0 5 0     | 0 7 0     |          |
| ar, Cuba .....                    | 0 0 3 1/2 | 0 0 4     |          |
| onduras, &c. ....                 | 0 0 3     | 0 0 4     |          |
| ustralia .....                    | 0 0 3     | 0 0 3 1/2 |          |
| ogogay, Cuba .....                | 0 0 5     | 0 0 7 1/2 |          |
| nt, Domingo cargo av. ....        | 0 0 3 1/2 | 0 0 7 1/2 |          |
| erican .....                      | 0 0 4     | 0 0 5     |          |
| chance cargo av. ....             | 0 0 4     | 0 0 5     |          |
| onduras cargo av. ....            | 0 0 4 1/2 | 0 0 6 1/2 |          |
| le, Rio .....                     | 7 0 0     | 17 0 0    |          |
| alia .....                        | 0 10 0    | 18 0 0    |          |
| in St. Domingo .....              | 0 0 8     | 0 1 3     |          |
| orto Rico .....                   | 0 0 8     | 0 1 3     |          |
| lut, Italian .....                | 0 0 4     | 0 0 5     |          |

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

| Nature of Work.                                               | By whom required.                          | Premium.              | Designs to be delivered. | Page. |
|---------------------------------------------------------------|--------------------------------------------|-----------------------|--------------------------|-------|
| Public Offices .....                                          | W. Hartlup Imp. Com.                       | 25l.                  | Dec. 1st                 | ii.   |
| Public Offices .....                                          | Streitford Local Board                     | 32l., 20l., and 10l.  | Dec. 5th                 | ii.   |
| Designs, Specifications, and Estimates, for New College ..... | Cent. Univ. College of Wales, Aberystwyth. | 100l., 50l., and 25l. | Not stated               | ii.   |
| Law Courts .....                                              | Birmingham Corporation.                    | Not stated            | do.                      | ii.   |

CONTRACTS.

| Nature of Work, or Materials.                                                    | By whom required.                                    | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page.  |
|----------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------|--------------------------|--------|
| Guernsey Granite and Kentish Flints .....                                        | Acton Local Board .....                              | C. N. Lailay .....                | Nov. 2nd                 | ii.    |
| Quilts, &c., and Walls .....                                                     | Dover Town Council .....                             | Official .....                    | Nov. 3rd                 | ii.    |
| Building, Tar-Paving, &c. ....                                                   | Lewisham Bnd. of Wks. Guards of St. Leonard, .....   | do. ....                          | do.                      | ii.    |
| Building, Dining-hall of Workhouse .....                                         | Shoreditch .....                                     | F. J. Smith .....                 | Nov. 4th                 | ii.    |
| Goods Depot, Broad-street, E.C. ....                                             | Great Northern Ry. Co. Midland Railway Co. ....      | Richard Johnson .....             | Nov. 5th                 | ii.    |
| Building for Horses, &c., St. Pancras .....                                      | Royal Arsenal, Woolwich .....                        | A. A. Langley .....               | Nov. 6th                 | ii.    |
| Building .....                                                                   | Horseley Local Board .....                           | Official .....                    | Nov. 7th                 | xviii. |
| Building-up Streets .....                                                        | Wandsworth Bd. of Wks. Southampton Corporation ..... | T. De Courcy Meade .....          | Nov. 8th                 | ii.    |
| Work Cultivat. and Alterations to Reservoir for Paving, Fencing, and Gates ..... | Hendon Local Board .....                             | W. Matthews .....                 | Nov. 10th                | ii.    |
| Materials and Works (Main Drainage, &c.) .....                                   | Met. Board of Works .....                            | Official .....                    | do.                      | ii.    |
| Underground Urinals, &c., Eastcheap .....                                        | Met. Board of Works .....                            | do. ....                          | Nov. 11th                | ii.    |
| Draining, &c., and Walls .....                                                   | Tottenham Local Board .....                          | do. ....                          | Nov. 13th                | ii.    |
| Building and Asphalting Footpaths, &c. ....                                      | Manchester Corporation .....                         | do. ....                          | Nov. 17th                | ii.    |
| duct, Thirlmere .....                                                            | Cheshire Lines Com. ....                             | do. ....                          | do.                      | xviii. |
| Materials and Materials .....                                                    | do. ....                                             | G. H. Hill .....                  | do.                      | ii.    |
| ices and Chambers .....                                                          | do. ....                                             | Official .....                    | Nov. 26th                | xviii. |
| ached Residences, Brentwood .....                                                | do. ....                                             | E. A. Robinson .....              | Dec. 5th                 | ii.    |
| ation & Son, and Works .....                                                     | W. Franklin .....                                    | Nixon & Raven .....               | Not stated               | xviii. |
| do. ....                                                                         | do. ....                                             | Haltridge & Cubitt .....          | do.                      | xviii. |
| do. ....                                                                         | do. ....                                             | do. ....                          | do.                      | xviii. |

PUBLIC APPOINTMENTS.

| Nature of Appointment.            | By whom Advertised.  | Salary.                | Applications to be in. | Page. |
|-----------------------------------|----------------------|------------------------|------------------------|-------|
| Mayor's Temporary Assistant ..... | Chelsea Vestry ..... | 2l. 2s. per week ..... | Nov. 3rd               | xvi.  |

TENDERS.

|                                                                                                                                                                                                              |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| BRIGHTON.—For building additional premises to St. John's, Brighton, Western-road, Hove, for the Brighton & Hove Co-operative Supply Association. Messrs. T. W. A. & B. Field .....                           | £9,137 0 0 |
| G. R. Lockyer .....                                                                                                                                                                                          | 7,981 0 0  |
| Chesman & Co. ....                                                                                                                                                                                           | 7,603 0 0  |
| W. Rickman .....                                                                                                                                                                                             | 7,600 0 0  |
| G. Howard .....                                                                                                                                                                                              | 7,108 0 0  |
| J. Barnes .....                                                                                                                                                                                              | 6,950 0 0  |
| CAMBRIDGE.—For proposed new wing to St. John's, Cambridge. Mr. F. C. Penrose, architect, 1, Upper House, St. Paul's, London. Quantities by Messrs. J. E. Goodchild & Son, Finsbury-pavement, London, E.C.4.— |            |
| Thompson, Chesterborough .....                                                                                                                                                                               | £9,405 0 0 |
| Robinson, Chesterfield .....                                                                                                                                                                                 | 9,024 0 0  |
| Loveday .....                                                                                                                                                                                                | 8,763 13 0 |
| Shidell, Cambridge .....                                                                                                                                                                                     | 8,560 0 0  |
| John Bentley, Waltham Abbey .....                                                                                                                                                                            | 8,310 0 0  |
| Horseman .....                                                                                                                                                                                               | 8,274 0 0  |
| John Parnell & Son, Rugby .....                                                                                                                                                                              | 8,187 0 0  |
| William Bell & Sons, Cambridge .....                                                                                                                                                                         | 7,967 0 0  |
| Thos. Wootton Smith & Son, London .....                                                                                                                                                                      | 7,900 0 0  |

\* Accepted.

| METALS (continued).            |           | £. s. d.  | £. s. d. |
|--------------------------------|-----------|-----------|----------|
| COPPER—                        |           |           |          |
| British, cks. and ingots ..... | 43 10 0   | 44 10 0   |          |
| Best selected .....            | 44 0 0    | 46 0 0    |          |
| Sheets, strong .....           | 63 0 0    | 0 0 0     |          |
| India .....                    | 0 0 0     | 0 0 0     |          |
| Australian, fine cast .....    | 0 0 0     | 0 0 0     |          |
| Chili, bars .....              | 39 15 0   | 40 2 6    |          |
| YELLOW METAL .....             | 0 0 4 1/2 | 0 0 4 1/2 |          |
| LEAD—Pig, Spanish .....        | 11 2 6    | 0 0 0     |          |
| English, com. brands .....     | 11 10 0   | 0 0 0     |          |
| SPRUE—                         |           |           |          |
| Silesian, special .....        | 14 5 0    | 14 7 8    |          |
| Ordinary brands .....          | 14 0 0    | 14 5 0    |          |
| TIN—                           |           |           |          |
| Straits .....                  | 90 15 0   | 91 5 0    |          |
| Australian .....               | 91 0 0    | 91 10 0   |          |
| English ingots .....           | 93 0 0    | 0 0 0     |          |
| TINPLATES—                     |           |           |          |
| IC cokes .....                 | 0 15 8    | 0 17 0    |          |
| IX ditto .....                 | 1 1 8     | 1 5 0     |          |
| IC charcoal .....              | 0 17 8    | 1 0 0     |          |
| IX ditto .....                 | 1 8 0     | 1 7 0     |          |
| OILS.                          |           |           |          |
| Linseed .....                  | 23 5 0    | 23 15 0   |          |
| Cocunut, Ceylon .....          | 31 0 0    | 31 10 0   |          |
| Ceylon .....                   | 27 15 0   | 28 0 0    |          |
| Copra .....                    | 26 10 0   | 0 0 0     |          |
| Palm, Lagos .....              | 20 10 0   | 30 0 0    |          |
| Palm, Ceylon .....             | 26 10 0   | 0 0 0     |          |
| Rapeseed, English pale .....   | 23 5 0    | 0 0 0     |          |
| do. brown .....                | 23 6 0    | 0 0 0     |          |
| Cottseed, refined .....        | 20 15 0   | 22 10 0   |          |
| Tallow and Oleine .....        | 25 0 0    | 45 0 0    |          |
| Lubricating, U.S. .....        | 7 0 0     | 10 0 0    |          |
| do. Refined .....              | 8 0 0     | 15 0 0    |          |
| TECHNICAL—                     |           |           |          |
| American, in cks. ....         | 1 6 6     | 1 6 6     |          |
| Tar—Stockholm .....            | 0 19 8    | 1 0 0     |          |
| Archangel .....                | 0 11 6    | 0 12 0    |          |

CARLTON (Notts.).—For draining, metalling, and kerbing in the forming of paths and roads at the new Cemetery, Carlton, near Nottingham. Mr. Robt. W. Clarke, architect, Nottingham:—  
John Smith, Belgrave, Leicester .. £1,088 7 7 1/2  
W. E. Hopkin, Sutton-in-Ashfield .. 947 0 0  
H. Vickers, Nottingham .. 8 0 0  
Foster & Barry, Nottingham .. 850 0 0  
J. A. Dawson, Lincoln .. 788 10 0  
W. Gordon, Burton Joyce .. 708 16 10  
T. Wilson, East Markham (accepted) \* 653 0 0  
\* John Shortland & Co., Nottingham. 623 7 8  
\* Mr. Wilson has the contracts for the chapel, lodge, and boundary-wall in hand.

DALSTON.—For alterations, &c., at the Duke of Richmond public-house, Queen's-road, Dalston. Mr. R. A. Lowcock, architect:—  
R. Marr .. £293 0 0  
J. Anley .. 285 0 0  
W. Shurmer .. 279 0 0  
E. Hayworth .. 274 0 0  
Jackson & Todd .. 257 0 0  
W. Pringle .. 245 0 0  
Steel Bros. .... 230 0 0

DORSBT.—For sanitary work in connection with new wing to Chalmington House. Mr. Mark H. Judge, architect and surveyor:—  
Conway (accepted) .. £132 4 0

EALING (Middlesex).—For making-up Hambleton-road, for the Ealing Local Board:—  
Seward .. £247 8 8  
Novell & Robson .. 905 0 0  
Kallet .. 894 0 0  
Bath .. 879 0 0  
Mowlem .. 819 0 0  
Constable .. 799 0 0  
Pizzey (accepted) .. 777 0 0

EASTBOURNE.—For superstructure of a dwelling-house in the Carlisle-road, Eastbourne, for Mr. R. W. Tweddie, Mr. Wm. Kidner, architect, Old Broad-street, London, E.C.4:—  
Luing & Son, London .. £5,561 0 0  
Fawcett, Eastbourne .. 4,981 0 0  
Newman & Hart, Eastbourne .. 4,583 0 0  
Punnett, Tonbridge (accepted) .. 4,569 0 0  
Roddie, St. Leonard's-on-Sea .. 4,500 0 0  
Longley, Crawley .. 4,460 0 0

HACKNEY.—For re-building the Tabernacle, Chatsworth-road, Clapton Park, for the Rev. T. Jackson. Messrs. Kerridge & Son, architects:—  
R. W. Spelt .. £1,798 0 0  
Barber, Son, & Lutwyche .. 1,550 0 0  
J. W. Dixon & Co. .... 1,483 0 0  
G. Byrnest .. 1,380 0 0  
J. Jarvis & Hammond .. 1,350 0 0  
W. Shurmer .. 1,278 0 0  
J. W. Wilkinson .. 1,268 0 0  
H. Randa & Son .. 1,225 0 0  
H. Deasley .. 1,239 0 0  
J. Godfrey & Son .. 1,224 0 0  
R. Swan .. 1,214 0 0  
Bennett Bros. .... 1,201 0 0  
H. Winkley .. 1,160 0 0  
J. Garrud .. 1,137 0 0  
F. Challis .. 1,137 0 0

HOLLOWAY.—For additions to No. 5, Northampton Villa, Seven Sisters. Mr. C. W. Lovett, architect:—  
Canning & Mullins .. £1,685 0 0  
W. Shurmer .. 990 0 0  
Stevens Bros. .... 885 0 0  
W. & F. Croaker .. 850 0 0

KENT.—For the erection of new stables and coach-houses, Westcombe Park, Kent, for Mr. W. C. Johnson. Mr. D. Douglas Hayland, architect, Mr. T. Marcus Hayland, surveyor:—  
H. Bridel .. £720 0 0  
H. L. Holloway (accepted) .. 719 0 0  
J. O. Richardson .. 717 0 0

LONDON.—For the erection of new schools in Coburg-road, in the Lambeth Division, for the School Board for London. Mr. Thos. J. Bailey, architect:—  
J. Godfrey & Son .. £14,956 0 0  
Tongue .. 14,340 0 0  
Shepherd .. 14,330 0 0  
J. Shillitoe & Son .. 14,303 0 0  
W. Shurmer .. 14,039 0 0  
F. & F. J. Wood .. 13,773 0 0  
Frestley & Gurney .. 13,500 0 0  
Lathley Bros. .... 13,449 0 0  
J. Grover & Son .. 13,456 0 0  
C. Cox .. 13,287 0 0  
Wall Bros. .... 13,234 0 0  
W. Johnson .. 13,094 0 0  
H. Hart .. 13,072 0 0  
E. C. Howell & Son .. 13,034 0 0  
Kirk & Randall .. 12,948 0 0  
Stimpson & Co. .... 12,998 0 0  
W. & F. Croaker .. 12,963 0 0  
R. J. Gerrard .. 12,920 0 0  
Atherton & Latta .. 12,800 0 0  
J. Holloway .. 12,900 0 0  
W. Downs .. 12,849 0 0  
W. Oldroyd .. 12,660 0 0  
W. Brass & Son .. 12,450 0 0  
C. Wall .. 12,263 0 0  
H. L. Holloway .. 12,163 0 0

LONDON.—For building a new brick sewer and repairing old sewers, for the Holborn District Board of Works:—  
Williamson .. £2,920 0 0  
Stubbs .. 2,469 0 0  
Walker .. 2,339 0 0  
Turner .. 2,223 0 0  
Pizzey .. 2,198 0 0  
Mowlem .. 2,150 0 0  
Killingback (accepted) .. 1,900 0 0

LONDON.—For sundry additions to brewing plant, at the Lion Brewery, Broad-street, Golden-square, for Messrs. Huggins & Co., to the distillery under the superintendence of Messrs. Scamell & Colyer, civil engineers, 18, Great George-street, Westminster:—  
R. Moreland & Sons, London .. £2,330 0 0  
Thornwell & Warham, Burton-on-Trent (accepted) .. 1,557 0 0

LONDON.—For enlargement of Wesleyan Mission premises, Cable-street, St. George's-in-the-East. Mr. F. Boreham, architect:—  
 L. H. & R. Roberts ..... £1,398 0 0  
 J. D. Hobson ..... 1,394 15 0  
 J. Grover & Son ..... 1,297 0 0  
 Harris & Wardrop ..... 1,295 0 0  
 G. S. Williams & Co. .... 1,293 0 0  
 J. Holloway ..... 1,190 0 0  
 J. Allen & Son (accepted) .. 1,068 0 0

LONDON.—For alterations, &c., at the Tramway Terminals Inn, No. 9, Blackfriars-road, for Mr. J. Muncy. Mr. E. H. Burrell, architect:—  
 Esqually ..... £583 14 0  
 W. Downs ..... 649 0 0  
 Holloway Bros. (accepted) .. 642 0 0

LONDON.—For sanitary improvements, including new drains in concrete, at 23, Sussex-gardens, Hyde Park, W., for Mrs. Gillespie. Mr. Mark H. Judge, architect and surveyor:—  
 Andrews (accepted) ..... £110 5 0

MARYLEBONE.—For enlargement of schools, Barrett-street, Marylebone, for the School Board for London. Mr. T. J. Bailey, architect:—

F. & F. J. Wood ..... £2,589 0 0  
 F. Sargeant ..... 2,274 0 0  
 S. Pritchard ..... 2,233 0 0  
 Macey & Son ..... 2,231 0 0  
 Godfrey & Son ..... 2,189 0 0  
 Atherton & Latta ..... 2,189 0 0  
 E. C. Howell & Son ..... 2,108 0 0  
 J. Manley ..... 2,083 0 0  
 Wm. Brass & Son ..... 2,064 0 0  
 S. J. Jerrard ..... 1,998 0 0  
 Williams & Son ..... 1,994 0 0  
 J. Grover & Son ..... 1,984 0 0  
 T. Oldrey ..... 1,983 0 0  
 E. L. Holloway ..... 1,891 0 0  
 W. Shurmer ..... 1,869 0 0  
 Priestley & Gurney ..... 1,945 0 0  
 Wall Bros. .... 1,915 0 0  
 Lathley Bros. .... 1,886 0 0  
 Stimpson & Co. .... 1,883 0 0  
 J. Holloway ..... 1,805 0 0  
 C. Wall ..... 1,768 0 0

MOULSOE (Bucks).—For the addition of a new classroom and repairs to the National Schools, for the Right Hon. Lord Carrington. Mr. J. Carter Jonas, surveyor, Cambridge:—  
 Samuel Poeter, Bedford (accepted) ..... £197 10 0

NOTTINGHAM.—For the erection of cricket pavilion, Nottingham, for the County Club. Mr. H. M. Townsend, architect, Peterborough. Quantities by Mr. H. Lovegrove:—

G. Bell & Son, Nottingham ..... £5,117 0 0  
 C. Baines, Newark ..... 4,820 0 0  
 E. Hind, Nottingham ..... 4,802 0 0  
 Dennett & Ingle, Nottingham ..... 4,741 0 0  
 H. Vickers, Nottingham ..... 4,662 0 0  
 J. J. Adams, Nottingham ..... 4,638 0 0  
 T. Fish & Son, Nottingham ..... 4,638 0 0  
 \* Accepted.

OLD FORD.—For alterations and other works proposed to be done at the John Bull public-house, Roman-road, Old Ford, E. Mr. R. H. Lewcock, architect:—  
 Mover ..... £1,120 0 0  
 Shurmer ..... 1,089 0 0  
 Jackson & Todd ..... 1,040 0 0  
 Spencer & Co. .... 1,449 0 0  
 Walker ..... 993 0 0  
 Roome ..... 968 0 0  
 Pringle ..... 960 0 0  
 Russell ..... 970 0 0

RYDE (I.W.).—For dwelling-house at Springvale, near Ryde, I.W., for Mr. H. Dodsworth. Mr. Stephen Salter, jun., architect, Union-street, Ryde:—  
 James & Wheeler ..... £285 10 0  
 Smith & Son ..... 820 0 0  
 James Cook ..... 764 15 0  
 Isaac Barton, Ryde (accepted) .. 747 0 0

STOKE NEWINGTON.—For alterations at the Marquis of Lansdowne, Stoke Newington-road. Mr. R. A. Lewcock, architect:—  
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 S. Goodall ..... 1,531 0 0  
 W. Shurmer ..... 1,498 0 0  
 Steel Bros. .... 1,435 0 0  
 Jackson & Todd ..... 1,369 0 0  
 R. Burton ..... 1,340 0 0

STOKE NEWINGTON.—For pulling down the Caledonian public-house, Stoke Newington-road, and erecting five shops on site. Mr. J. J. Stiles, architect:—  
 W. Good ..... £4,306 0 0  
 Steel Bros. .... 4,135 0 0  
 W. Shurmer ..... 3,879 0 0  
 S. Goodall ..... 3,814 0 0  
 G. Mower ..... 3,679 0 0

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 Newman ..... 685 0 0  
 Smith ..... 615 0 0  
 Pizzev ..... 578 0 0  
 R. Neal (accepted) ..... 473 0 0  
 Etherell ..... 469 0 0

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 Alcorn & Sons (accepted) ..... £170 0 0

WOODFORD (Essex).—For erecting house, Tavistock-road, Woodford. Mr. B. High, architect:—  
 W. Shurmer ..... £1,148 0 0  
 J. Hack ..... 1,134 0 0  
 M. Wells ..... 1,027 0 0

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# The Builder.

Vol. XLIX. No 221.

SATURDAY, NOVEMBER 7, 1886.

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### The Thirlmere Scheme.

HE tenders for the first part of this great undertaking are to be sent in to the Chairman of the Manchester Waterworks Committee upon the 17th inst. Specifications and quantities have been prepared for some time past. A contract which it is intended to carry out will consist of about 5½ miles of tunnelling and 1½ mile of open cutting, with necessary masonry and other work connected with the aqueduct. We intend giving a sketch of the whole of the proposed new works, briefly stipulating, in the first place, the reasons which led up to the adoption of this scheme in preference to any other, referring, as a preliminary, to the existing and previous means of supply of water to Manchester, and following up by a statement of the extent to which the part of the Lake District is likely to be benefited by the alterations which are now about to be carried out.

The first scheme for obtaining water for the Manchester and Salford Water Company, which was laid out in 1844, proposed to take water from the tributaries of both the Tame and the Etherow; but the mill-owners interested in the scheme were so exacting, the compensation for them in water being fixed at a higher rate than the promoters thought reasonable, that the Bill was abandoned.

An endeavour was made to obtain additional water from the new red sandstone at Gorton, which purpose a shaft was sunk by Mr. Benson, the late Engineer of the Chelsea Waterworks, and, at that time, the Engineer of the Manchester and Salford Water Company. The point selected being very favourably situated, it was hoped that a yield of at least 3,000,000 gallons per day would be obtained, but it never reached 1,000,000 gallons, and the ultimate regular yield was less than 700,000 gallons per day, although a pumping engine of 160 horse-power had been tried.

The Lancashire waterworks scheme was next mooted, the object of which was to supply Gorton, Salford, and Manchester from the neighbourhood of Bolton; but this was successfully opposed by the Manchester Corporation, which decided to purchase the existing company and bring in a Bill themselves. Now, it may be remarked, has since carried out the proposal of the Lancashire Waterworks Company so far as it referred to itself. Mr. F. Bateman, who was consulted by the

corporation, advised that the Tame should be abandoned and the Etherow, in the valley of Longdendale, wholly resorted to. The Act, however, was violently opposed by mill-owners; but an arrangement was ultimately come to with them, and the works were commenced late in 1848. Although the first drop of water from this district was brought into the city in 1850, the works were not finally completed till 1877. The construction of the five great reservoirs in Longdendale gave considerable trouble, owing to the dislocated character of the district, and the unretentive nature of the ground into which the puddle trenches of the reservoirs had to be sunk. Mr. Bateman has since somewhere remarked, referring to this difficulty, that "such embankments require knowledge and experience in their construction, and may easily become dangerous in the hands of unskilful persons." After the completion of the works, it was found that the gross quantity of water available for Manchester was 25,000,000 gallons per day. This was not the realisation of the original expectations, a result which was partly to be accounted for by the fact that districts from which additional water might have been collected had, in the meantime, been taken up by Stockport, Glossop, Oldham, Ashton, and Staleybridge. Since the commencement of the works, the consumption had gone on increasing to such an extent that it was necessary on their completion to consider the question of obtaining an increased supply. The few spots in the Pennine-hills capable of yielding water, and which were not already taken up, were in immediate requisition for adjacent towns; and, had this not been the case, they were not sufficient for the demands of Manchester and the places dependent upon it for water. These places, some thirty-seven in number, have an aggregate population of upwards of 1,000,000 persons, who are, for the most part, people carrying on business in the city and living beyond its precincts, and who must, therefore, be regarded as its inhabitants. In this connection, it will be interesting to refer to the rate of increase observed during five recent years in the consumption of water for domestic and trade purposes beyond the city in comparison with that which took place within the municipality. In the case of domestic consumption it was found to be 38·3 per cent., and in that used for trade purposes 24·8 per cent. of a higher rate beyond the boundary than that recorded within, which is a sufficient reply to any objection which might be made to the claims raised above. The rate of consumption in past years indicates that calculations as to future demands ought not to be made at less than 30 gallons per head per day upon the gross population to be supplied. In ten years

the demand for Manchester and its immediate neighbourhood will probably reach 39,000,000 gallons per day; and in twenty years 50,000,000 gallons per day, and this is 25,000,000 gallons more than the present means of supply will yield. This large quantity cannot be obtained at a nearer point than the Lake district, and if it has to be brought so far, there is no more convincing argument why, once and for all, at least so far as the present generation is concerned, the future should not be anticipated in a sufficiently large spirit.

In 1874 Mr. Bateman was consulted by the Liverpool Water Committee about the extension of their supply. After going carefully into all the various suggestions of other engineers regarding the matter, he concluded by recommending Ulleswater and Haweswater, the scheme to be carried out as a joint undertaking with Manchester. He argued that eighty million gallons could be brought three-fourths of the way, and then forty millions branched off to Manchester, and the other forty million gallons taken on to Liverpool, so that it would only be a joint project for about three-fourths of the whole distance. This scheme was specially put forward on account of the purity of the water, the inexhaustible supply, and, particularly, as one which would not affect districts which properly belonged to towns whose funds would not allow of a large undertaking in obtaining a supply of water. If the Longdendale supply had reached its limit, here, at least, was one which might reasonably be considered limitless. But Liverpool refused to have anything to do with a joint affair. She was afraid that "the carrying out of a scheme in conjunction with Manchester might involve complicated arrangements." The immediate and pressing question for Manchester became, therefore, where, going independently, it could obtain in the best and cheapest way the necessary water. Mr. Grave, the chairman of the Water Committee, who resided in the Lake district, suggested Thirlmere. Mr. Bateman had already come to the conclusion that there was only one source from which a constant supply of good and wholesome water could be procured and depended upon. He represented the advisability in circumstances where it was proposed to incur a large outlay in bringing water a great distance, of providing for at least a supply of forty million gallons per day, and in that way anticipating the demands of the future, and not entertaining ideas of ultimate enlargement or additions, the latter being always very expensive. The proposal to go to Ulleswater and Haweswater, the other two possible sources from which a supply to Manchester and Liverpool could be obtained, in the event of a joint scheme being entertained, he now discarded in favour of Thirlmere,



which, he argued, was the best in every way to satisfy the requirements of Manchester. The elevation of each of the three lakes in question is as follows:—

|                                        |     |
|----------------------------------------|-----|
| Haweswater, 695 ft. above Ordn. datum. |     |
| Thirlmere 533                          | " " |
| Ulleswater 477                         | " " |

Any one of these is high enough to supply water to Manchester by gravitation. Thirlmere, at little more than the same distance, and being 56 ft. higher than Ulleswater, had various other advantages to recommend it. The heaviest rainfall in the kingdom takes place at Thirlmere, a great bulk of the water flowing away in floods uselessly to the sea. There is sufficient for the wants of the district itself, and as much as Manchester, its neighbourhood, and the vicinity of the aqueduct are ever likely to require. The level of the lake can be raised to any desired height, with very little or no damage to existing property. In the case of Ulleswater being adopted, a tunnel,  $8\frac{1}{2}$  miles long, and in one place, at Kirlstone Pass, 1,000 ft. below the surface of the ground, would be required; whereas from Thirlmere its greatest depth would only be 270 ft. at Dunmail Raise, and the greatest length of tunnel would be between two and three miles. Another point to be noticed is the fact that the same quantity of water can be conveyed to Manchester for about 370,000l. less from Thirlmere than from Ulleswater. The other objections to Ulleswater may be stated briefly. The residential injury would have been considerable; but a greater one was the existence of the Glenridding lead workings, at the head of the lake, which would have given rise to some rather inconvenient popular prejudice. Thirlmere was therefore adopted, and the scheme is now about to be carried out.

The first part of the work towards Manchester will be a tunnel of nearly three miles in length, and 270 ft. below the surface. The aqueduct to be constructed will be large enough to convey 50,000,000 gallons per day. It was found that Thirlmere, with the addition of Mill Gill and Shoulthwaite Beck, would yield this quantity. It is intended to take advantage of the higher level of Thirlmere, and distribute the fall equally over the whole line of aqueduct to Manchester. This greater fall per mile will lessen the cost of the works upon the original proposal some 200,000l., as it was then intended to construct the aqueduct at a sufficiently low level to allow Ulleswater to afford at some future time a further supply; but in consequence of the adoption of the above proposal this suggestion has been abandoned as being unnecessary.

There will be no conspicuous indication of the point at which the water is drawn from the lake, further than a cottage; none, at least, which an ordinary pedestrian would recognise. This assurance will no doubt gratify the popular mind, which is too apt to associate the name "waterworks" with a factory-looking pumping station having a high chimney, the sight of which is, to the lover of nature, one more indication of the vulgarising tendency of the present age. On leaving the tunnel, the aqueduct will issue in the valley leading to Grasmere, keeping the high land above Rydal and Windermere, passing under Chapel-green, Nab-Scar, and Skelgill Wood, being cut out of the solid ground where not tunnelled. In this latter case, after two or three years, it will be hard to discover where the ground has been disturbed. Crossing Troutbeck by a system of inverted iron syphon pipes, covered over with earth, it will be taken behind the residences of Hole Hird, St. Catherine's, and Elleray, by a tunnel, passing Windermere railway station, about two miles to the east. The valleys of the Kent, the Lunne, the Ribble, and others, will be crossed by inverted syphon pipes, the rivers being passed over by bridges. When it reaches the neighbourhood of Bolton, the water will be conveyed in cast-iron pipes, mainly along public roads, to the existing service reservoirs of the Manchester Corporation, and then distributed to the inhabitants. There will be nearly thirty-three miles of 40 in. cast-iron syphon pipes, nine miles of

36-in. piping, and, besides these, about eighteen miles of 33-in. size. Before leaving this point, we ought to call attention for a moment to the important amendment upon the Bill, which was carried in the House of Commons, providing that upon certain conditions, all places in the neighbourhood of the aqueduct, requiring water, are to be supplied.

At Thirlmere the rainfall is fifty per cent. greater than at Ulleswater or Windermere. The corporation have purchased nearly all the land forming the drainage area of the lake, along with the manorial rights, so that no mineral workings can be carried on by private parties within that area. The lake is divided into two, an upper and a lower, the latter of which is not known to the ordinary tourist. The narrow stream connecting them passes through a rocky ravine, which is lined with dense masses of woodland. There is no road to the point where this stream leaves the upper lake. It is difficult of access. This spot has been selected for the erection of an embankment which will raise the surface of the lake 50 ft. 9½ in. The sheet of water is narrow now, but it will be wide and magnificent then. The present surface area of the lake is 328½ acres; when raised, it will be 793 acres. In the event of no rain falling for 157 days, the lake would only, at the end of that time, be brought down to its present level, supposing that the whole 50,000,000 gallons per day were being constantly drawn away. The beauty of the lake will be increased beyond conception by this enlargement of its area. As the ground there consists for the most part of gravel and detritus from the hills, a fresh beach will be formed of unrivalled beauty. The drainage area of Mill Gill and Shoulthwaite Beck taken together is nearly equal to half that of the lake itself, which is 7,400 acres, the total available area for drainage purposes being 10,920 acres, or about 17 square miles. At 80 in. of rain, collected in a dry year, the yield, subtracting compensation, would be upwards of 49,000,000 gallons per day.

The Corporation of Manchester has been generous in its consideration of the interest of the tourist. The hilly road on the western side of the lake is at present quite inaccessible to carriages, and is rarely even travelled by pedestrians. It is intended to substitute a good carriage-road, following the sinuosities of the hills, which will communicate with the existing roads at each end. This will afford the tourist an opportunity of seeing the more beautiful Lower Lake for almost the first time. A drive will be formed all round the lake, which, when completed, will no doubt become a new, and not the least interesting, feature of a stay at Keswick. Nearly nine miles of roadway will thus be formed, costing something like 39,000l. When the works are carried out in their entirety they will have cost the Manchester Corporation a sum, it is estimated, of not less than three and a half millions sterling.

#### THE STRENGTH OF MATERIALS.

THE conception of an architect's qualifications, as formed by Vitruvius, differs widely from that which has generally been held in this country up to a very recent period. Probably the sketch drawn by the old Roman writer in the first chapter of his first book on Architecture was a fancy one, and no one could have been found at that time to come up to the ideal character, for the ideal was a high one. But it showed a much truer conception of the requirements which an architect ought to possess than is often formed in the nineteenth century. It is true that in the last few years it has begun to be felt by some of those who have the interests of the profession most at heart, that it is desirable for an architect to have a fair general education to start with; and that, if this is supplemented by a certain amount of technical instruction in matters intimately associated with his practical work, he will be all the better for it. But when efforts are made to bring the means of attaining this technical education within the

reach of all students, the practical difficulties are enormous. The Architectural Association has done excellent work in this direction, and will probably do much more, and the Institute, we hope, take firmly in hand the question of architectural education, and endeavour to overcome the passive opposition which appears to exist in many quarters to the efforts which are being made to take away the reputation which undoubtedly clings to this country in this matter. It cannot be too often insisted upon that though an architect ought to be a draughtsman, a draughtsman is not necessarily an architect, and that the scientific side of profession ought not to be neglected. It is inevitable that without a good scientific knowledge of construction, there must be a large amount of mere guesswork in working out the simplest design. The responsibility for the state of things does not lie with the students and assistants, who are like sheep without a shepherd. How shall they learn except the taught? And we earnestly hope that by long a comprehensive scheme of architectural education will be founded on a firm basis, the combined efforts of the Institute and Association.

We have been led to these remarks by publication in America of a new work on strength and stability of structures.\*

This is a subject that has been too long supposed to belong exclusively to engineers, but it really concerns the architect most intimately. There are several treatises on the subject in existence, the principal one of which is that of Rankine, while Moseley, Box, and lately Cotterill, have all published works of more or less importance. The great difficulty in the way of these works being of any use to architectural students is that they are too mathematical, and the greater part of reasoning would be unintelligible to the great number of architects. We think it a matter for regret that this should be the case, as we believe that many would-be students, deterred from studying the scientific principles of construction by the feeling that they soon be stranded among the hopeless difficulties of the higher mathematics. The fundamental conceptions which form the basis of all theories into strength and stability should, however, without any doubt, be familiar to all students, and we should heartily welcome a text-book which should attempt to treat the subject in a manner more likely to be "understood of the people," and on the assumption of less mathematical knowledge on the part of the readers. Although the work under consideration does not proceed on these lines, it is a very important contribution to the literature of Applied Mechanics. Every one knows the great difficulty of enunciating clear and accurate definitions; the author has endeavoured to improve on the previous definitions of *force*,—upon a conception of which everything depends. He cannot think that he has been altogether successful in this attempt: *force*, according to Mr. Lanza, "is a tendency to change the relative motion of the two bodies between which tendency exists," and although this definition differs very slightly from Rankine's, *force* is "an action between two bodies causing or tending to cause change in their relative rest or motion," we think the latter the clearer of the two. Velocity, momentum, and other terms are clearly explained, and the propositions concerning the parallelogram, the triangle, and the polygon forces, are clearly enunciated and proved the examples given for working out are practical. The chapter on roof trusses is so excellent, and of the greatest importance to students, as not only is an explanation of Clerk Maxwell's system of diagrams for the purpose of graphically delineating the stresses in the different parts of a truss, but a number of stress diagrams for various forms of roof are given for the student to work out himself. In this connexion a table of the

\* "Applied Mechanics." By Gaetano Lanza, Prof. of Theoretical and Applied Mechanics, Massachusetts Institute of Technology. New York: John Wiley & Sons; London: Tribner.

† This objection does not apply to Professor Cotterill's work, which is the most admirably adapted to its purpose of any that we are acquainted with.



pressure of the wind on roofs of different inclinations is given. The maximum force of wind is here taken at 40 lb. per square foot, as the author remarks, this is too small; in fact, the rule which we ourselves adopt, which will be found to agree very closely with experiment, is the extremely simple one, the maximum pressure of the wind on a roof measured in pounds per square foot is represented by the inclination of the roof to the horizon; thus a roof of 20° inclination has to sustain a pressure of 20 lb. per square foot, one of 45° a pressure of 45 lb., and so on. The necessity of concentrating the load on the joints of a truss in order to avoid cross strains is clearly explained.

The chapter on stresses and strains is very good and lucid, and the student's attention is directed to a fact which is too often lost sight of, viz., the sudden application of a load produces a strain which would be produced by the same load gradually applied. The German engineer Wohler\* conducted numerous experiments in this direction, and he proved convincingly that the variations of load to which material is subjected affect in a marked way its ultimate strength. For instance, a pin of quality of iron, of which the breaking weight was 45,000 lb. per square inch with a constant load, would be broken by a weight of 10,000 lb. per square inch applied at frequent intervals and entirely removed in the meantime. The importance of this fact in the case of roofs which are constantly subjected to various strains through wind pressure must be evident to every one, and yet, as far as we are aware, it has been entirely ignored.

In dealing with the question of the stiffness of beams, nearly all the recorded experiments have been made upon pieces of small sectional area, and Mr. Lanza invariably very strongly on the important fact that a pure assumption to conclude that large beams will behave in precisely the same way as small ones. Moreover, very few experiments have been made upon the combined effect of transverse tension and compression; and the very assumption that a piece will be permanently injured if loaded beyond the "limit of elasticity" is not borne out by recent experiments. With a view to obtain reliable results, an extensive series of tests was carried out by Mr. Lanza's direction during the last few years at the Watertown Arsenal and at the Massachusetts Institute of Technology, the tabulated results are given here and constitute the most important contribution to the subject that has yet appeared, and the results previously relied upon, which were deduced from experiments with pieces of small size, will have to be considerably modified. We can be no doubt at all that for comparison Euler's formula, which has been constantly used in the ordinary text-books, is useless if applied to large and long members. This was shown to be the case some years ago by the experiments of Mr. Baily, described in the Transactions of the Institution of British Architects for 1854, and it is a very curious thing that experiments should have been entirely neglected. It may have been thought that the experiments were too few to draw conclusions upon, but the striking difference between the practical and the theoretical results should have prompted further investigation. These results very closely agree with those obtained by Mr. Lanza in his tests. To the striking difference between the results deduced from the old rules and from those of Mr. Lanza, we have calculated the breaking-weight of a pine post 5 ft. long and square. According to Tredgold's rule this would be 36 tons, whereas Mr. Lanza makes it 10 tons. A precisely similar result was obtained in testing the transverse strength of pine. Full-size beams of spruce, white pine, yellow pine, and oak were tested, and the tabulated results of no less than eighty-three tests are given, and whereas in the

older text-books the modulus of rupture\* arrived at from the tests of small pieces is given on the average as 6,300 lb. for spruce and white pine, 10,800 lb. for oak, and 8,298 lb. for yellow pine; the mean of Mr. Lanza's experiments gives 4,884 lb., 6,075 lb., and 7,292 lb. respectively. For instance, the breaking-weight on the centre of a beam of yellow pine 12 in. by 4 in. and 20 ft. long should be, according to the old formula, 13,248 lb.: it actually broke under a weight of 11,071 lb. It will easily be seen, therefore, that the value of these experiments can scarcely be overrated. A further series of tests were made to ascertain the effect of cutting into timbers for the purpose of framing, and in all cases it was proved that a considerable diminution of strength took place. The whole work is a valuable contribution to the subject of which it treats, and we can cordially recommend it, especially that part of it dealing with the experimental tests,—to all interested in the subject.

# NOTES.

**I**N regard to the temporary failure of the proposal to purchase Parliament Hill as a permanent open space for London, Mr. Shaw-Lefevre has addressed an urgent and able appeal to the *Times* representing the value of the purchase to London, in a health point of view, even at a very large outlay. He observes:—

"The public is entitled to ask whether the Board have had an independent valuation made of the land, and whether they have made any offer, formal or informal, to Lord Mansfield; if their valuation results in a sum very much below 1,000l. per acre, the question would arise, if Lord Mansfield should not be prepared to treat upon such a basis, whether a Bill should be introduced to take the land under compulsory powers of purchase. Without committing myself in any way to an admission that 1,000l. per acre is a reasonable price, I must express the opinion that it should appear, upon a valuation by competent persons, that land thus situated, and in the near approach of London, is worth this sum, large as the amount would seem, it would be well worth while to the metropolis to acquire it. The views from it over London are splendid. Its purchase is equally necessary in order to prevent the practical ruin of Hampstead Heath, which owes much of its charm as an open space to the fact that this adjoining land is unbuilt on."

Whilst entirely sympathising with these views, we cannot but contrast Mr. Shaw-Lefevre's liberal tendencies in regard to this kind of expenditure with his cheese-paring policy in regard to the site of the War and Admiralty Offices. But the English politician is "made so" that he can see the advisability of spending money on purchases for material interests, but when it comes to a question of architectural splendour and dignity, of making a great building worthy of a great nation (if we are still to be allowed to be one), then we get nothing but the *non possumus* of buttoned-up pockets.

**W**E regret to hear that the reported reduction in railway rates, alluded to in our last issue, turns out to be very limited in its effect. A general misunderstanding appears to have prevailed with regard to the scope of the promised concessions, which will really only apply to coke (and possibly pig iron) from certain districts, and not be of general application. This discovery has caused much disappointment, amounting, as a Birmingham correspondent to a contemporary remarks, almost to dismay. We have before pointed out that such relief would be a great boon to the trade of the Midlands, and the supposed realisation of hopes long entertained gave such great satisfaction that it may well be imagined that the disappointment has caused a corresponding depression. Even the concessions still looked upon as likely to be made are not confirmed by the railway companies, some of

which, in fact, are giving their customers notice that they are not making any alterations. It is greatly to be hoped that a similar disappointment does not await the Manchester and Liverpool traders, who are confidently looking for substantial reductions in the rates between those towns in consequence of the success of the Ship Canal Act. There is but little doubt, however, that they will benefit in this direction, and it is stated that the London and North-Western and Lancashire and Yorkshire Railway Companies have already resolved to adopt a revised list of rates which will effect a saving to traders of nearly ten per cent. in freight. In view of these concessions it is not surprising that other canal schemes are being pushed,—notably the one to connect Birmingham, Wolverhampton, &c., with the Bristol Channel ports, by joining, widening, and deepening existing canals. It is stated that freights would thus be reduced by no less than one-half, and this mode of conveyance would doubtless be utilised very extensively for heavy traffic for which immediate delivery is not essential. The North Eastern Railway Company, in reducing the carriage on certain minerals in proportion to the fall in the price of pig-iron, are showing a consideration for the depression from which their customers are suffering, which, if imitated by other lines, might perhaps avert the competition with which they are now threatened.

**W**E have received a circular from the Secretary of the Hartley Institute at Southampton in regard to the satisfactory result of a recent memorial to the Government on the subject of the Geological Survey of Hampshire and the Isle of Wight. On learning that it was not proposed to prepare a six-inch geological map of the county, but merely to survey the drift on the one-inch map, without revising the old one-inch survey of the solid geology, a memorial was prepared by the Town Council of Southampton, and circulated in the county for signature. This memorial was very numerous and influentially signed during last winter, and in February last was forwarded to the Lord President and the Vice-President of Her Majesty's Privy Council. The result has been that it is now determined that a six-inch geological map of Hampshire and the Isle of Wight will be prepared by the Geological Survey, by placing the colours to show the various formations on the present six-inch Ordnance map, and that in surveying the drift beds the solid geology will be revised up to date on the six-inch maps. This is a very satisfactory result of a well-timed interference, due mainly in the first instance to the representations made to the Town Council by the Hartley Institute.

**T**HE Benchers of the Inner Temple have for some time shown a little well-directed energy. They have during the past Long Vacation established a system of electric lighting for the Library of the Society. In place of the oil lamps and candles which used to make the darkness visible, the entire library is now equally, steadily, and comfortably lighted by numerous electric lamps. Should this experiment,—for such, to a certain extent, it is,—prove, as seems in every way probable, a success, it may fairly be expected to give an impetus to electric lighting in similar buildings. The chief clubs of London, the Athenaeum, the Reform, and others, will, in such case, be behind the time if they do not establish it. The space for an engine-house may perhaps cause a difficulty in some cases, but it is hardly ever insuperable. The experiment at the Inner Temple may, therefore, prove a noticeable fact in the history of electric lighting.

**T**HE question has been raised how far a Local Board can fairly go in asking a contractor of public works to draw his labour from the parish in which these works are being constructed, and to the cost of which the householding labourers in that parish contribute as ratepayers. The Acton Local Board is at present proceeding with the construction of its drainage system, and a deputation of labourers of the parish waited on the Board recently,

\* The modulus of rupture is defined as the greatest tension or compression per square inch to which the most strained fibre of a beam is subjected when the beam is just on the point of breaking, and from this the constant number is computed which is given in the text-books. The formula  $W = \frac{C \cdot l \cdot d^2}{L}$  would be written as  $W = \frac{1}{2} \cdot m \cdot \frac{d^2}{L}$  where  $C$  is the modulus of rupture and  $l$  the length of the beam in inches.

"Festigkeits Versuche mit Eisen und Stahl." Berlin, mention has lately been drawn to this by one or two engineers in relation to the effect of intermittent railway viaducts.



and made a somewhat peculiar request. It seems that considerable feeling has been created among the unemployed labourers in the parish, of whom there are, as in most parishes, unfortunately, too many, because the "ganger" or clerk of works has sent the Acton labourers to the "right about" when they came to ask for a job on these drainage works. It is obvious that a contractor is free to draw his labour from the best and cheapest field, and that he would be acting prejudicially to his own interest, if not to that of his employers, if he did not do this, unless, indeed, it be specified in the contract that he has to draw his labour principally, if not entirely, from a certain parish. It is also obvious that such a limitation of the sources of labour would mean inferior labour, because the chance of selection is naturally diminished, and inferior labour means increased cost to the contractor. Therefore, if Local Boards are anxious to give employment to the labourers of their parish on public works which they desire a contractor to carry out, this must be, in fairness, stated in the tender, so that the contractor may give the circumstance due weight in his calculations. In the Acton contract there was no stipulation of the kind indicated, and the Acton Board acted wisely in merely respectfully drawing the attention of the contractor to the claim of preference which, in the matter of employment on these parish works, the Acton labourers who are competent to the work had over those from a distance. The matter has, it is believed, been amicably settled between the Board and the contractors, so that those labourers of that parish who are found able for the work required of them have no reason now to complain.

**T**HE collection of water-colour drawings by Mr. Carl Haag, which has been opened at the Goupil Galleries in Bond-street, forms a remarkable example of that form of art which represents the most brilliant ability without ever rising to the height of genius. As instances of the highest power in handling the materials of water-colour painting it would be difficult to find anything superior to the best of these, both among the studies of Eastern figures which have become so familiar to all *habitués* of our picture galleries, and among the architectural subjects which are equally able in their way. In this sense the collection is a remarkable one for the amount and the quality of the work done, which never seems to fall below the high standard of execution which the artist has acquired. But there is nothing beyond this; nothing that appeals to the imagination. The large and splendidly-finished figure entitled "One of our Ancestors," may be, as it is claimed to be, correct in all its archaeological details of dress, and is, moreover, very powerfully drawn; but it impresses us with no sense of reality as the revival of a figure of a former age; it is a burly fair-haired man dressed out in the requisite "properties," and that is all. Among the views are some very carefully-executed representations of the Acropolis at Athens and its monuments, as well as many of the representations of Eastern architecture with which the artist has made us familiar.

**O**N Saturday, the 31st ult., there took place, at Paris, the annual public meeting of the Académie des Beaux Arts, under the presidency of M. W. Bouguereau, assisted by M. Chas. Garnier, and by M. Le Vicomte Henri Delaborde, the Permanent Secretary. The President paid a tribute of regret to the memory of the Academicians deceased during the year—M. Ballu, M. Du Sommerard, and M. Émile Perrin. He then announced the awards of the "grands prix" for painting, sculpture, architecture, and music respectively. Some interest was excited by the fact that the winners both of the first and second "grands prix" in architecture, M. André and M. Louvet, were both pupils of their fathers, of whom M. André *père* is a member of the Institut, and M. Louvet was one of the jury, the fathers of the two young men having been thus both their instructors and their judges.

After the delivery of the awards, M. Delaborde read a notice on the life and works of Augustus Dumont, the last descendant of a numerous and ancient family of artists, and one of the prominent sculptors of his day in France, author of the figure of the "Genius of Liberty" which surmounts the "Colonne de Juillet." The musical portion of the proceedings comprised an overture by M. Hie, a pensionnaire of the Académie de France at Rome, and a cantata for three personages (Diana, Eudymion, and Pan), by M. Henri Leroux, pupil of M. Massenet.

**T**HE Vicar of Deerhurst, Mr. Butterworth, communicates some interesting particulars to Thursday's *Times* in regard to the old Saxon building embedded in a farm-house at that place (near Tewkesbury), which is attracting many visitors. Mr. Butterworth says,—

"It is now a conclusion tolerably well established that the ancient edifice was formerly a chapel. It consists of two portions, nave and chancel, divided by a chancel-arch of very solid construction, the width between jamb and jamb being 6 ft. 6 in. The extreme exterior length of the chapel is 48 ft., the thickness of the walls being 2 ft. 6 in. There can be little doubt that this chapel, forming now the central portion of a large farm-house, was originally attached to a manor-house belonging to the Abbey of Westminster. The whole building is still called Abbot's Court. The chapel has all the appearance of being of pre-Norman date, and from the massiveness of its construction is calculated, if only it has a fair chance, to last for centuries still.

We are now in the possession of evidence which makes it probable that the exact age of the edifice may be told. Built into a portion of the farmhouse, an inscribed stone has been discovered, which was evidently the dedication slab of the altar of the chapel. Unfortunately, the stone has had its centre cut away and hopelessly destroyed; enough, however, remains of the inscription to prove its real nature and purport. It runs thus,—the letters still preserved are put by me in capitals:—

"IN HONORE SANCTI MARTINI A.D. MDCCCIV. T. E. E. Now, it was ordered by an early English canon, viz., one of those set forth by Archbishop Wulfred at Cealchythe, A.D. 816, that all altars, at their erection, should have attached to them the name of the saint in whose honour they were consecrated. This injunction was obeyed at first, but after a time it became a dead letter; hence the rarity of the survival down to the present day of such inscriptions of dedication."

**A**T the Winter Exhibition at Mr. Wallis's Gallery in Pall Mall one wall is occupied by works of Professor Müller, most of which have appeared in this gallery before, but it is of interest to see so much fine work with so much individuality of style collected together for comparison. Müller might be called, perhaps, a "mannerist," but his manner is so powerful that it perhaps claims the higher standing of a "style." Among the works which are here are the "Arab School," "Mecca Pilgrims," "Egyptian Water-carriers," &c. We do not find the remainder of the Exhibition as interesting as the collections at this gallery usually are, but it contains, of course, some fine work. Heffner's "Reverie of Windsor" (16) is a large landscape, giving Windsor from the aspect of a foreign school of landscape painting; but Heffner is more at home upon his Bavarian plains. Among other works may be named Schloesser's "Food for the Mind and Food for the Body" (49); "The Event of the Day," by the late Everton Saintsbury, a village scene with a good deal of character; and "Le Forgeron" (11), by E. Allan-Schmidt, a small interior of a forge, admirably painted, and a perfect marvel in the artistic treatment of odds and ends of old iron.

**M**ESSRS. Arthur Tooth & Sons' Gallery has become an interesting one among the minor exhibitions which have so much increased of late years. Visitors to the exhibition will be pleased to renew acquaintance with Mr. Alma Tadema's admirable series of small paintings, illustrating the four seasons by scenes from ancient Roman life, which will be remembered as having been in either the Grosvenor Gallery or the Royal Academy some time since; we do not like to say positively which, for memory becomes confused amid the long vista of picture-galleries in the vanished years. Among the attractions of the collection are two or three remarkable little studies of Venetian

architecture by M. Gallegos, which, for liancy and truthfulness of effect and execution it would be difficult to beat among paintings of this class. Leon Lhermitte's "Noonday-field scene, painted in a grand and simple style, and an admirable work by Mr. Sey-Lucas, "Metal more attractive," are other prominent paintings. The names J. C. Hook, Brett, Leader, and Ernest are among the list of artists whose work exhibited.

**T**HE Council of the Société Centrale d'Architectes commenced its session Wednesday last, and a portion of the proceedings consisted of a report by M. Chas. I. on the studies of Mr. R. P. Pullan, which presented to the Société Centrale when Pullan attended last June at the Congrès des Français Architects.

**A** SMALL collection of landscapes by various artists is to be seen at Messrs. Downwell's, in Bond-street. The most interesting feature in it is a series of miniature Th. drawings, scenes at Pangbourne, Ship Goring, &c., by Mr. F. W. Cartwright.

**A**T the Fine Art Society's Gallery are to be seen a collection of drawings by Herbert A. Olivier, illustrating life and landscape in India and Cashmere. These are highly-finished or very effective drawings, they impress one with the idea of truthfulness, and taken straight from nature, in this respect are of considerable interest.

**T**HE Council of the University College of Wales at Aberystwyth have taken rather odd course in regard to their present building. We commented not long ago on the very unfair course which was at contemplated towards Mr. Seddon, the architect of the building, in proposing to the completion of it to another architect. We, we understand, overruled, and Mr. Seddon was appointed to complete his own work, the existing portion of the College was built, and now the whole question is re-opened. The Council have decided on having a building on a new site, but without his apparently, obtained or decided on the site. Accordingly, they have issued instructions to competing architects for a building suited to a sloping site, without naming the site, the building can be satisfactorily designed in any way, and we cannot help adding that we think the Council must have an inadequate idea of Mr. Seddon's very exceptional abilities if they expect to get anything better than he can give them by throwing him over a second for this kind of blind competition for a building without a site.

#### FLOWERED AND OTHER QUARRIES.

**I**N the examples of quarries already given, whether mere verbal descriptions of their merits and enrichments, or actual representations of the same,—care has been taken to point mainly to such as have not already been described or represented.† The sixteen specimens already given, comprising single examples of many types, might no doubt be largely added to; for they have been mainly taken from particular localities, known specifically to the writer. It is often found that patterns of certain quarry are common, or have been common, in a special county, neighbourhood, diocese, &c. Other parts of the country furnish fresh and remarkable examples, those already given, added to those of a period which illustrate this portion of the present paper, are fair and faithful specimens of English Flowered Quarries in general. Other examples are now set forth in detail in *Emmington, Ozon*.—A vase of lilies, &c.

\* See p. 597, ante.

† We may mention that the work on "Ornamental Glazing Quarries," by A. W. Franks, M.A., contains a collection of 112 plates of singular interest, is a most useful and valuable publication, but extremely rare.

‡ There is good reason for believing that just as building masons and builders travelled from place to place in the Middle Ages, so bell-founders and glass-stainers, the same, carrying on their work for awhile in particular localities.



yellow, outlined with black; the flowers pale, the leaves pale-brown, shaded with dark brown. (See illustration, fig. V, No. 1.)

**Warborough, Oxon.**—Here remains a quarry which is represented the Host in white, with I. S., in capital letters in its centre, surrounded by a yellow glory, with rude cross ending in the background.\* (See illustration, V., No. 2.)

**Stamford, Lincolnshire.**—There were several crosses remaining here in 1840, upon which a Host and Host were depicted. The chalice glory round the Host were stained yellow, the Host itself white. The shading was of black-chocolate lines. Some of these quarries were preserved by a local collector, when the chancel window in which they were and was re-glazed circa 1843, and the quarries were removed as useless and worthless. There were also in 1862, and probably still are, several somewhat similar examples remaining in old house in York, which had belonged to Corpus Christi Guild of that city,† and was with the chalice and Host represented them, at Nostell Priory, in the same county. (See illustration, fig. V., No. 3.)

ending in fleurs-de-lys, with rudely-drawn leaves between each arm. (See illustration, fig. VI., No. 1.)

**Yaxley, Suffolk.**—On a large quarry the capital letter I in dark brown, with a thin flowing floriated ornament in yellow, forming a cross round about the letter. In type this ornamentation is much like the decoration of illuminated MSS. of the latter part of the fifteenth century.

**Waterbeach, Cambridgeshire.**—A small branch of oak with acorns, three in a cluster at the top and one on each side below. This device is outlined in dark brown, the leaves and acorns being yellow, shaded with a still darker yellow.

**Marsh Baldon, Oxon.**—A white flower of four petals placed upon a cross in yellow, with the arms of the cross ending in fleurs-de-lys. It is roughly and rudely drawn, but full of good effect.

**Fyfield, Berkshire.**—A four-petalled flower in yellow, placed upon a floriated cross ending in a bold fleur-de-lys, with four other fleurs-de-lys depicted between each of the arms of the cross. This quarry differs slightly from that already described remaining in the same church.

panes is given in Dr. Lee's "History of Thame Church."\*

**Waterperry, Oxon.**—A yellow device of a Renaissance type, outlined in brown, consisting of three floriated leaves above, with an archaic piece of fruit in an oval centre below.

**West Stoke, Sussex.**—A remarkable specimen remains here. It consists of three circles in yellow, one surmounting the other two, and forming a triangular arrangement, upon a perpendicular stem. The letters J M S in dark brown, stand, one in each circle, while the inscription, *est amor m<sup>r</sup>* is placed on a label below. A golden glory, in yellow, surrounds the Sacred Name.

Independently of those already described or referred to, there are conventional flowers worthy of examination and note, on quarries remaining at Thaxted, Essex; Doddiscornleigh, Devon; Brown's Hospital, Stamford; Milton, Cambridgeshire; Easington, Oxon; St. Cross, Winchester; Garsington and Stanton St. John's, Oxon; Sutton Courtenay, Berks; Hunadon, Hertfordshire; Pennmachno, Carnarvonshire; Wantage, Berks; Chearsley and Crendon, Bucks; King's College, Cambridge;



Fig. V.

1. Emmington, Oxon.
2. Warborough, Oxon.
3. Nostell Priory, Yorkshire.
4. Brandeston, Suffolk.

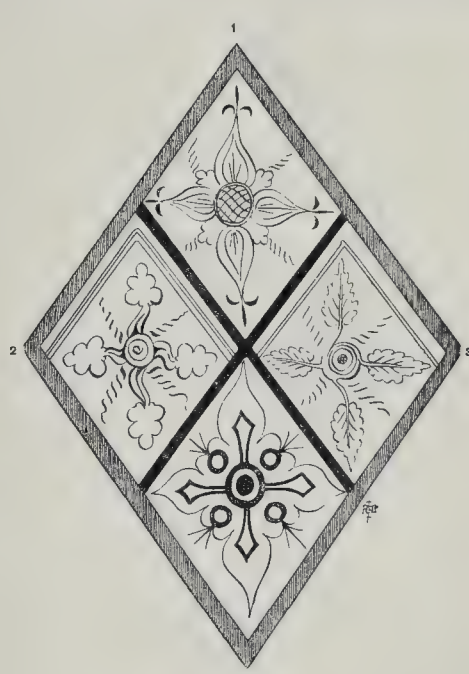


Fig. VI.

1. Berkhamstead, Herts.
2. Haddenham, Bucks.
3. Ockham, Surrey.
4. Stoke Talmache, Oxon.

**Wicote Chapel, Northleigh Church, Oxon.**—A stained cross of a simple character, the arms terminated by rude fleurs-de-lys, the centre a trefoil, with four branches of seeds, between the arms, coloured yellow and brown. Sketched 1876.

**Wicote Harcourt, Oxon.**—A floriated cross of four small branches, not unlike the cat's tail. Coloured yellow and brown. Sketched in 1876.

**Warborough, Oxon.**—A cross formed of four en-edged ivy leaves, with a bunch of berries. The centre is circular and cross-hatched, the arms brown, and the berries black.

**Berkhamstead, Herts.**—A floriated cross, with circle in centre, cross-hatched, its arms

**North Moreton, Berks.**—A simple cross composed of four leaves conjoined cross-wise, stained yellow and outlined in black. Around the whole quarry is a double border, half of which is yellow and the other half formed of double dark lines. . . . A somewhat similar cross of leaves, only more carefully drawn, and with a broad border of yellow outlined in black on one side only.

**Baulking, Berks.**—An eight-petalled flower in yellow, with a cruciform centre in dark brown, and having eight brown leaves surrounding it.

**Wantage, Berkshire.**—A "ragged robin," as it is commonly termed, drawn conventionally, with a flower or blossom at the top and two seed-pods with leaves on each side, the stem and leaves stained yellow, the flowers and seed-pods white, all outlined in brown, exceedingly graceful and effective.

**Tetbury, Oxon.**—A similar flower was represented, almost exactly in the same form, only somewhat larger and bolder, upon certain panes in the old church here, pulled down circa 1843, and in similar colours. But when this building was destroyed these were, apparently, lost. An engraving of one of these picturesque

Headington, Marston, and Thame Park House, Oxon; and at Munsley, Herefordshire.

Mottoes, to note another feature of certain quarries, are often found set forth. Sometimes the same are of a distinctly religious character, e.g., *Jesus Hic*, at Penshurst, Kent; *Hic*, at Lambourne, Berks; *Hic*, at Checkendon, Oxon; *Hic*, at the small disused and deserted church of Easington, in the same county; *Hic*, at Charlcombe, near Bath. At Waddington, Oxon, a quarry remains with the name *Sanctus* thereon, in black letter. Possibly other names of distinguished heathen and Christian writers were thus sometimes commemorated. In other cases quarries of heraldic character, set up in the windows of chantry chapels belonging to particular families, are commonly found placed alternately with crests, official or family badges, or coats of arms.† Of such, numerous examples exist

\* See "History of the Prebendal Church of the B.V.M. of Thame," &c., p. 203. London: 1883.

† E.g. At Horton Kirby, Kent, charged with the crest and initials of John Browne; and at Lullingstone, in the same county, where a rebus on a quarry still remains,—that of John Peachy; at Brighthelm, Oxon, at Buckland, in Berkshire; and elsewhere.

On the chancel wall of the parish church of St. Peter Paul, Warrington, Bucks, restored soon after the 1840 under Mr. Joseph Clarke. A similar series of paintings,—Hosts in glory,—were discovered at its creation. The decayed state of the plaster rendered preservation impossible. They were almost exactly identical with those in the quarries at Warborough. Information afforded by the late Mr. J. Fort Munby, solicitor-at-law. He does not make it clear, however, whether the guild in question was called "Corpus Christi" or whether one of its chief meeting days was the val in question.

in out-of-the-way manor-houses, now often deserted by the representatives of old families, and often let as farmhouses. Many such specimens have been wisely described and well depicted in the publications of local archaeological societies.

At a cottage at Chenies, in Buckinghamshire, there remains on a quarry the head of a white greyhound, collared, springing out of a posy of forget-me-nots,—one of the old devices or badges of the ancient family of Cheney, of Buckinghamshire, which in Henry VIII.'s days had lived there "from time immemorial." (See illustrations, fig. VII., No. 1.)

The writer possesses a drawing of a curious quarry, the object represented upon which may be thus described:—A butterfly settled on a mushroom, which is growing out of a plot of grass, from which springs on each side of the mushroom's stem a forget-me-not in flower. The butterfly is tinted yellow, the mushroom white, the flowers and leaves are in dark brown. We have no note of the place in which this quarry remains, though we believe it exists in some church in Oxfordshire. There is possibly much hidden symbolism in the device, of

many years.\* The margins of late illuminated service books often contain them,—sometimes exceedingly spirited representations. They are also still to be found on the misericords of stalls, and are sometimes depicted in stained glass.† There is in the writer's possession a sixteenth-century quarry, possibly unique; at all events, very curious, which came from Westington House, Bucks, and a woodcut of which has already been published.‡ It represents a fox or wolf, in a friar's habit, hooded, standing in a wooden pulpit with its face to the left, and holding a scroll in its right paw. Scratched on the glass on either side, in the style of writing of the latter part of the sixteenth-century, are the words "The People's Chaplain."

The white daisy or "marguerite" is found upon quarries at Doncaster, Yorkshire; Penn, Bucks; § Coberley, Gloucestershire; Culham, Oxfordshire; Coton, Cambridgeshire; and Yaxley, near Peterborough. It was, possibly, put up as the device of one of the Queen Margaret, out of compliment and honour to the spouse of the railway monarch.

The sun in its splendour,—one of the badges of Richard III. (see illustration, fig. VII., No. 3),

mentioned examples are almost alike, and each has the letters D and E on either side. In the Rectory of Newdigate, in Surrey, there is a quarry remaining to commemorate a parish named Bell. A church bell is thereon represented in the centre, with the letters A and B on either side, with interlacing cords, their ends tasselled, the colours used being yellow and brown. (See illustration, fig. VIII., No. 2.) A fine specimen of a somewhat similar quarry remains at Little Greenford, Middlesex. It represents a hunter's horn, with its strap ornaments, with flowers both at its apex and base, and with the letters H and B on either side. The horn and blossoms are white; the letters, stems, and leaves being of pale-yellow shaded with dark-brown. The white greyhound may be seen on quarries at Ickford, Bucks, and at Stanton-St.-John's, in Oxfordshire. The writer has an original quarry from Westington House, near Aylesbury, of a white greyhound seated and collared, no doubt another form of this Tudor badge. (See illustration, fig. VII., No. 1.)

Specimens of the conventional rose, B



Fig. VII.

- |                              |                                       |
|------------------------------|---------------------------------------|
| 1. In a Private Collection.  | 3. In a Private Collection.           |
| 2. Wooburn Deyncourt, Berks. | 4. In a Cottage at Haselmere, Surrey. |



Fig. VIII.

- |                               |                             |
|-------------------------------|-----------------------------|
| 1. Chenies, Bucks.            | 3. In a Private Collection. |
| 2. Newdigate Rectory, Surrey. | 4. Dytchley House, Oxon.    |

which, it may be added, we know no second example.

The emblem of St. Peter,—the crossed keys in yellow, with two palm branches in saltire, still remain,—with other good examples, in windows of the Parish Church of Watlington, Oxon. At Adwell adjoining,—before the old church was removed and a new one built under Mr. Blomfield's directions,—there were two chancel windows almost filled with similar quarries. Recent inquiry leads to the conclusion that one and all have been destroyed.

There is a late but effective quarry at Waterbeach, in Cambridgeshire, containing the capital letters J. M.,—possibly standing for John Salisbury, sometime Bishop of Tretford, and subsequently Bishop of Man,—with a pastoral staff between the letters, the whole linked together by a tasselled knot. The letters and staff are in yellow, the cord white.

In the early part of Henry VIII.'s reign certain satirical illustrations of the clergy,—possibly of regulars by seculars and vice versa of seculars by regulars,—were made in carvings both of wood and stone, and are still to be seen. Such, in one form or another, had been used for

—is likewise frequently found upon quarries; but the unique and remarkable device of a falcon with a woman's head holding a rose in its claw,—another badge of that monarch,—is exceedingly rare. Two fragments of such a quarry were found, when a grave was being dug in the churchyard of Thame Church, Oxon. This badge is found in sculpture in the Somerset Chapel at Windsor.

The two badges of Henry VII.,—a hawthorn bush crowned royally, and a white greyhound courant,—are each found depicted in quarries. The former in the Chapel of King's College, Cambridge (a picturesque and well-drawn badge); as also under a more elaborate form in Charrington Church, Surrey, and in a cottage at Haselmere, in the same county. (See illustrations.)

\* "Rudiments d'Archéologie," p. 307. Paris: 1851.  
 † "Mélanges d'Archéologie," vol. i., p. 124, plate xxiv.  
 ‡ "The Society" ("Christian Symbolical Zoology"), vol. i., p. 187. London: 1871.

§ On inquiry we find that this quarry has been either lost or destroyed.  
 It was from the example here exactly represented that the late Mr. Augustus Welby Pugin made a drawing for the new quarries used in the House of Lords. We believe that the quarry in question originally came from Ryecott House in Oxfordshire.

white and red,\* are frequently found of a date towards the end of the fifteenth and the beginning of the sixteenth century. There is a plain and bold specimen at Yaxley, in Suffolk, another at Hunsdon, in Hertfordshire, and other examples may be seen in the north windows of King's College Chapel, Cambridge, and in a cottage near the Moors, Thame, Oxon. There remains on a quarry a fine example of a white rose placed within a circle.

The "Rose in the Sun," found depicted in quarries at Yaxley, Suffolk (an artistic specimen), Henley-on-Thames, Toot Baldon, Oxfordshire; Kenton, Suffolk; Wooburn Deyncourt, Bucks;—was the badge of King Edward IV. But examples of this are not very common.

The Pomegranate, the badge of Queen Kai

\* A quarry with a rose half red and half white, divided as the heralds say, "per pale," existed in 1538, in the Parish Church of Wooburn Deyncourt, Bucks. (See illustration, fig. VII., No. 3.) This, with other fragments of stained glass, was cleared out at its recent "restoration." A Leicestershire friend informs us that a conventional rose quarterly white and red, remained on a quarry in the church of St. Margaret, Leicester, under the patronage of the Rev. W. H. Anderson, i.e., circa 1850.—also MS. 16, F. 2, Royal Lib., British Museum.



the wife of Henry VIII., remains on a quarry to the Church of Bradenstone, Suffolk. This is of a yellow. Above, on a label, runs in Latin, *Quod trus junxit homo non sperat*. (See illustration, fig. V., No. 4).

The Castle and crowned phoenix, the badge of Jane Seymour, one of Henry VIII.'s wives, is originally represented in a window at Wolfall, near Great Bedwyn, Wiltshire, and remained in several lights of the same until the year 1846. These examples are not now to be recovered.

The portcullis crowned may be seen on a quarry at North Cray, Kent, placed upon an alcaidic shield, upheld by a hand issuing from a cloud. A like emblem also exists at Peter Cathedral and at Kenton Church in Devonshire. We have seen a quarry with the same device of a portcullis uncrowned, coloured yellow, which came from Westington House, Bucks, the residence of the family of Franklin. This may possibly have been brought from nearley Church, in which John Franklin and his wife in the fifteenth century founded a chantry,—suppressed under Henry VIII.,—and where a brass still remains over their original site of burial in the chancel of that church.

The badge of Queen Mary Tudor, a red rose on a white rose, with a sheaf of arrows tied, the whole represented in a circle and crowned with a royal coronet, with rays of glory round the entire device, is represented in one of Browne Willis's collected sketches as remaining on his day upon a diamond pane at Ashridge chapel, near Tring. Subsequent inquiry, i.e., in 183, from a member of the noble family of Downland interested in ecclesiology, leads us to conclude that this curious badge,—probably long ago represented on a quarry,—has been lost or destroyed. The chapel has been restored to the time of Browne Willis, and much that is ancient and curious has been lost.

In the writer's possession is a quarry of no date but of the Renaissance style, with the letters R. P.,—for Richard Parkhurst,—from Westington House, Bucks (see illustration, fig. V., No. 3); and also a rebus on glass of the person in question, representing a deer-park enclosed by palings, with the word HVRST below. Both are obviously of the sixteenth century.

Some interesting specimens of heraldic devices,—one, the merchant's mark of the family of Dormer, of Bucks and Oxon; another containing the armorial bearings of John Dormer, granted circa 1517; and a third, the crest of the same family, a bird on a gloved hand,—remained in an old cottage at Dadbroke, near Giddington, Bucks, circa 1870. Upon inquiry, in 1884, of the owner of the place, I found that the glass had been removed to Dadbroke House, and that in its removal it had been broken. The fragments are, however, preserved.

There is a merchant's mark on glass in St. Michael's Church, Oxford, on each side of which a white rose (barbed and seeded or) is represented.

A somewhat similar mark occurred in several families in the north aisle of Thame Church, Oxon. This mark belonged to Geoffrey Dormer, sometime woolstapler and merchant of the staple of Calais, who died in 1503. But these are removed or lost circa 1843, though the mark still remains engraved on a brass field upon his tomb.

There were, in their original position, some exceedingly effective heraldic quarries at Lee's Hall, part of an old mansion near Charlbury, Oxfordshire. They consisted of (1) a coat of arms, (2) a crest, (3) the letters H. L., and (4) another coat of arms, each being surrounded with the garter and its motto. All had been evidently put up soon after the year 1597, when Sir Henry Lee, the owner of the existing mansion, was sworn of the Privy Council of Elizabeth, and made a Knight of the Garter (see illustration, fig. VIII., No. 4). These quarries, for safety's sake, have been removed to Ditchley House,\* by the Hon. Harold Wilson, F.S.A., where they are now preserved.

**Free Library, Bethnal Green.**—His Royal Highness the Prince of Wales has gladly consented to become Patron of the Bethnal Green Free Library, in place of the late Lord Shaftesbury.

One of the four, it appears, has been lost or broken. It is that upon which the arms, as depicted on the alabaster monument of Lady Lee and her children, in Aylesbury church, were represented.

## LETTER FROM PARIS.

Now that the election period has terminated, will the Government at length occupy itself about the industrial crisis, and will the new legislature be the signal for a trade revival? Public opinion, to say truth, shows itself very incredulous on this head. The political passions are far from being lulled, and one can see already that the new Chamber will have too many irritating subjects before it to decide at once on new works of public utility. If we add to this natural uneasiness the difficulties of the epoch on which we are entering, and of the sufferings which winter and the dull misery of a population out of work will bring in their train, we can easily comprehend the general feeling of apprehension which exists. It is as a diversion from these kind of pre-occupations that the Parisian Municipality and the press wish to organise the *Fêtes* of which M. Alphand is studying the programme. There are to be divers grand balls at the Hôtel de Ville, a tournament on the Champ de Mars, and an immense historical procession of the Medieval trade guilds.

These are only palliations, while public opinion demands a number of important operations, without counting the Metropolitan railway, which is a pressing necessity, or the Exhibition of 1889, which seems to have gone out of people's minds for the moment. There is, for instance, the opening up of the Palais Royal, a project intimately connected with the extension of the Bank of France, and which will necessitate a whole series of street improvements of great importance.

By its actual situation the Palais Royal, placed close against the neighbouring houses and surrounded by narrow streets to which one descends by steps and alleys, has become a kind of *cul-de-sac*. Its galleries of splendid shops, formerly the resort of visitors and loungers, become more and more deserted, and the numerous tradesmen there feel so clearly that it is a question of actual existence to them that they have offered spontaneously to contribute to the cost of, or even to erect at their own entire cost, a great flight of steps, covered with a verandah, opposite to the Rue Vivienne, where the latter so suddenly and inconveniently terminates. The Town Council ought to occupy itself at once with this important improvement scheme, which will modify entirely the aspect of one of the most curious quarters of old Paris.

The Rue Vivienne itself is in process of transformation, thanks to the works for the isolation of the Bibliothèque Nationale. The large buildings intended for lecture-halls and collections are beginning to replace the private houses and shops which have been disestablished for the sake of public safety. These new constructions will probably be completed in 1886.

It is to be hoped that similar precautions will at last be taken in regard to the Museum of the Louvre. The grates and chimneys, it is true, have been replaced by heating apparatus installed in the basements, but that is all, and an Under Secretary of State, were it M. Turquet himself, may hardly be able to conquer the routine and indifference of the Government. It is not here the merchants who must be driven from the temple, according to Scriptural precedent, but that knot of minor officials and employees whom the State lodges in the Museum itself, by the side of the Raffinels and Titians and Poussins, and whose presence constitutes a continual danger of fire to our national collection. But M. Turquet, to do him justice, is full of good intentions. Thus he is credited with the excellent intention of taking down very shortly the gigantic quadriga in plaster which M. Falguère erected some three years ago on the summit of the Arc d'Étoile. It is to M. Antonin Prout that we owe the unhappy idea of this useless crowning of Chalgrin's fine monument, which has been condemned by public opinion long since.

Among urgent and necessary operations is also the reconstruction of the Gobelins, which has been long ago talked of. The "Conseil Général des Bâtimens Civils" has already given its approval to the plan of M. Chabrol, the architect, and if Parliament will vote the three millions necessary a start can be made in 1886 with the above work, comprising buildings for administration, exhibition galleries, and schools of painting and decorative design. As the actual buildings, constructed on no fixed plan, and successively enlarged at different epochs as necessity arose, have been partly de-

molished for carrying through the Avenue des Gobelins, and partly destroyed by the incendiaries of the Commune, the work required will not bear delay if the reputation of our national manufacture and its collections is to be preserved. As we are on the *rive gauche*, let us not forget to name the work which has been undertaken to repair and consolidate the old tower of the ancient Abbaye des Gémonies, which for five centuries has arisen on the Mont St. Geneviève, and overlooked the quarter of the "Eschollers Parisiens." Let us add, in passing, before quitting these remote quarters, where curiosity brings numerous visitors to the Pantheon, that it is very necessary to think of doing something with this chilly temple, which at present serves no public object; with its great dome, its bronze centres which hang in empty space, its partly-decorated walls and immense nave, it has an air of desolation which in the eyes of visitors produce a lamentable effect. There is another operation which for Paris would have the greatest interest, the enlargement of the Halles Centrales, constructed in 1858 by Baltard, and which are now notoriously inadequate. At that time Paris had only 1,500,000 inhabitants, while to-day it counts more than 3,000,000.

It is not far from the Halles, in the Rue Étienne Marcel, that there stands the old tower of the Ducs de Bourgogne, which constitutes one of the curiosities of Paris. An architect of ability, M. Huillard, has prepared a scheme of restoration, which it has been decided to carry out, for the "Commission de Monuments Historiques" has compelled the municipal government to take steps to secure this curious specimen of the military architecture of Henri IV. from further decay.\*

Artistic news generally there is but little, the following may be taken as the summary. There is first the award of the Leclair prize, by the Académie des Beaux Arts, to two young architects, MM. Convert, pupil of M. Galignat, and Jay, pupil of M. Daumet. There is also the nomination of M. Delplanché, the eminent sculptor, to the Superior Council of the Beaux Arts, in place of Schœnwerk, whose tragic death we have recorded. The sculptor Chapu is completing a remarkable monument to Mgr. Dupanloup for the town of Orleans. The same artist has been recently commissioned to execute the bust of the Empress of Russia.

In regard to artistic work to be carried out by the Municipality, there is talk of decorating the Place d'Anvers with bronze statues of Sedaine and of Diderot, and of raising in the same square an allegorical statue of Paris, for which M. Coutan has made a model. The statue of Lamartine, by M. Vasselot, the vicissitudes of which were recounted in our letter of September, will also be soon placed at Passy, not far from the chalet which the town offered to the illustrious poet. There will be raised at a little distance the statue to Victor Hugo, on the place of that name, near which he died.

There is talk, also, of decorating the state rooms of the Hôtel de Ville with medallion portraits of men illustrious in art, literature, and science. In one room will be placed the portrait of Ampère, the celebrated physicist; of the astronomer Arago, the physiologist Claude Bernard, and the chemist J. B. Dumas, who for so long a time was President, under the Empire, of the Municipal Council of Paris. In the "Salon des Lettres" will be placed the portraits of Victor Hugo, Lamartine, Littré, and Michelet; and in that of "Arts" those of Ingres, Rude, Herold, and that of the architect of the building, Theodore Ballu, whose bust in marble, the work of Ernest Barrias, will adorn the vestibule of the grand staircase.

There is also the exhibition of the works purchased this year by the State; but, as all these were mentioned in our articles on the *Salon* of this year, we may pass over this exhibition, which is not very favourable to the judgment of the Ministry of Fine Arts, and will not tend towards raising the level of contemporary art in the eyes of the public.

It remains still to speak of the exhibition "*du travail*," which will be open till the end of the month at the Palais d'Industrie. We wished before to speak of it, but other subjects have crowded it out. Besides which, this exhibition, proclaimed *urbi et orbi* with much sounding of trumpets, is mostly only an immense bazaar for the display of the vulgar "article de Paris."

\* From a quotation we gave from a French paper in our "Notes" last week it will have been seen that this restoration is viewed with great disfavour in some quarters.—Ed.



which is to say that it contains nothing truly artistic. We will pass, then, rapidly enough the hall where the department of primary education of Paris has made the mistake of exhibiting the work of pupils which ought not to have crossed the threshold of the elementary schools, and pause before the windows designed by M. Champigneulle. We find here some very curious specimens, already seen a year ago at the "Union Centrale des Arts Décoratifs," especially a "Fontaine d'Amour," a remarkable imitation of the window glass of the sixteenth century, intended for the mansion of Mme. Judic. We like less the Henri VIII. window, also commissioned by the same lady.

The exhibition-room of M. Champigneulle is very interesting, for it is a sort of compendium of the art of stained glass. It shows us the art from the great epoch of the thirteenth and fourteenth centuries, when glass, roughly made and striated by the accidents of manufacture, formed in its lead seams a veritable mosaic of sparkling facets, to the windows of the sixteenth and seventeenth centuries, painted on large surfaces, and which were the precursors of the glass blinds now in use in our private houses. We note among these latter, which take a more and more important place in the decoration of apartments, Indian and Japanese glasses of glaring tones and real originality. But by the side of these modern examples, we much prefer the archaeological reproductions, especially three large reproductions of the windows of Chartres and Bourges. There is especially a copy of a rose-window from Chartres, of perfect execution, and which might easily deceive the eye into thinking it original. We should mention also the great modern window of which the cartoon, executed by M. Wagnez, symbolises the return to France of Alsace and Lorraine. The design is very pure, the figures well arranged, and the colour harmonious and sober.

As a complement to this exhibition, M. Champigneulle has had the happy idea of uniting, in the gallery, a complete installation of the instruments and methods used in glass-working, so as to render intelligible to the public the industry of the glass-worker, from the oven where the vitrification takes place, to the successive operations of drawing, cutting, and leading.

We are again obliged to terminate our letter with an obituary notice. Without speaking of Emile Perrin, who, besides being successively director of the Opéra Comique, of the Opéra, and of the Théâtre Français, was a painter of talent, we have to record the death of the landscape-painter, Ségé, which leaves a great gap in the artistic world. He was a conscientious painter, of very individual talent, who, though a Parisian *pur sang*, delighted in reproducing the arid landscapes and wild moors of Brittany. He had studied with Flers and Leon Cogniet, and had obtained medals successively in the *Salons* of 1869, 1873, 1874, and 1878. Since 1874 he was a chevalier of the Legion of Honour. We may mention among his best pictures, "Le Chemin Vert," exhibited in 1878; "Les Châtaignes de Beauvoir" (*Salon* of 1882), and the "Vallée de Ploukermeur," purchased by the State in 1883.

In regard to M. Perrin, who has rendered such services to musical and dramatic art, he is replaced at the Comédie Française by M. Jules Claretie, an accomplished writer whose name is well known in England, as he was for some years the Paris correspondent of the *Athenæum*.

#### PRESIDENT'S ADDRESS, ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The following is the address delivered by Mr. Ewan Christian, President of the Institute, at the opening meeting of Session 1885-86:—

Gentlemen,—Last year at our opening meeting, when I had the privilege of addressing you, I had before me the comparatively easy task of speaking of the half-century in the life of our Institute then about to terminate. I have now to deal with the future, and who can be said to be sufficient for such things? But, before proceeding to speak of other matters, I think it is incumbent on me to fulfil a sorrowful duty,—that of recording the death of our chief founder and past president, Professor Donaldson.

Last year I could say, when reviewing the past, that we had still with us "the loved and honoured Nestor of our profession;" now, we

must be thankful that he has gone to his well-earned rest, leaving us to chronicle and cherish the memory of his genial kindly presence, his never-failing enthusiasm for the art he loved so dearly, and the earnest self-sacrificing labour he was always ready to bestow on anything connected with the affairs of our corporate body. Truly, though in a different sense, and without profanation, it may, I think, be said of him, in the words of the terse and noble epitaph inscribed in the cathedral to the great architect of St. Paul's, "*Vixit annos nonaginta non sibi sed bono publico*," and, as regards this Institute, I think it may also be added, "*Si monumentum requiris, circumspice*."

If we look back mentally to that meeting of fifty-one years ago in the parlour in Regent-street, and now on the large assembly gathered in this room, or wander into the well-stored library behind me, truly we may say his early work has borne good fruit; and though his conception, like that of the great architect, has needed many able men and willing coadjutors to bring forth this result; yet his was the mind that commenced it, and, as was well said by our first president, Earl de Grey, "There is no individual who has taken more pains to forward the object which all have in view than Mr. Donaldson has by his indefatigable exertions, or has contributed more heartfelt zeal to its benefit. Others have contributed in various ways, and most efficiently, but he has had the labouring oar. He has laboured steadily at that oar, and I trust and believe that he has rowed us into a good harbour."

Gentlemen, I shall not on this occasion attempt to portray the events of the life of our departed friend. That is a pleasing task I must leave to others. There have been many notices of his career, and Mr. Godwin, as you know, has given us a sketch of much interest,\* which renders further comment from me the less needful. Our friend has left us, gathered to the great harvest like a sheaf of corn fully ripe, surrounded by all those things which should accompany old age, as "honour, love, obedience, troops of friends," bequeathing to us the fresh green memory and the bright example of the kind and courteous Christian gentleman, the enthusiastic lover of his art, and the honoured and honourable architect; and what more can I say, or what more would he have wished to be said of him than "Let me die the death of the righteous, and may my last end be like his"? The venerable Professor's death occurred at a time when many members were out of town; consequently, although 1,000 letters were despatched on the afternoon of the day on which the intelligence was received, few comparatively were able to obey the summons and be present at his burial, but those present were, I am sure, all earnest mourners of departed worth. On behalf of the Council I addressed to the family, shortly afterwards, a letter of condolence; but you will, doubtless, desire that one from the whole body of our members shall also be sent, and the Council will be ready to transmit any resolution that may be arrived at on this subject.

Before dismissing this matter wholly from our minds, let me say a few words further, not so much on the personal man, but on the character of his studies. It has been said that there will never be another Donaldson. Possibly, as regards intense zeal for the welfare of this Institute, we "ne'er may look upon his like again," though I hope the contrary; but, as regards the status and culture of the individual architect, surely it is to be hoped that such men as he will still be found in our ranks. Sad, indeed, would be the prospect if it were otherwise; but when we call to mind, as we may easily do, the numerous examples in our own time of the value of prolonged study, have we not good reason to hope that the future will not prove to be so barren as such a prophecy might lead us to expect, and that not only the genius, but the ability to wait, may still be found to meet this necessity of our art, if it is to be practised in its full development?

Other losses by death I shall refer to later on; that of our late Fellow, Mr. Whichcote, was sorrowfully recorded in January last; but it is, I think, the first time in our history, that two past-presidents have left us in the course of a single year.

As regards the future, you will probably remember that at our opening meeting of last year I alluded to the necessity of some change in our Charter to meet the requirements of this

later time, and it is, I think, remarkable that the death of the Founder of the Institute should have coincided so nearly with the issuing of a completed form, of the proposed new Charter which the committee appointed for the purpose of considering the subject has presented as a result of their labours. As a print of the document has been sent to each member of the Institute, and as a special meeting will be called for its consideration in detail, hardly necessary for me to do more than glaze at one or two of its principal provisions.

Few human works can be called perfect; we cannot therefore expect to escape criticism; but as I hope no one amongst us, any more than the members of the Council, has any doubt except that of obtaining for the future of the Institute the best government possible and the greatest freedom of action practicable within reasonable limits, I trust the subject will be carefully considered by all of us, and in the judicial spirit which alone is likely to contribute to the desired end.

We have been told that the result of the change will be to give greater power to the Council; but a government, to be worth anything at all, ought to be strong; and, with greatly enlarged constituency, surely the wise decision of any important question must be that of the whole body of members, rightly given, ought to be generally satisfactory. We have been asked also why the laws, which are to determine so much important action, have not been issued with the Charter itself; but it is a golden rule of business, one thing at a time, and the Council are of opinion that the principles of action should first be agreed upon, and the settlement of details may follow afterwards.

Probably the most important provision in the proposed new Charter is the extension of the examination test to all classes of members except under circumstances and in cases which the Council may determine otherwise; I think we must all see that that requirement is an inevitable consequence of the obligation of examination of Associates, and must ultimately extend to the strengthening of our body.

That there must nevertheless be exceptions is also inevitable, and it is, in my judgment, not undesirable that so it should be. There will, I trust, always be some exceptions; men, deep students and real artists, to whom the ordinary rules of examination cannot do justice; men of genius to whom solitude is the rule who may not see with our eyes, but whose presence amongst us would necessarily be welcomed; men who, having proved their power, could not be asked to submit to ordinary rules. There are such men now, and there will be more in the future, and it would be foolish to refuse to include them all amongst us.

As regards that important section of the body, the Associates, the extension of the power of voting is a right and necessary change; it is to be hoped that by this, and the action in the method of recording their votes, which the new Charter will give the power by-laws to prescribe, the provincial member may be put on that footing of equality which has so long been desired, and to which, the provision of the old Charter, it was impossible to attain. As to other matters, hardly necessary to occupy your time with further observations; but such radical changes as those to which I have alluded could not be passed over without remark.

But although the question of internal government is undoubtedly important, there is a thing beyond, and still higher, which it behooves us to consider.

The opinion I expressed last year on the subject of the education of the architect I long held, and have not yet seen reason to change; but although I have not been able to discover how this Institute is to become educating as well as an examining body, I no reason why we should not do more; we have hitherto been done for facilitating attainment of knowledge by those who desire to possess, and have not the means otherwise acquiring it.

Architecture is essentially a science of observation. Its theory and history may be learned from books, and in office practice and teaching, but unless these are supplemented by the careful study of buildings at home and abroad, education cannot be really said to be satisfactorily completed. Would it not be within our province, as I trust it might also be found within our means, to do more than

\* See *Builder*, August 15, p. 212.



have hitherto done in establishing travelling scholarships as prizes for young men who have distinguished themselves in passing our examinations; supplementing, but also enlarging, the scope of what we already possess in the Soane and Pugin prizes, and the Godwin Bursary; scholarships, I mean, for the promotion of real and prolonged study in such paths of our diversified art as may be most congenial, and at the same time the best adapted for advancing that knowledge, which our Charter proclaims to be the great object of our existence.

Our ranks have to some extent, in the last few years, been recruited by men who have passed through the educational course of our universities; let us hope that in the future they may be still further leavened by such well-trained students; for nothing surely is of more importance than that the preliminary education of the architect should be as thorough and complete as it can possibly be made; nor can there, I think, be anything more valuable for raising the general level of professional attainment.

Nothing, of course, will atone for want of general aptitude and artistic feeling; but, in my judgment the additional time expended on the university course, provided it be well employed, is of more importance to the future of the architect,—supposing such genius or aptitude to exist,—than the same time spent in any other way. May we not hope that the advantages of this early education may be more fully exemplified amongst us?—and combining with this our English system, I do not fear the future of our art.

There is much, indeed, in what we see about us to make us mourn; but there are not wanting many hopeful signs and sources of rejoicing in good work now being done amongst us. Englishmen are apt to decry and depreciate the works of their own countrymen, and it is hard to obtain favour for contemporary work at any time, but there is much done unknown to the general public which proclaims the fact that architecture in this country is by no means that dead and spiritless thing that some would have us to believe. That we cannot revive the grand old times of originating genius, is a fact to be deplored, but neither can we change the character of our age, though we need not despair of inspiring it with fresh ardour in the search for the beautiful, and the execution of that which will live will be duly valued in the future.

And now, gentlemen, without dilating too much upon our own proceedings, I think I may say of the preceding session, that its record as given in the last volume of *Transactions* is one of considerable and varied interest. Mr. Stannus's paper on the internal treatment of cupolas, and the discussion which followed, showed very conclusively the great difficulty of the subject, and as regards the task of completing the work of the great master architect of our metropolitan cathedral, the almost hopelessness of arriving at a conclusion that shall be generally accepted as satisfactory. Certainly it is a subject worth any amount of preliminary study and cost that may be bestowed upon it, and whether the work be finished in our generation or the next, is comparatively a matter of minor importance. Our Associate, Mr. Lawrence Harvey, did good service in bringing before us the highly suggestive work of Professor Semper, refreshing us with thoughts from abroad, on a subject undoubtedly of very considerable importance to the progress of our art. Mr. Farrow's essay as the holder of the Godwin Bursary, was an excellent illustration of the great advantage to our younger members arising from the wise and thoughtful provision of its founder. . . . As a combination of practical and artistic work in a subject of much freshness and general interest, the modest but very excellent paper on flint work, by Mr. Baggallay was an illustration of thorough good work, which I trust he will follow up hereafter; and last, though certainly not least, of general sessional papers, I need hardly call to your remembrance the learned and very excellent paper by our Fellow, Alexander Graham, on "Remains of the Roman Occupation of North Africa," a subject of great and abiding interest, on which we shall, I am sure, very gladly welcome any further contribution with which he may be willing to favour us. Mr. Graham's paper was, as you know, profusely illustrated by many beautiful drawings and sketches, and our annual volume is greatly enriched by these and others I have not particularly mentioned.

Gentlemen, I think there is in this brief notice of papers much to encourage us.

In my former address I said, "Are there none of our younger brethren anxious to show what they can do, and would it not be good for them, and useful for us that they should take the opportunity offered by our meetings of testing their powers? And is it not a hopeful sign, and does it not fully justify our proposed action in respect of the Charter, that eight papers out of eleven, all more or less valuable, should have been contributed by Associates? Truly I think so, and I rejoice in the fact, and while I would congratulate our younger brethren on the fruits of their ardour; I would ask, ought it not to stimulate their elders, not to imitate, but, from their more extended knowledge and mature experience, to put before us from time to time the fruits of such researches as Mr. Graham's?"

To some of us, immersed as we are in the active pursuit of our laborious profession, we know that it is impossible; but I would fain hope there are still among us men of learning and some leisure,—Sharpes, or Donaldsons, or Grahams,—who may be stirred to activity by this wholesome rivalry of younger men.

The record of the work of the past session would be incomplete were I not to refer to its closing meeting, when we had the pleasure of welcoming the great explorer, Dr. Schliemann, and presenting to him the Royal Gold Medal, of which you had unanimously voted him to be a worthy recipient. I have reason to know that the satisfaction was mutual, and that not only in this room, but subsequently, Dr. Schliemann expressed the great delight that our reception had afforded him.

Nor must I allow the proposal of Professor Kerr to pass unnoticed. We all know how jealous our friend is of the honour of this Institute; and how anxious that its operations should be extended wherever it may be usefully done. We may not all agree with him in what he desires to accomplish, and I for one cannot concur in his proposal for the alliance with noble patrons, because I think, with all due respect, we have as a corporate body passed that stage of development, and shall do better to trust to ourselves; but, nevertheless, I highly appreciate his wish for general improvement in our action, and shall be always ready to support whatever well-considered measures may be practicable for advancing this result. Professor Kerr has, I believe, appointed his committee, and we may hope in due course to hear the result of their labour.

Amongst subjects that have interested not only architects, but society generally, is one that has excited much keen controversy, and on which you will doubtless expect me to say a few words,—Westminster Hall. Last November I said, in respect of the appointment of a Committee of the House of Commons to consider Mr. Pearson's plans and report, "I think in this case the action of Parliament is hardly to be regretted, if it gives further time for the consideration of a subject of unquestionable difficulty, one which deeply concerns all who care, as we should do, for the preservation of our ancient monuments"; and, as regards the thorough sifting of the case, I think good has been done by eliciting opinion from all sides, though, as regards the architect chiefly interested, it has been a somewhat fiery ordeal, which, however, he has happily survived. It is no part of my business to uphold the decision of the Committee, though in the main I think it was right; but I must confess to much astonishment at opinions that have been expressed on the one most important point of substantial repair. How it could have been seriously said that the great buttresses should have been left in their sadly dilapidated state to moulder away into ruin, while the hall itself was to be preserved, I am at a loss to understand. Westminster Hall is, and I hope will long remain, a living building; one of the noblest in the land; one of which no Englishman can be otherwise than proud; one that it is our bounden duty to maintain; and I think that the late First Commissioner of Works did wisely when he appointed our Fellow, Mr. Pearson, to carry out the work so urgently needed for its preservation.

We may not agree with every detail of what he proposes to do; but is it just, is it generous to criticise in the way that has been done the work which he, as a thoroughly scientific and practical architect, pronounces to be absolutely needed for the maintenance of this grand his-

torical monument? Personally, I regret that Mr. Pearson's proposal for raising the towers is not to be carried out, but I cannot do otherwise than rejoice that the Hall is still to remain open to view. It is to be hoped that in the near future the lead may be restored to the roof, and the poor turret now standing may be replaced by a *fliche* more worthy of the grand and beautiful proportions of the finest piece of timber-framing of which this country is possessed.

Of similar works of restoration that have been in progress during the past year and the further work in prospect, those at the Tower of London are probably not the least interesting. Considering the national importance of that great building, and the special knowledge required for its proper treatment, it would be satisfactory to know that advice had been asked from those who, having long studied the subject, may be best qualified to afford it. This may have been done, and I trust it has, for it would be much to be regretted if work of this kind were not to be carried out with all the accuracy which only very few specialists can be expected to possess.

Another subject, interesting alike to ourselves and to the artistic and antiquarian world in general, about which controversy has raged so fiercely that the aid of an archbishop had to be sought in order to settle a question which might, one would have thought, have been safely left to the architect to solve, is the restoration of the tower of Peterborough Cathedral. I should occupy too much of your time were I to attempt to traverse the ground which so many have trod, but I think it is to be regretted that Mr. Pearson should not have been allowed to act on his own matured judgment, and, with the most profound respect for the Archbishop's opinion, I cannot but think that the rebuilding of arches of later date, interfering with the original design of the Norman arcade, which had once a reason, but now will have none, is a requirement of the letter, rather than the spirit of correct restoration. As to the upper part of the tower, opinions must and will differ, and the solution agreed upon is undoubtedly safe; but, personally, I should have preferred to see Mr. Pearson's fine design for rebuilding completely carried out.

As regards the new public offices, not much advance appears to have been made. The model recently exhibited has drawn forth many strong expressions of opinion and some useful criticisms, but others might have been spared had it been entirely accurate and accompanied by explanatory plans and sections. Surely it was worth while, more especially in a case like this, one of so much importance to the future of London, to have made an entirely new model, instead of exhibiting lines of roadway and buildings no longer extant, and omitting others all important for proper comparison with the proposed new buildings. (Applause.) The model may have been useful in showing to the public what has long been the opinion of many architects, that the site is insufficient for the buildings proposed to be put upon it. But for any supposed deficiencies resulting from that cause, the architects whose plans have been accepted are, of course, in no way responsible, and I cannot but think they have been subjected to some unfair criticism which more careful consideration would have shown they do not deserve. Larger courts and more through openings would, no doubt, be valuable, but when a certain amount of superficial area in internal accommodation had to be provided, and all the requirements of structure to be substantially met, the difficulties of the task were enormous, and the result as good as, under such circumstances, could reasonably have been expected. It may, nevertheless, be useful to state, what I am assured by the architects is an exactly ascertained fact, that within the external lines of each site the superficial area of courts provided by the plans as compared with that covered by building, is larger in this case than in the Palace of Westminster or the Royal Courts of Justice, and but very little less than that in the new Foreign Offices; but this is, of course, irrespective of any question of height or distribution.

It is one of the misfortunes of our densely-crowded city that space is so valuable as to forbid much lateral expansion, and, as a consequence, what is wanting in breadth has to be given in height, which, in a climate like ours, involves a serious interference with air and sunshine. Height is no doubt an element of grandeur



in architecture, but if unaccompanied by surrounding space it may become a serious evil. When engaged in the examination of the plans for the new offices, I represented to the judges the seriousness of this consideration in respect of the frontage next Whitehall, where the roadway is narrow, and the building proposed very lofty. In the revised plans the difficulty has to a certain extent been met by recessing the main front about 30 ft.; but it will not remedy what to my mind is a defect of considerable importance, and which could only be completely remedied by a considerable extension of area. What the difficulties may have been in obtaining more space, and especially the frontage towards Charing-cross, at present, with the exception of the banks, occupied by such comparatively low mean buildings, I am unable to say; but, I think, it is much to be regretted that when an important work like that now contemplated, and which ought to be a great metropolitan improvement, had to be effected, the additional land was not secured, however large the cost might be.

Surely, in view of its vast importance to the future of London, the right solution of this question, in an imperial rather than a merely financial sense, is a thing much to be desired, and one that this Institute would do well in endeavouring if possible to promote.

I think it must be gratifying to all of us, that for the new bridge proposed over the Thames, the design of our past-President, Horace Jones, has been accepted for execution. We may all be grateful that London Bridge is to be left untouched in its noble simplicity, and that to our brother architect has been committed the far more congenial task of designing something entirely new. Mr. Jones has favoured us with a sight of the general design, and a brief description of the construction to be followed, but it is obviously to be a work of so much importance and interest that it would be wrong for me to attempt in this address to describe it in detail, and I gladly forego to do so, in the hope that our friend may one day give us something much more valuable than I could presume to put before you on an evening like the present. I may, however say this much, that the design in its general outlines is strikingly original in character, and, as regards the towers, affords the architect a rare opportunity of rivaling in massiveness and simplicity of structure the great works of antiquity, which no one can contemplate without satisfaction and delight. Mr. Jones further informs me that an Act of Parliament was obtained authorising the Corporation of the City of London to erect this bridge, after a contest lasting nineteen days before a committee appointed by the House of Commons, and seven days before a committee appointed by the House of Lords. Mr. John Wolfe Barry was the civil engineer under whose advice application was made to Parliament, and his skill, talent, and experience contributed in no small degree to the success of the Corporation in obtaining their Act of Parliament.

On subjects not immediately connected with architecture, but of serious importance as regards the healthfulness and beauty of our vast and ever-growing metropolis, I think it may not be out of place to notice the movement that has been set on foot for the acquisition of land for a North Metropolitan Park, supplementing, as it is proposed, in a very necessary way the original purchase by the Metropolitan Board of Hampstead Heath. Possibly few people, except those who have studied the subject on the spot, and have watched the ever-advancing tide of bricks and mortar, have realised what a terrible loss it would be to the northern side of London if the tract of undulating and beautifully-timbered land between Hampstead Heath and Highgate, including the historical mound of Parliament Hill, were delivered over to the speculating builder. Many years ago our first professional president, Professor Cockerell, proposed a plan, which, if it had been adopted, would have made a noble approach to a beautiful suburb; but that, like many another fair proposal, was thwarted, and finally dropped. Mr. Cockerell's plan was published in the *Builder* of July 2nd, 1853, and accompanied by an excellent editorial article, from which I quote the following passages. The editor says:—

"The effect of parks and pleasure-grounds on the health, the manners, and the happiness of a great metropolis, has been wisely felt and distinctly recorded from the earliest times. Hampstead Heath is one of the loveliest spots in the kingdom, and we would aid those who are seeking to

keep it in its present state for the health and delight of the people."

"Cold must he be who ever gazed  
Impassive on its beauty."

If we make a circuit around the rapidly-increased suburbs of the metropolis, we can find no spot concentrating so many advantages for a public park as Hampstead Heath; indeed, it is unique, and may challenge the great cities of the world for a parallel suburb. Its height,—no less than 425 ft. above the Thames,—commands views extending over the vast metropolis from east to west,—to Shooter's Hill on the one side, and on the other to the Surrey and Berkshire hills, embracing Windsor Castle,—and an interesting country of surpassing beauty and variety, and proverbially healthy. Its sandy soil, of vast importance in our humid climate, secures at all times a dry and healthy recreation-ground; and in accessibility to all classes from all parts of London it is unrivalled already, and the projected lines of rail from the East of London will render it still more convenient. It has long been the school for landscape artists. It is to London what Fontainebleau is to Paris, and the extent to which its picturesque beauties, undulations, and the wildness of the Heath are enjoyed by the humbler classes on Sundays and holidays is refreshing to behold."

But Hampstead Heath, on the side next London, without the acquisition of the adjoining land to which I have alluded, would be deprived of almost all the beauty so eloquently descanted on by the Editor. It would, in fact, become a mere narrow strip of brown grass, shut in by houses on either side, and this is the part which, more than any other, is the people's recreation-ground. The scheme now before the Metropolitan Board is entirely practicable, if only the cost of it can be met; and it has, I believe, been clearly shown by experts that it can, without imposing any appreciable burden on the general community. Looking to the future of this metropolis, it is one of such vital importance for the health and recreation of toiling multitudes, that it is to be hoped it will be viewed by the Board, not as a mere local matter, which in no sense it is, but as it is in truth, one of metropolitan, not to say national, importance. Anything that concerns the healthfulness and beauty of our great city ought to be a subject of interest to us as architects, and for that reason, as for others, I think this movement is quite worthy of the sympathy and support of this Institute.

Another subject, akin to this in one sense, has occupied much public attention during the passing year, one of vast importance to the well-being of the community, but by no means easy of solution,—“the housing of the working classes.” One considerable difficulty as regards artisans connected with building is the migratory nature of their employment. Men must live near their work, or lose much time and cost in getting to and fro, and this must needs interfere with the occupation of a settled home, so conducive to the comfort and general happiness of life, and it is one that cannot well be met by legislative enactments. But the roving tendency is not confined to artisans, and with others, as with them, it produces similar results. The most serious matter, however, is the condition of the houses inhabited by the very poor. Sad it is to contemplate, and most seriously difficult to devise a remedy. As regards provision of buildings, much may probably be done by architects who have the charge of estates; but the other difficulty is far more serious, and will require the highest wisdom in social questions effectually to grapple with what is not only a difficult, but involves a serious danger to the State. It is to be hoped that much good may result from the investigation of the Commission, which has recently presented its report, and of which, amongst others, our Fellow, Mr. Godwin, was an active member. Few, if any, men living have done more than he in persistently working in this subject, to which, to his honour be it spoken, he was one of the first to draw the public attention (applause). It is a subject for architects to ponder, and therefore not, I think, out of place in an address to the Institute.

As regards our Colonies, we have lately entered into relations with the Auckland Institute of Architects (New Zealand), founded in 1880 on the lines of our own body, which I trust may bear fruit in the future; and with Mr. W. W. Wardell, of Sydney, the honorary secretary for Australia, our communications are very frequent.

It is each year a sad necessity to record the losses sustained by death. I have already spoken of those of men pre-eminent in their connexion with our own body, but there are unfortunately more to be mentioned, some of whose names were well known to us, and though others may have been less familiar, it is not right they should be left unnoticed.

George Alexander will only be remembered

by few, having early retired from practice the enjoyment of the life of a country gentleman on his estate in Wiltshire, but in younger days he was well known as a successful architect, and he was, I believe, a friend of Professor Donaldson.

Of Matthew Ellison Hadfield, a name-power in the Midland counties, we have already taken note, and the same may be said of Richard Mackelwaine Phipson, in the Eastern district a man sorely missed by those amongst whom practised. John Middleton, of Cheltenham, of the kindest and most genial of men, was an excellent architect, an artist, and antiquary, some of whose works display, in combination with sound construction, a freshness of detail which is always grateful to those who appreciate good work. His son is still amongst us, and we hope may long continue a labourer in the more special field he has chosen for himself.

William Thompson was a name well known in former years; a lover of Greek art, but whose works I am unable from personal knowledge to speak.

I am sorry also to record the very recent death of Frederick W. Ordish, of Leicester, architect of no mean power, formerly associated with that able man John Johnson.

His works were not numerous, but there was much originality in all that I have seen of them, and some of which distinctly show the hand of a master of his craft.

Mr. Ordish met his death in attempting to leave a train in motion, a warning to all, far too often heeded.

To complete the list of professional members there remain also the names of John H. Sandford, Fellow; Frank Johnson, Alfred Bevan, J. Herbert E. Tijou, Associates.

In the ranks of Honorary Associates the loss of death has also unfortunately been busy. Mr. Lord Houghton we have lost a most accomplished man, a poet, and lover of art; and in Watkin Williams Wynn a magistrate of the world whom we could ill spare, and Mr. Andrewes Palmer.

Lastly, of Honorary and Corresponding Members we have also to regret the loss of Theodore Ballu, of Paris, and Heinrich Dehn Rofelzer, of Berlin.

It is a natural sequence of our obituary that I should record the receipt of a legacy of 19l. 19s. from Charles Henman, whose death I mentioned last year; but although legacies are valuable, and to be thankfully received, is a more agreeable and promising subject of congratulation to speak of gifts from those who remain amongst us, and in which the present year has not been unfruitful. I do not many, probably only very few amongst us who can afford to make such acknowledgments of professional success as that of our Fellow and friend David Brandon on retiring from office as Vice-President. But such gifts are none the less gracious because they are rare, and it is to be hoped in the future that a valuable example may lead others to do likewise.

Mr. Aldwinckle's donation for one year of encouraging travelling in Italy is a hopeful sign, and the graceful act of Miss Jones, endowing a scholarship for the study of coloured decoration in memory of her late brother, that great master of the art, is a for which we may be truly grateful, and it is allowable to hope will keep his memory green in the minds of many yet to join our ranks and participate in its benefits. Opportunities are constantly occurring for the disposal of such gifts, and they may all be made to tend to the essential object of our existence, the advancement of the knowledge of the art of the profession.

Finally, gentlemen, it is I think indisputable that as in the body politic so with us, with the enlarged franchise must come increased responsibility, and I would fain remind our younger brethren, the Associates, so full of zeal for the higher work of the Institute that its future must rest with them; and if I may again, and with a difference, quote my own words, I would say that as the aim of our founders was high, so let their standard be raised still higher. The work which their predecessors commenced in weakness let the continue in strength, and, disregarding all meanness and petty jealousies, let them labour, not much for their own material interest as for the true and loyal promotion of the great art which they profess, and for the maintenance of its



and honourable character which it was the great object of our founders to establish.

Let them, in the words of the poet, be like a youth

"A youth—whose brow, 'mid snow and ice,  
A banner, with the strange device."

d died

"Still grasping, in his hand of ice,  
That banner, with the strange device,  
Excelsior!"

[For a report of the proceedings which followed, see p. 659.]

# COTTAGES FOR RURAL DISTRICTS.\*

THIS series of designs and descriptions, dictated by permission to H.R.H. the Prince of Wales, is the work of an architect who has had a large practical experience in the selection of the particular class of structures which he treats, and as such he is entitled to special attention. His book, which is without an index,—comprises eight plates of plans and elevations for cottages of many kinds, an introductory essay on cottage building, and a specification, intended, we presume, for the assistance of the otherwise unaided amateur. With the views expressed in the introduction we are almost wholly in accord, and, indeed, they have long passed the controversial stage. But on one or two points we are not quite at one with the writer, and think that some of his statements, though true in the main, require,—looking to the hands of whom the book is evidently intended,—some qualification, *e.g.*, in stating that gravel and other open soils are the best for building on, it is necessary to observe that these should be overlaid by a retentive substratum: if they simply fill up a clay basin they become mere sponges filled with impure matter, and are worse than clay itself.

Nor are we quite certain that leaving the cottage to distribute the chamber, scullery, and other foul water over the garden is a prudent course, for the chances are that he will simply throw it out of doors and it will lie out in puddles to saturate the foundations. Again, we are not in favour of providing in the owner's cottages that "best room" which the author's plans are never without. Such rooms are wasted, and their area would be more profitably divided between the kitchen and wash-house. To make the kitchen, which is really the living-room, capacious and comfortable is the first importance; the "best room" is a luxury which, in the majority of cases, can well be spared.

We are surprised that the author has given no information as to the cost of his (presumably executed) designs. The "close contriver" of such buildings finds that to be the crux; and the task of providing a three-bedroom cottage for 100l. has puzzled many a wight. The cottages designed by Mr. Menzies are far over this mark, and range apparently from about 225l. to 575l. each,—the former in rows, the latter designed for superior occupation. These rates are too high to be of general application, and they are due in a measure to the provision of that "best room" which, in the lower class of cottage at least, is usefully omitted.

In designing the plans compactness has been evidently been earnestly sought, and nothing could well be more compact than these plans. But Mr. Menzies has not always,—indeed he has seldom,—observed his own caution as to the relative positions of doors and fireplaces, and in most of his designs a cosy fireside would be an impossibility. The "best room" in plate i., is an example, and plate iii. is worse, for every fireplace,—except that in the scullery, which is of no importance,—is directly flanked by the entrance-door. These little things show that in so small a matter as designing a labourer's cottage there is room for thought and scope for the exercise of considerable skill. The best plan of the series is that for a double cottage (plate vi.). But here we are compelled to take exception to the position assigned to the linen-closet, which is placed against the outer wall, with a south-west and, therefore, a wet aspect, and far removed from any fireplace. It should, if possible,—and it generally is possible,—be arranged so that the kitchen-due, as being the most constantly used, passes close to it and helps to air its contents,—a precaution about which

cottagers are notoriously careless. Another closet near the kitchen fire to dry the labourer's wet clothes when he returns from work is a very desirable provision. One other point, and our fault-finding is at an end. The bed-rooms do not always afford satisfactory accommodation for the bed. This article of furniture should be plotted on the plans invariably, and the windows, doors, &c., accommodated to its comfort. In the plans before us it must, for the most part, be placed opposite the door, or partly under the window, or both. But it is more important that the bed should be warmly placed than that the windows should be externally symmetrical, or be placed centrally in the gables. Mr. Menzies has displayed considerable ingenuity in planning and grouping his cottages, and he will not, we feel sure, take it ill if we suggest the direction in which still further excellence is attainable.

His designs are set out in clear and precise drawings, and he has had the good taste to abstain from endeavouring to obtain for them a worthless admiration by presenting them to us tricked out in the effective but misleading sketchiness which is generally thought to be the fit accompaniment of such subjects.

## Illustrations.

### ALTAR CLOTH, LAMBETH PALACE.

THIS altar-cloth was executed for the private chapel of Lambeth Palace last year.

Owing to the richness of the decoration of the building, it was necessary to make the covering of the altar as rich as possible: plush was therefore selected, the frontal itself being composed of this material, of light terra-cotta colour, stamped with a specially-designed pattern, while the superfrontal and covering of the super-altar are of dark terra-cotta plush unstamped.

The whole of the needlework is composed of silks of various colours and of Japanese gold, the latter being used both in solid masses and for outlining certain parts.

It will be seen by the phoenixes on the superfrontal that the main idea of the design is symbolical of the resurrection. It will be found that this thought practically pervades the whole design; but the phoenixes being the chief symbol, it appeared well to emphasise them as far as possible: their bodies have therefore been embossed to a considerable extent,—about three-eighths or one-half at the highest point,—by means of pillows laid underneath, over

The fringes are all of silk, the bottom one partly tied, whereby a dark red plush backing is shown: the strips of needlework above the fringes are enlivened here and there with gold and silver spangles.

It should be mentioned that the cross is mounted upon an unstamped plush appliqué of the same colour as the frontal.

The covering of the super-altar is diapered with gold-coloured filoselles, large circles containing flowers, and small circles containing jewels, being introduced at intervals,—the whole in silk.

The work was very beautifully executed by the Sisters of Clewer.

J. ARTHUR REEVE.

### NEW CHURCH NEAR NETLEY.

THE Church of St. Edward, Netley, is now being erected about a quarter of a mile from the abbey, upon a site given by Colonel the Hon. H. Orlington, who is also a liberal donor to the building fund. The church is being built of Portland stone, with dressings of Douling stone from Mr. Trask's quarries. The length of the church is 102 ft., and the width of the nave 24 ft. 8 in. The contractor is Mr. Bone, of London, and the architect Mr. J. D. Sedding.

### HULL ROYAL INFIRMARY.

ON Thursday last the new wing of this infirmary was opened by Lord Herries. The foundation-stone was laid by H.R.H. the Duchess of Edinburgh, October 1st, 1884, and on both occasions the arrangements were presided over by Mr. Henry Simpson, the Chairman of the Board of Management.

The alterations to be carried out at this building under the direction of the architects, Messrs. H. Saxon Snell & Son, are of a very extensive and important character, for they illustrate the possibility of improving, at a moderate cost, the bad planning and general arrangements of existing hospitals.

It will be useful, therefore, if, in giving an account of the alterations this building is undergoing, we first show what was the original plan, and how injudiciously it has been added to in past years.

The accompanying plan (fig. 1) shows the principal floor as it existed before the present alterations were commenced, and the rooms are so numbered as to indicate the various additions that have been made from time to time.

The building was originally designed for the accommodation of seventy patients, and con-

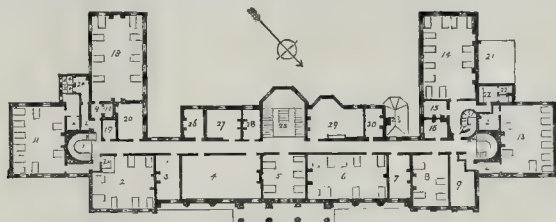


Fig. 1.—Plan previous to present alterations.

which has been worked solid Japanese gold, the feathers being indicated by the varying directions of the strains; the main feathers of the wings are also slightly embossed, while the eyes are of amber-coloured glass with black pupils, such as are used for stuffed birds. The aureoles round the heads of these birds are composed of Japanese gold and yellow filoselles about half and half, and the flames and ashes are entirely of filoselle, red and yellow.

The plants occurring between the phoenixes are of green filoselle of various shades, the flowers being coloured somewhat after the manner of the eyes in a peacock's tail.

Very little Japanese gold has been used on the frontal, it has only been employed for outlines to the cross and in similar positions; the whole of this work is, therefore, practically in filoselle.

The colour of the cross is mainly of shaded gold deepening into dark terra-cotta, but the colouring of the birds on the stoles is very bright and varied,—the predominating tints being blue and yellow.

sisted of three stories of rooms, numbered from 1 to 10 on the plan, ranged along the principal front, and connected together by means of a corridor running 'along the back front. The foundation-stone of this part of the building was laid in the winter of 1782, and the building was opened on the 1st of September, 1784. Its cost was 3,000l., but the total outlay, including the site and other expenses, is stated to have been 4,216l.

In the year 1842 the external brickwork was cemented over, and the facade next Prospect-street re-designed by Mr. Lockwood. The wings containing the wards and offices numbered upon the plan from 11 to 13 were also added, and so far the building was as good a hospital as any erected at that date, and before the introduction of the pavilion or block system of construction. But the work of deterioration shortly afterwards began, first by the erection in 1855 of a wing containing the rooms numbered 14 to 17, then in 1853 the commencement, and subsequently in 1864 the completion of the wing containing Nos. 18 to 20, thus cutting off

\* Cottages for Rural Districts. By William Menzies, Architect. Windsor: Wm. Clarice.



much of the sunlight from the rear portion of the building, and destroying the free circulation of air that previously existed round all parts of it.

The additional offices numbered 21 to 24 on the plan were also added at various times, but the climax of injudicious extension was reached when the three stories of rooms numbered from 25 to 30 were erected, thus effectually closing in on each floor the only ventilated sides of the corridors of communication. Thus the living-rooms of the officers and the wards containing the sick open in common on to the same un-ventilated passages, and it will not, therefore, be surprising to learn that Mr. Hagyard, the house-surgeon, found it necessary in his medical report to draw attention to the fact that, although "a great number of deserving cases had to be sent away for want of room and for fear of over-crowding the Institution and rendering it unsanitary," yet that there had been "a great deal of sickness among the resident officials, nurses, and servants principally of a kind pointing to unsanitary conditions of the hospital." Further, he points out that on the contrary the night nurses who, for want of space in the main building are located in one of the adjoining houses in Brook-street, "have been singularly free from sore throats and other septic ailments."

It is, however, not only in the general planning of the extensions above referred to, that errors have been committed, but even greater blunders occur in matters of detail. For example, the small room numbered 2, is a combined scullery and lavatory, with a washing-up sink. Its only light is obtained through the glazed partition that separates it from the adjoining ward, and it ventilates itself into the corridor leading to the sick wards and offices. Again, the air from the water-closets numbered 24 and 22, also passes into the corridor, for these offices are unprovided with cross ventilation, and the higher temperature of the inside of the building consequently induces currents of air to pass from these water-closets along the corridors rather than outwards and through the windows.

This, then, was the condition of the building before the present works were commenced, and we will now describe, by reference to the accompanying plan, Fig. 2, what these alterations will consist of.

The separation of the officers' quarters from their present connexion with the sick wards will be effected by cutting two gaps through the main building to the right and left of the centre of it, and removing the sick from the central to the two side detached blocks thus created. At the same time the officers' apartments and the administrative offices generally will be concentrated in the central block. Communication between the two blocks is provided for by means of light iron bridges spanning the separating gaps.

These wings will further be extended by the addition to each of a new arm, three stories in height, running north-west and south-east, and providing accommodation for 78 and 96 patients respectively.

But for the short arms running out at right



Fig. 3.—Detail Plan of New Wing: First Floor.

angles, to the side pavilion blocks, and which it would have been desirable to remove, did the funds permit of their erection elsewhere, the building, in its altered state, will be as near an approach to the recognised type of English hospital construction as is possible under the circumstances. It will certainly so far as regards the separation of the sick from each other, and from the officers, be vastly superior to the arrangement of the Glasgow Western Infirmary.

In a new building the sick pavilions would, of course, have been removed further from the

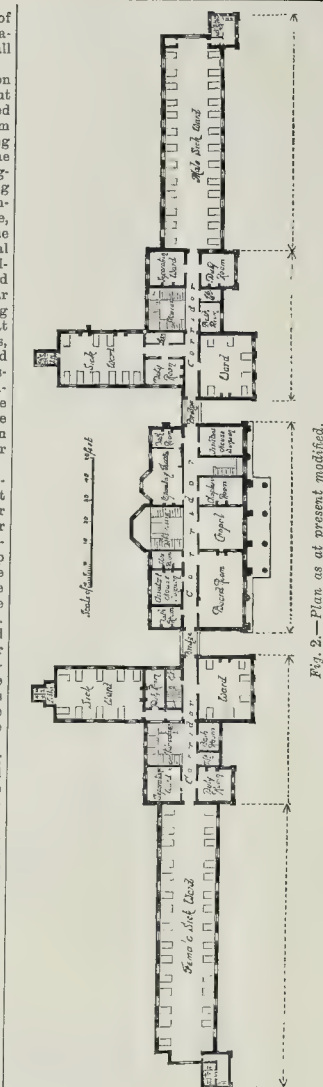


Fig. 2.—Plan as at present modified.

room, secretary's room, and medical office consulting-room; on the first floor a board-room, chapel, chaplain's room, second assistant house-surgeon's sitting and bedroom, an operating theatre and dressing-room. On the second floor the kitchen, scullery, and stores, the house-keeper's apartments and domestic dormitories.

The south-east wing will contain, on each floor, one ward for the accommodation of thirty-one beds, one for nine, and one for six beds, and also a separation ward for two beds. One of the wards on the upper floor, being for children, will contain two additional beds; the small ward on the ground floor, adjoining the entrance-hall will be used as an accident ward.

The corresponding wing on the north-west side will contain, on each floor, one ward of twenty-four, one for ten, and one for six beds, besides a separation ward for two beds; a small ward on the ground-floor will, like that of the opposite wing, be available for cases of accident.

The view we publish shows the new north-west wing and its connexion to the present building, and the accompanying enlarged plan shows the principal floor of this wing.

It will be seen to consist of a three-story building, and it contains on each floor a large ward for twenty-four patients, and an adjoining smaller ward for two patients. A bath-room, nurses' room, lift, and staircase is attached, and at the extreme end there is a well-planned lavatory, with water-closets and slop-sink attached (Fig. 3). It is to be regretted that the extent of the ground did not allow this wing to be lengthened for the accommodation of a large number of beds as in the opposite wing.

It has been estimated by Messrs. Snell & Son that the cost of the alterations (exclusive of the out-patients' department, which is a detached building) will be 25,000*l.*, or 93*l.* per bed, and so far as the works have progressed it does not seem that this sum will be exceeded. No doubt is therefore entertained that the building when entirely renovated will have cost little more than half that of a new building.

The works are being executed under contract by Messrs. Jackson & Sons, and other local tradesmen.

#### LARGE FREE CHURCH.

WE give this design in memoriam of its young author, Mr. A. J. Grahame (not W. A. Grahame, as the name appears on the plate by a mistake of the lithographer), whose untimely death we alluded to in our last number. Under the circumstances, we are unable to procure any further details or particulars as regard to the building, which, we believe, is being carried out, or to be carried out, from this design under other superintendence.

From the *Pall Mall Gazette* we learn that the funeral of Mr. Grahame, which took place a few days ago at Highgate Cemetery, was attended by a concourse of mourners such as is seldom seen at the grave of so young a man. The Dean of Westminster, at his own request, read the service.

#### MUSIC-ROOM, 6, GLOUCESTER-ROAD, REGENT'S PARK.

A NEW wing, comprising billiard-room, music-room, and nurseries, has been added to the house, the residence of Mr. R. Borwick. The accompanying view shows the interior of the music-room, which is 33 ft. by 18 ft. and 14 ft. high, and is generally approved by musicians as being well-proportioned for acoustic purposes.

The organ has hydraulic power attached, worked by constant supply.

The work was carried out by Messrs. Taylor & Parfitt, builders, from the design and under the superintendence of Messrs. C. Eales & Son, architects.

#### COTTAGES AT SEAL, NEAR SEVENOAKS.

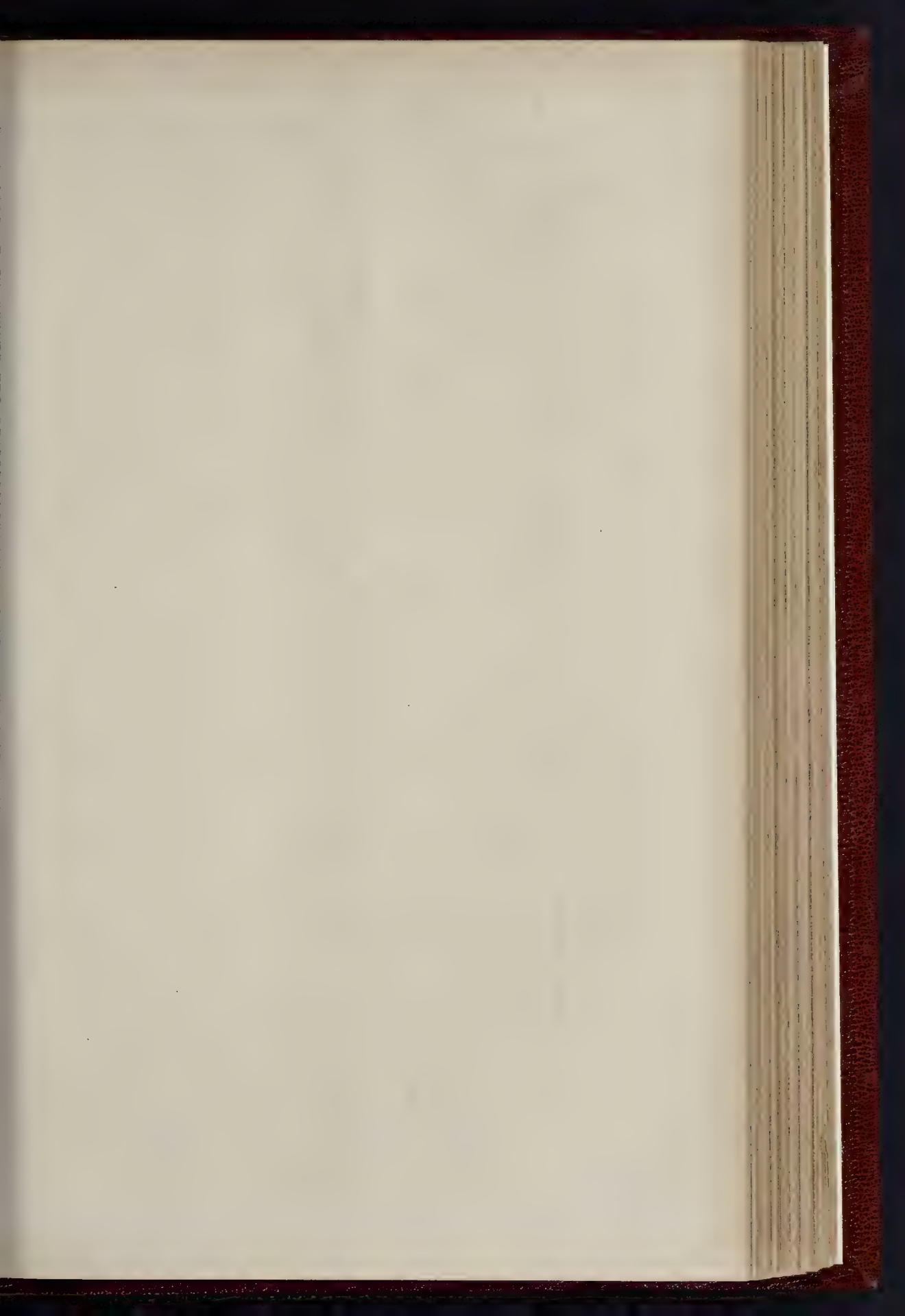
THE cottages, of which a view is given, have been recently erected for Sir Charles H. Millard, M.P., on part of "The Wilderness" estate at Seal, near Sevenoaks, Kent. They each contain, on the ground-floor, a living-room, kitchen, and scullery fitted with sink and water laid on a ladder, and a coal-cupboard.

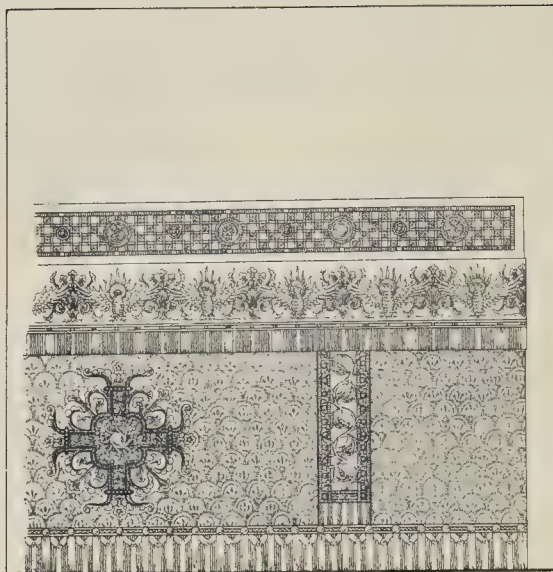
Each cottage has three bedrooms,—the central has two on the first floor and one larger on above. They are built of red bricks, with stone

central administration block, and the dimensions of the wards and the arrangements of their offices would have been in some respects different if unfettered by the necessity of retaining as nearly as possible the levels of the present floors, preserving the external character of the present building and other like considerations.

The central block as altered will contain upon the ground floor the entrance-hall and staircase, a waiting-room, lady superintendent's sitting and bed room, house surgeon's and first assistant house surgeon's sitting and bed rooms, a dining-







GENERAL ELEVATION



DETAIL OF STOLE



FTB for lth

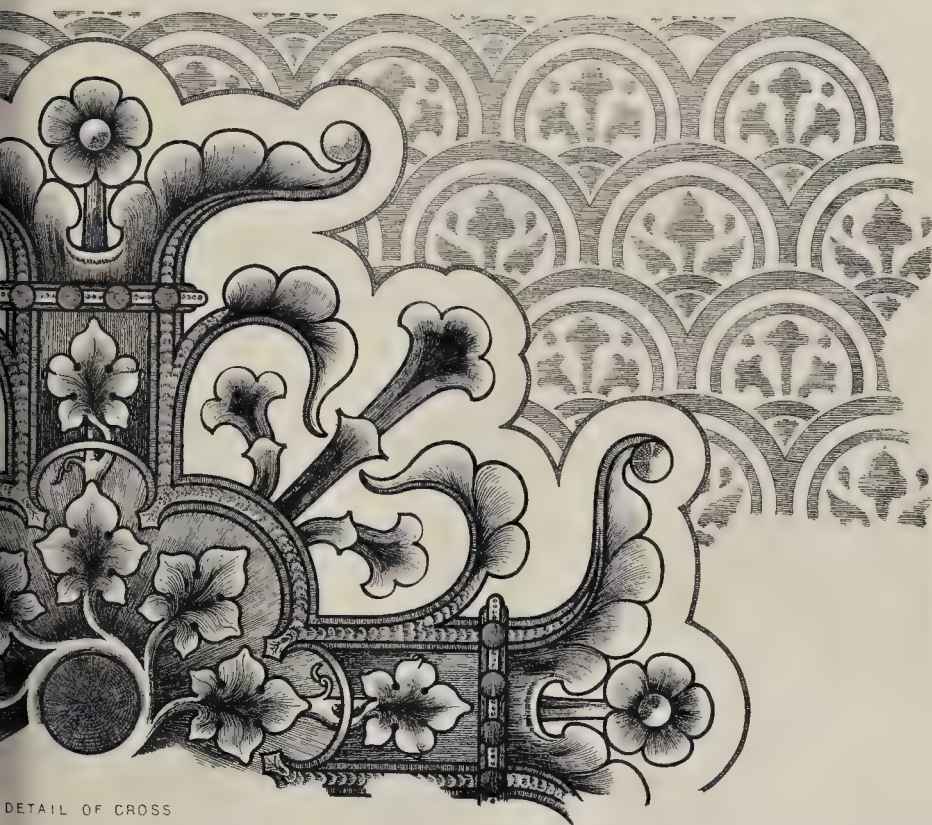
J. F. Kelly Litho & Printer

FRONTAL AND SUPER-ALTAR FOR THE CHAPEL





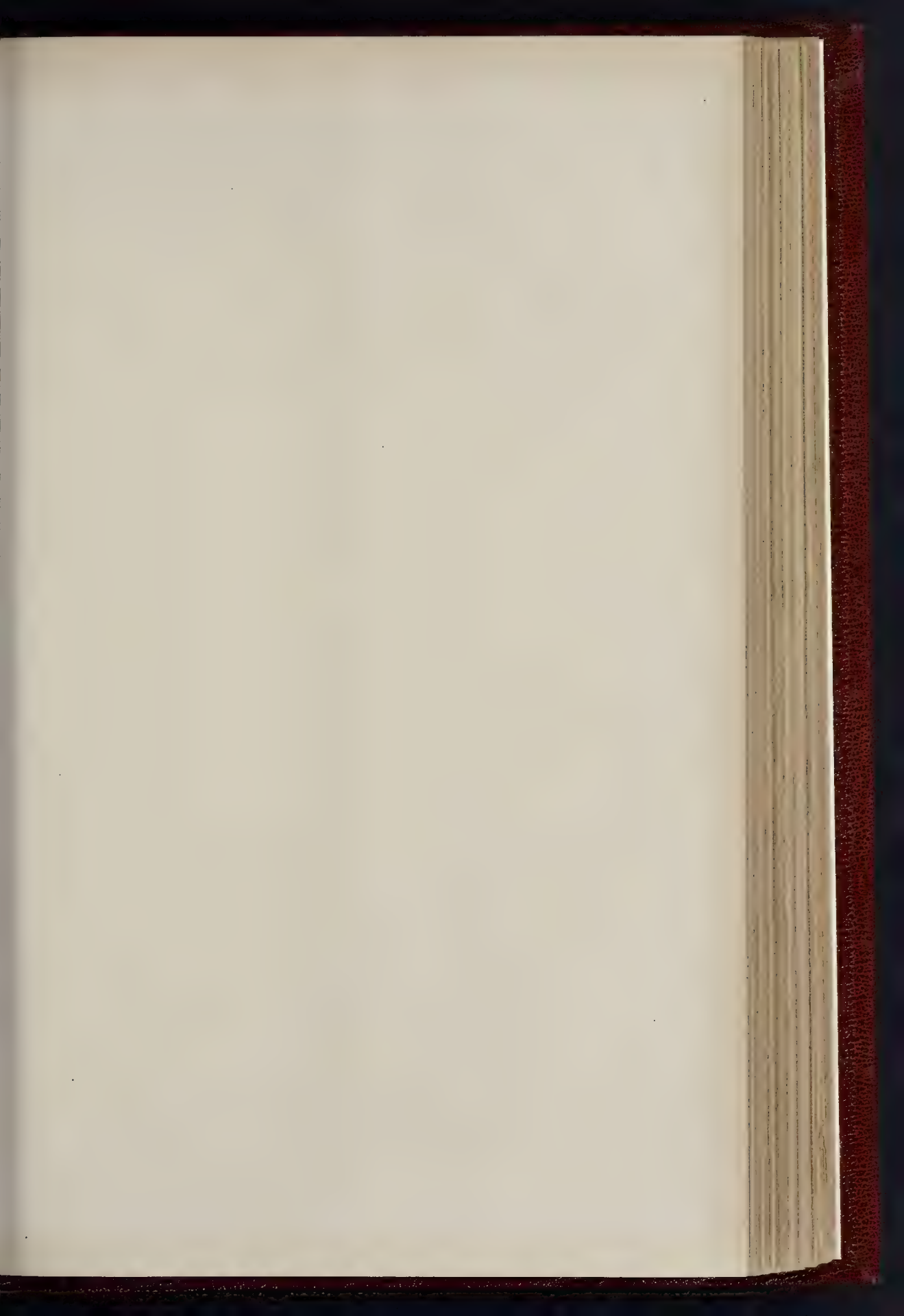
BORDER OF PHOENIXES



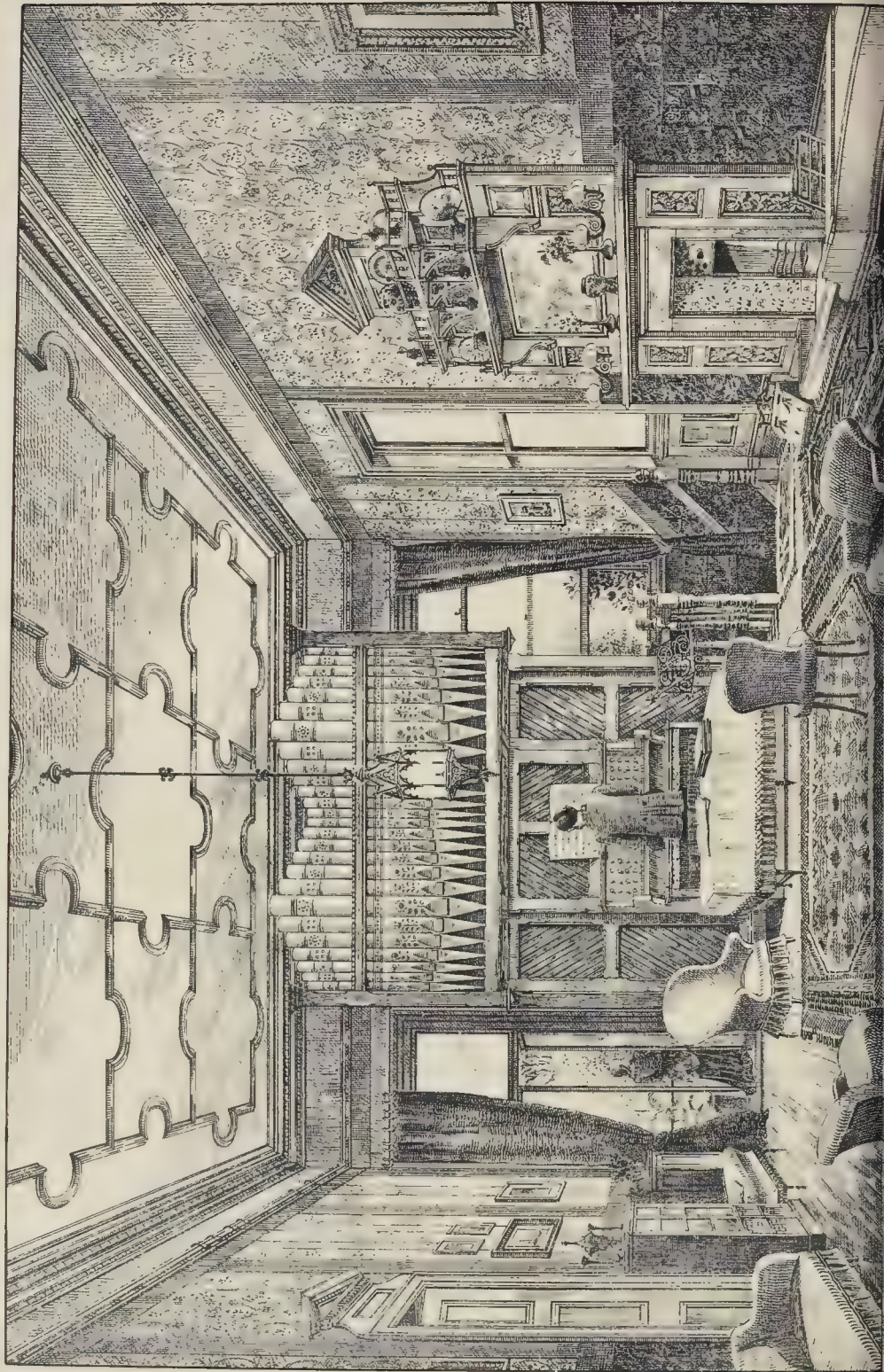
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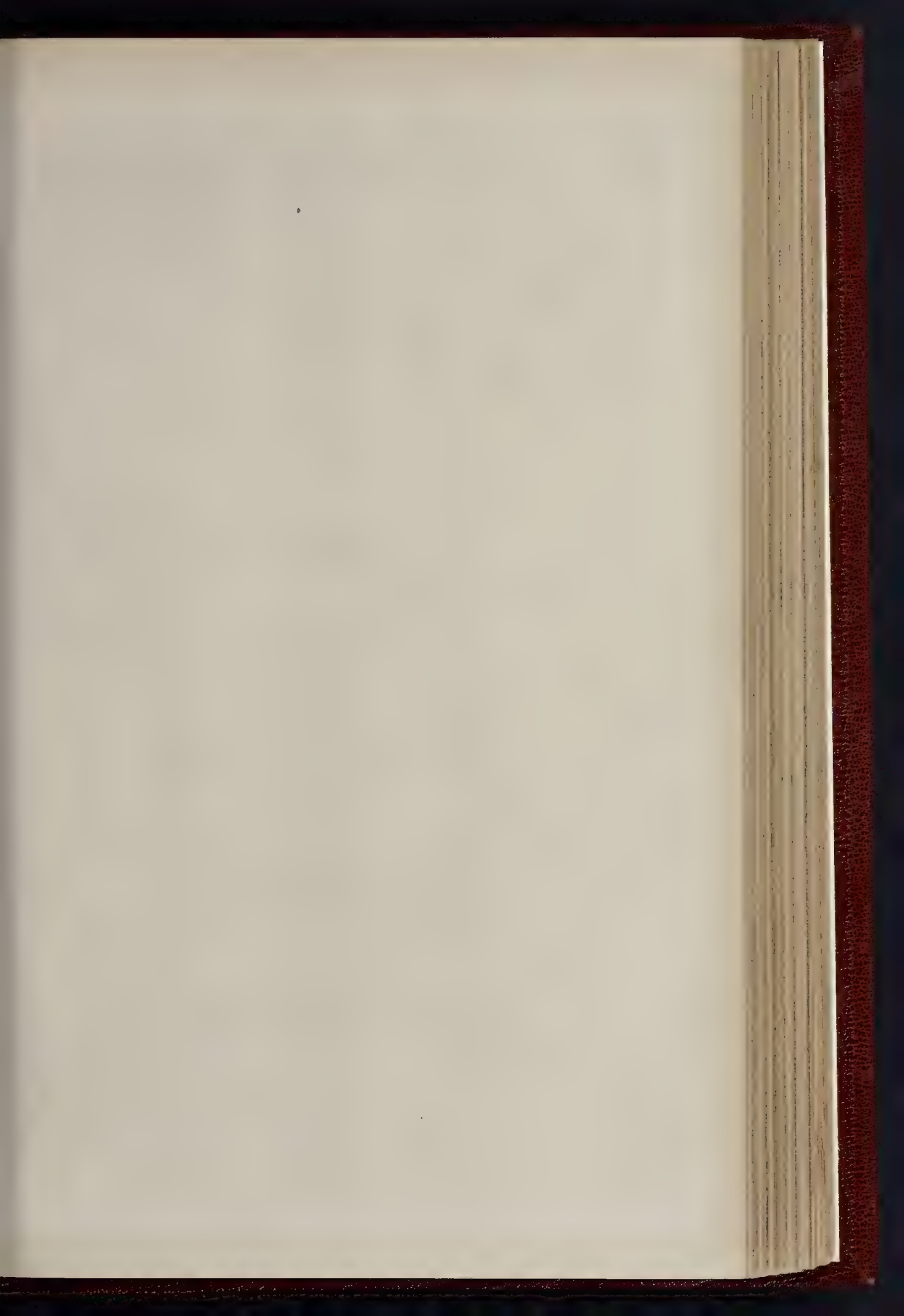




THE BUILDER, NOVEMBER 7, 1895











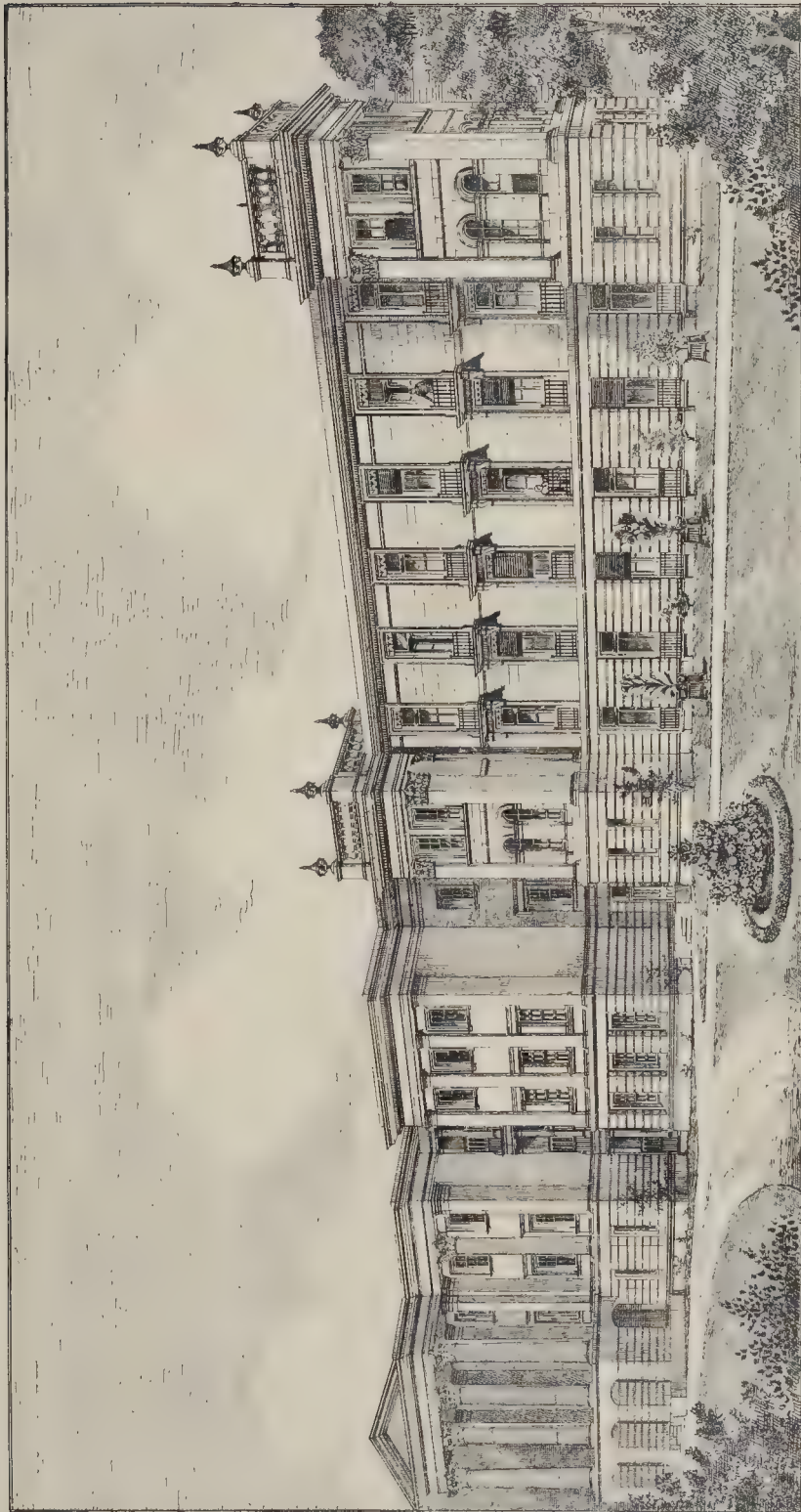


NR PHOTO SPRAGUE & CO LONDON

DESIGN FOR LARGS FREE CHURCH.—THE LATE W. A. J. GRAHAME, ARCHITECT.







HULL ROYAL INFIRMARY NEW NORTH-WEST WING

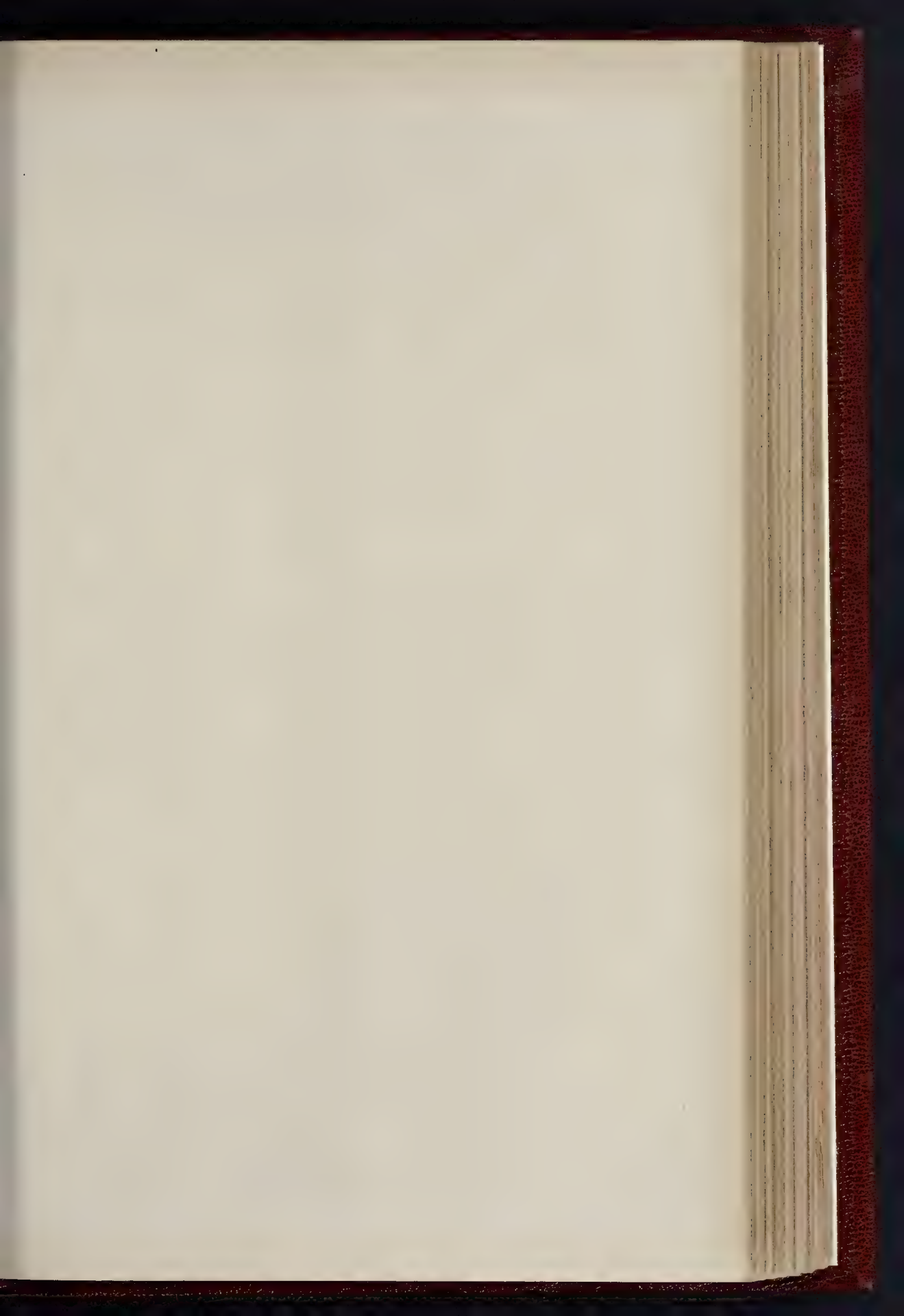
MESSES. H. SAXON STELL & SON, ARCHITECTS.

W. & A. C. G. P. & S. Ltd.

W. & A. C. G. P. & S. Ltd.



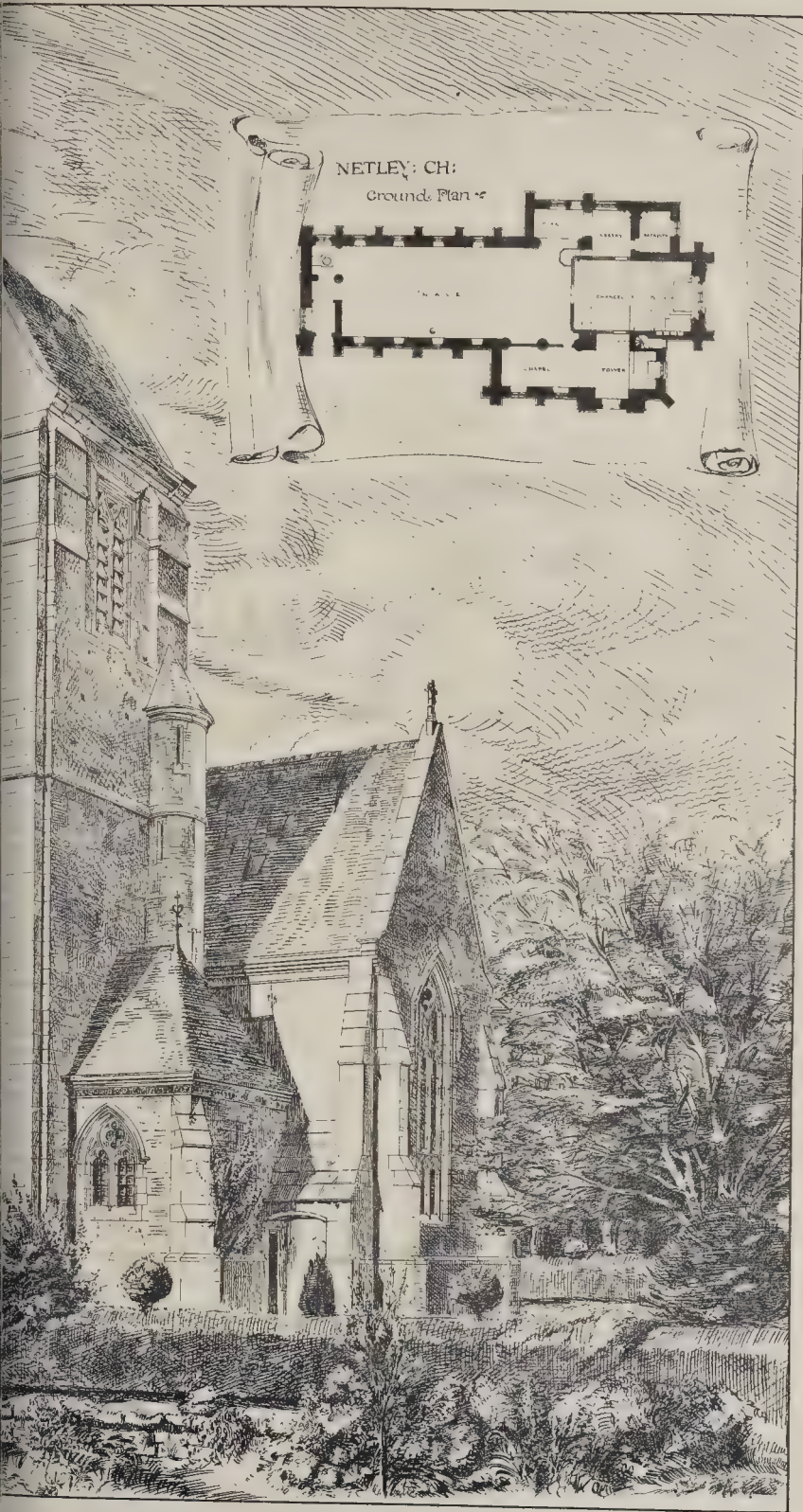






NEW CHURCH, NEAR









hs, bands, &c.,—the external walls being w. The upper and overhanging parts, as as the gables, are timber-framed, filled in cement concrete with a roughcast face; internally the bedrooms are battened, as a precaution against damp. The roofs are red with red pressed tiles, which, as well as the red bricks, are from the Dunton Green works.

se works have been carried out by Mr. W. Shire, of Sevenoaks, under the superintendence of the architects, Messrs. Hooker & ings, of 7, Fenchurch-street, E.C.

#### ARCHITECTURAL SOCIETIES.

**Birmingham Architectural Association.**—The 11th annual conversations were held on day evening in the Library and Examination Hall at Queen's College, Paradise-street. President (Mr. F. B. Osborn) was supported Messrs. A. Reading, Doubleday, Henman, J. on (Vice-President), W. H. Kendrick, R. B. an, J. K. Jones, F. G. Hughes, H. H. onal, J. P. Osborne, J. W. Tonks, W. ke, Dolly, Ayres, Cooper, Spencer, T. W. F. ton, and others. There was a very good collection of loan drawings, notably some by rs. Ernest George and Peto, W. F. urther, E. J. May (London), J. Douglas ster), and drawings of works in progress Birmingham architects. In the absence of V. Scruton, hon. sec. (who was too unwell tend), the report was read by Mr. T. W. F. ton. In it the committee expressed their on that the last session had been the best Association had seen, the classes and res being far better attended than pre- ly. The prizes for fire-proof construction entation have both been taken by Mr. D. ll. On the motion of Mr. Reading, seconded r. Doubleday, the report was adopted. The ident then read his address, in which he w with the work of the past session, and d members to work well and truly for he cement of their art. Having touched e New Assize Courts competition, the ident urged members to do all in their r to further the aims of the Association, o carry out to its fullest their motto, 'sign with beauty, build in truth.' A vote hanks was accorded to the President, on motion of Mr. John Cotton, seconded by W. H. Kendrick.

**York Architectural Association.**—On the 29th he opening meeting of the fourth session e York Architectural Association was held e Saloon of the Victoria Hall, Mr. A. rd, the President, in the chair. Mr. B. tley Shires, hon. secretary, read the annual t of the session of 1884-5, which stated ere had been a continued increase of all es of members, and a marked progress had ade since the Association was started e years ago. The report was adopted. J. J. Monson, G.E., one of the vice-presi- ds, read a paper on "Sewage and its osal."

#### COMPETITIONS.

**Proposed Law Courts, Birmingham.**—The h-plans for the proposed New Law Courts Birmingham are to be sent in on February 1st xt year, when five designs will be selected, he authors will be paid 100l. each for com- pils to be sent in on June 1st, the 100l. ing in the commission in the case of the tect finally selected. Mr. Waterhouse is the professional adviser of the corpora- n the selection.

**Dispensary, Manchester.**—We are ind that the designs of Messrs. Pennington idgen were selected recently in a limited ition of local architects for the new sary in connexion with the Hospital for mption, Manchester.

**Piers, Bournemouth.**—The Bournemouth vement Commissioners, under the advice of Joseph Bazalgette, have awarded the first in this competition to Messrs. Peregrine M.I.C.E., and F. E. Robinson, A.M.I.C.E., eir joint designs; and the necessary powers e construction of the piers will be applied he ensuing Session of Parliament.

**Hamstead District Board of Works.**—John Rowland, of Cedar-terrace, Old ton, Kent, has been elected by the above y, Surveyor for the parish of Charlton, at ry of 100l. per annum.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The opening meeting of the session was held on Monday last, Mr. Ewan Christian (President) in the chair.

Mr. William H. White (the Secretary) announced the decease of Mr. A. T. Ellison, Associate, and of the Duke of Abercorn, who was elected an Honorary Associate in 1881. Notice had also been received of the death of Mr. Lysandros Kaftangioglou, of Athens, Hon. Corresponding Member, and a very old friend of the late Professor Donaldson.

A large number of donations had been presented to the library since the last meeting. Mrs. Storr, daughter of the late Mr. Thomas Allen, had presented a bust of her father. Votes of thanks were presented to the several donors.

M. Charles Garnier wrote a sympathetic letter regarding the death of Professor Donaldson, and stated that he continued to take the greatest interest in the proceedings of the Institute.

Mr. Barnett, Government Architect, of Sydney, who attended, was presented to Mr. Christian.

Mr. F. W. Farrow, the holder of the Godwin Bursary, was admitted as an Associate.

The President then delivered the opening address of the session, which we print on another page. On the conclusion of the address—

Mr. H. H. Statham rose to propose a vote of thanks to the President for his able address, in which so many points of interest had been fully and clearly dealt with. He also wished to express on behalf of the meeting the pleasure they felt in seeing their President again at the commencement of a new session. Feeling allusion had been made in the address to the death of Professor Donaldson, and although, as had been said, they might hope that there were others like him, yet all might feel that he represented a very rare class of mind, and one who had left behind him a high standard for the profession. The President had alluded to the coming reforms in the Institute, and it must be a matter of great gratification to every- body to notice how, in the meetings of the younger members as well as in the present meeting, the mention of the reforms had been received with such general testimony of approval. The extension of the principle of examination could not fail to strengthen the position of the Institute by rendering membership of it a real test of professional competency. But one of the most important of the proposed improvements was a by-law by which country members would have an opportunity of voting without coming up to town. Though this might seem a minor matter in some respects, yet, from what he had heard from various country Associates, he believed it would greatly tend to strengthen the position of the Institute, and to make it a really representative body. It was too much to expect the country members to come very often to London to vote, and they would, therefore, feel much more drawn to the Institute, and would take a stronger interest in its proceedings, if they felt that in spite of distance from the metropolitan centre, they were able to take their part and give their vote in its councils. Allusion had been made to important matters in connexion with the treatment of ancient architecture, which had excited a great deal of attention during the last twelve months. In regard to the treatment of Westminster Hall, he would yield to no one in admiration of the genius and learning of Mr. Pearson; but some of them felt it was not so much a question of the actual restoration of the architecture, but rather that, under the influence of certain persons, architecture was to be turned upside down, and rooms were to be made for which a use was to be found afterwards. The true course in building was to know what was wanted, and then to do it. He had been struck in reading the remarkable Blue Book of the evidence given before the Committee, with the fact that it should have taken some 220 foolscap pages of examination to find out what should be done with one face of an old building. Modern architects should be permitted to have a little more confidence in themselves, and not be so afraid of tackling such a problem. Reference had also been made, in the address, to the remarkable controversy about Peterborough Cathedral, and he entirely sympathised with the President's views on the matter. He (Mr. Statham) felt the deepest

regret that the eminent modern architect had not been allowed to do what eminent architects in all previous ages had done, viz., to make his own additions in his own spirit to a great building where reconstruction had become absolutely necessary. He entirely concurred with the view taken by the President as to the undesirability of rebuilding the two pointed arches that had been taken down. The desire to rebuild them in a style not in keeping with the immediate surroundings, simply because they were there before, arose, he believed, from one great fallacy which had lately gained ground. This was that architecture was all history, a statement which they were continually having thrust down their throats. Architecture was art as well as history. It was certainly going far afield to call in the Archbishop to settle the controversy, but although he could not agree with the conclusions, he must say that he had read the award with very great respect for the ability displayed in it. The President had further touched upon a question of even more importance, viz., the site for the new War and Admiralty Offices. He hoped the Institute would be able to make its voice heard as to the false economy of attempting to erect such great buildings on a manifestly inadequate site, putting them in and out and behind other structures of inferior dimensions and importance. Every one who read the debates in the House of Commons whenever architecture was touched upon, must be struck by the immense preponderance of purely economical views. The question of art was so tabooed by the assembly that even those members who might be expected to take an artistic view of the subject were obliged to say apologetically that they did not enter into it on artistic grounds. He hoped, therefore, that the Institute would be able to make its influence felt on the Government in regard to buildings which might be either a source of national pride or the reverse. He entirely agreed that the defects in the plans were not to be charged against the architects, who had been forced to put upon an inadequate site what could not be built there consistently with good sanitary arrangements and architectural effect. He believed there was some willingness on the part of those at present in office to hear suggestions on the subject, and these should be made with all the weight which the representations of a professional body like the Institute certainly ought to have.

Mr. Hugh Leonard, Hon. Associate, and late Chief Engineer in Bengal, seconded the vote of thanks. One could not hear, he said, such an address without being instructed, and the hopes raised by it must tend to do good, not only to the Institute in itself, but also to those who were trying to forward its views outside the profession. With regard to the alterations in the by-laws, those who had been partly opposed to them must have felt some satisfaction at the explanations which had been given, while those who were anxious for their passing would be gratified at the result. With regard to the new Government buildings, the general feeling amongst what he would term semi-professional men, was that a great opportunity was about to be lost, and that through motives which ought not to weigh with such an important matter.

Mr. E. C. Robins said that they had heard an address such as might incite them to deeds of daring, and they had really an exceptional case before them. They had heard a clear statement of what had been done with reference to the new public offices. A large number of the members present had gone into the facts of the case, and knew what the requirements were, and the difficulty of putting them on the proposed site. After the admirable way in which the President's remarks had been supported, he was desirous that some action should be taken in the matter. He would, therefore, propose—

"That the Council be requested to ascertain from the First Lord of the Treasury, or from the proper authority, a plan showing correctly the allocation of the proposed new buildings for the War and Admiralty Offices on the Spring Gardens site, inasmuch as doubts exist on this point, since the model exhibited for the public information at Spring Gardens in August last was incorrect and at variance with the plans published with the Bill; and that the Council be authorized to memorialise the Government, should they think fit to do so."

That would give effect to the admirable remarks of the President and those who had followed him.

Colonel Lenox Prendergast, Hon. Associate, seconded the proposal of Mr. Robins. Circumstances had led him to have some extended



knowledge of how troublesome it was to get anything done in London. The metropolis seemed to be different to any other place in the United Kingdom. The want of interest taken in anything by Londoners was most extraordinary, therefore he hoped a great body like the Institute would endeavour to lead the public. Any one who had gone into the matter must be aware that the architects had had imposed upon them a task almost beyond the power of any man to fulfil. Nearly all the employes had to be provided with separate rooms, simply because they had been accustomed to do their work in a lot of private houses. When firms, such as bankers and others, were building magnificent halls for their employes to work in, it seemed an anachronism to vulgarise a great national building by cutting it up into a lot of small rooms. He was afraid it would not be possible to deal with that, because certain conditions had been insisted upon in a hole-and-corner manner. At the same time, the Institute might express an opinion upon the utter inadequacy of the ground on which the buildings were proposed to be erected. He hoped the Institute would approach the authorities with no desire to interfere with their wishes generally, but merely to point out from experience of sites of this character, what a terrible mistake was being made.

Mr. William White, F.S.A., suggested that Mr. Statham's motion of thanks to the chairman should be dealt with first. The vote of thanks was accordingly put and carried by acclamation.

The President replied, and agreed with Mr. Statham that the judgment of the Archbishop was most carefully drawn in every respect, but he could not agree with His Grace. The arches mentioned by Mr. Statham, and which Mr. Pearson did not wish to rebuild, were put in on account of the failure which had occurred in the tower. This was absolutely without foundation, and was as rotten as a pear from top to bottom. The builder, who had thought that he would get a great quantity of material out of the old piers to rebuild the new ones, found he had only to cart away the rubbish. There was a remarkable circumstance connected with the foundations of the tower,—the original builders had gone down within 18 in. of the solid rock, and stopped in the soft ground. These arches had been put in because of the failure there, but now that the tower stood on a thoroughly sound base it required no arches or extra support. There was power enough in the piers which Mr. Pearson had built to carry any weight that could be put upon them. The arches, therefore, were an anachronism,—like the work of the Chinese tailor, who, on being told to copy a coat, copied patches and all. As to the site of the new War and Admiralty Offices, of course, the competitors had to deal with the outline given them. His quarrel with the site was not that it was a bad one, because, without doubt, it was a splendid position for a great public building, but that if it were carried out on the lines laid down, it would perpetuate what might have been a good thing some centuries ago when there was comparatively little traffic. Whitehall below was wide enough, but in the neighbourhood of Charing-cross it was absurdly narrow, and quite unfitted for a lofty building immediately contiguous to the pavements. On that ground, therefore, he would like to see it altered. He did not agree with many as to the insufficiency of the plans, which were to his mind remarkably good. But what was wanted for the future of London was a wider thoroughfare in that part if great public buildings were to be placed there. The modification might, doubtless, cost a hundred thousand pounds more, but what was that to a great nation like this in connexion with one of the greatest improvements to be made this century, and which, if not made, would be an everlasting disgrace?

Mr. J. Macvicar Anderson (hon. sec.) proposed a vote of condolence with the family of the late Professor Donaldson; also a vote of thanks to them for drawings handed to the Institute.

This was seconded by Mr. Charles Barry, and agreed to.

The resolution proposed by Mr. Robins being then before the meeting.

Professor Kerr remarked that its wording would require a good deal of alteration before it could accord with the peculiar position of the Institute in the matter. But, with regard to the spirit of the resolution, he

would like to say a few words, and first he would allude to the committee which had been appointed by the Council on his motion. Although they had not yet reported, they had done all their work, and some of them felt it was judicious to wait for a few weeks before committing themselves to anything direct. He was not justified in saying what the result was at which the committee had arrived. With regard, then, to Mr. Robins's proposal, he, for one, thought it was the duty of the Institute to interfere in public affairs. He was sorry to say that of late years the interference of the Institute with certain Governmental matters had not been so successful as they might have wished. A great misunderstanding obtained with regard to architecture and architects. The real reason for their unpopularity at present,—if he might use the expression,—was that they were living in a sceptical age. Parliament was equally sceptical of all the other professions. If a question of medical science was discussed in Parliament it was treated with considerable scepticism. The Church, the Army, and the Navy were all treated in the same way; how, then, could architecture expect to escape? Notwithstanding all this, it was the duty of the Institute, on behalf of the profession it represented, to be very firm, decided, and persevering, in its interference with public affairs as regards architecture. But in order to interfere effectually it was necessary first to be sure that they were right, and then to go ahead. Although the Government might be willing to hear what they had to say, they would be expected to speak with a perfect knowledge of the subject, and then he believed they would receive courteous attention to what they had to advance. But when they had advanced this, it would be necessary to be firm and decided, to be plain-spoken and out-spoken, and that was what did not prevail in the profession to the degree that it ought. Their proposals should be laid down, and maintained with great pertinacity. One enemy of the profession had spoken very plainly, cynically, and sarcastically about them. He alluded to Sir Edmund Beckett, a typical representative of the public at large (cries of "No, no"). There were not many who could speak with the same sarcastic effect as Sir Edmund Beckett, but a great many would if they could ("No, no"). He knew one man in the room who had provoked Sir Edmund Beckett to reply to the implication that he was an hysterical amateur. Now, if they spoke as broadly as that, and maintained their ground against hysterical amateurs who did not understand matters, there might be some effect. It was the duty of the Institute to interfere in this matter, on which some people seemed to feel so warmly, and if the meeting so determined the Council should give expression and effect to that opinion. But let the Council bear in mind that they were dealing with a sceptical Government, representing a sceptical people, and that it was necessary first to be firmly persuaded of what they desired to have done, and then to maintain their ground resolutely in face of all opposition.

Mr. Charles Barry said he thought they would all agree with Professor Kerr's remarks. The proposal of Mr. Robins treated the matter in the way in which alone they could move. It suggested to the Council that they should first of all possess themselves of the facts absolutely essential for the best argument, and with these facts must necessarily be the official copy of the plan. That plan had not as yet, either on paper or as a model, been made public; therefore the first thing to be done was to ask officially for that plan. He believed it had been asked for from the late First Commissioner, but was not forthcoming. The request might be again refused, but he did not think it would, under the present circumstances. If it should be refused, then the Institute would be justified in taking any action they might think fit on the only information placed before them, viz., the incorrect model which was exhibited in Spring-gardens. This model differed from the plans published with the Bill, and was, as the President had stated, surrounded by all kinds of objects, some of which no longer existed, while others which had sprung into existence, were not indicated; so that there were no means of forming a correct judgment. He had some reason to believe there would be no official difficulty in getting the necessary basis on which to argue, in the shape of an accurate plan. The insufficiency of the site would become evident, as would

the impossibility of securing the public improvement of the opening up of the Mall to Charing-cross, which had been so long desired, and which if the plan were carried out would be prevented for ever. The base of action would rest on the plan, and if it should be refused they could then go *à fortiori* upon the model. The last part of the resolution left the form of memorial perfectly open. It would be remembered that the Council had moved in the matter at the outset, pointing out the probable disadvantages of the site, but their views were without avail. These views could again be advanced with great advantage, to prevent this great matter from being a failure for all time. If they did not take action at the present time, the question would by-and-by be asked by the public, the Government, and all those interested,—“Why did not the profession come forward to prevent this?” It was only in England where an important public building could be proposed to be hidden by a tavern, a couple of private banks, and some insignificant shops. This was an imperial and not a mere economical question.

Mr. E. W. Edis, F.S.A., said he thought it would be well, before the resolution was put, to look to the other side of the question. A certain number of architects had consented to send in drawings for this very insufficient site, and were quite willing to accept the commission. They were now protesting, for the first time, against the insufficiency of the site. (Mr. C. Barry, “We protested years ago.”) The profession had accepted the site so far, that they had agreed to submit drawings for the building. He entirely agreed as to the insufficiency of the site, but in dealing with the Government of the day, they ought to appeal to the censorship of public opinion, and not to those who would answer them back by saying that, notwithstanding their protests, they had sent a number of competitors into the field, and that their President was one of the judges, who without protest, had awarded the prizes. The profession ought to take up these questions of public buildings with a stronger hand. In the case of Northumberland-avenue, the protest of the Institute had not been altogether successful, and if they proceeded now on the same lines, he believed their efforts would be again without success.

The President remarked that the last speaker had said he was one of the judges, and that he had entered no protest. His business was solely to endeavour, to the utmost of his ability, to find out the best plan for a building on a certain site. He had nothing to do with the question of the site, and, until he was asked to act as a judge, he had never considered the plan. But he now looked at the matter as an ordinary citizen, and it seemed to him a very serious thing, as regards the future of London, that the narrow neck at Charing Cross should be continued for centuries, when there was a chance of making a really great metropolitan improvement.

The resolution was put and carried unanimously.

The President then adjourned the meeting to the 16th inst., when a paper will be read by Mr. Wm. Woodward, Associate, on “London Re-modelled.”

**The Works at St. Albans Abbey.**—With regard to what has been done to “the noble and genuine” abbey church of St. Albans the *Athenaeum* of Oct. 31st repeats and endorses the comments made by us a fortnight ago (p. 562), and adds,—

“We have many times expressed our astonishment and sorrow at every step which has been taken by the rash custodians and pseudo-architect who have between them converted the much injured antique into a time-worn but unsophisticated abbey church into a false antique. Anything more miserable than this false front which has been constructed at St. Albans would be difficult to find.”

**Railway and Canal Traders' Association.**—The ordinary monthly meeting of the Council of the Railway and Canal Traders' Association was held at the offices, Eastcheap Buildings, London, on Wednesday last. In addition to the ordinary business, the following resolution was passed:—“That this Council tender their hearty congratulations to the promoters of the Manchester Ship Canal upon the attainment of the object for which they have contended so long, and hereby record their conviction that the authorisation of the scheme is the first great step towards the resuscitation and improvement of our inland navigations.”



## WOOD-WORKING MACHINERY.

In the course of our general articles on the Inventions Exhibition, which appeared in these pages shortly after the opening, we made reference to the wood-working machinery exhibited in the machine tool department, and stated that we should return to the subject more in detail later on. Want of space has prevented our recurring to the subject till the eleventh hour.

The principal exhibit of wood-working machinery in the Exhibition has been that of Messrs. A. Ransome & Co., of Stanley Works, Chelsea. This firm exhibited a complete machine coopersage in full operation. Those who visited the Fisheries Exhibition will remember that one of the principal attractions in the Machinery-in-motion Department was the cask-making shop, which formed the exhibit of this firm. The plant then shown, however, was for semi-tight casks suitable for packing fish and other goods. The machines exhibited this year are of a different description, being designed for making casks that must be absolutely tight, as they are for holding liquids. The large number of casks turned out at the Exhibition were all taken by a firm of vinegar-makers. Without a series of illustrations it would be impossible for us to make plain to our readers this novel and highly ingenious machinery. We prefer to devote the space at our disposal to illustrating and describing some of this firm's more recent descriptions of wood-working machinery which are likely to be of more direct practical interest to the majority of our readers. We may, however, remark in passing that the casks made by Messrs. Ransome's machinery are, so far as we can judge after a somewhat close study of the subject, more uniform and better constructed than the ordinary run of hand-made casks, and there can be little doubt that the process is far cheaper. Indeed, we do not think it would be a very bold flight to prophesy that before long the trade of the cooper, as a regular handicraft, will have become, through the competition of mechanical appliances, almost as obsolete as that of the wheelwright, and will be confined only to mending and repairing work.

The first machine we illustrate is one which, though not new, has attracted a good deal of attention at the Exhibition. This is Ransome's steam tree-feller, or cross-cut log saw, illustrated in fig. 1. The arrangement is very simple, and is well shown in the engraving. The saw-blade is attached to the piston of an ordinary steam cylinder. Suitable guides are provided, and the teeth of the saw are so arranged that the cut is only taken on the inward stroke, so that all risk of the saw buckling is eliminated, and saws 9 ft. to 10 ft. long can be used. For feeding the saw up to the work as the cut is made, the worm and toothed quadrant shown are worked by the hand-wheel, the cylinder pivoting in the centre of its length. Steam is conveyed to the machine through a flexible pipe, so that a considerable space of ground can be

there are one or two novel features. The work is fed up, as will be seen, by vertical rollers. These are both smooth, and are both driven or live rollers. In this way the certainty of the rack-feed is obtained without the loss of time incurred in running the rack back, and the

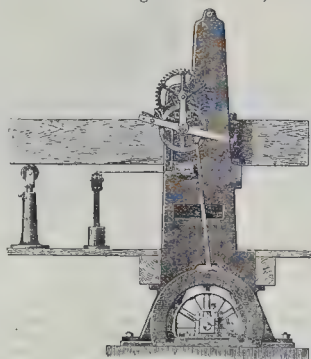


Fig. 2.

wood is not dented as it is when fluted rollers are used. The upper fence-bar can be shifted to allow for battens, deals, or planks being operated on, the rollers on the same side being arranged to accommodate themselves to this

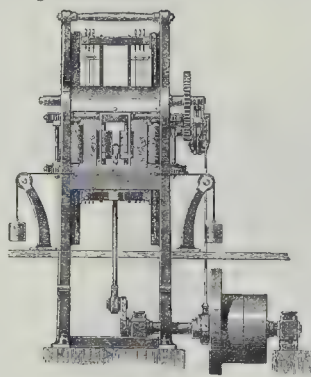


Fig. 3.

arrangement. These rollers on the fence side are pressed up to the work by springs, which act on the back of the bearings, and will thus give to any pressure communicated by the outer feed-roller to the deal. The swing frame is of

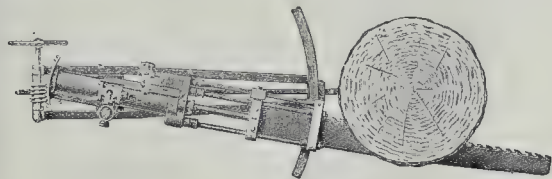


Fig. 1.

learned without moving the boiler. About a 5-h.p. boiler will work one machine, or two can be supplied by a 5-h.p. boiler. Four men will work any size machine, one to stroke, a second to attend to the apparatus itself, a third to drive in wedges to keep the weight of the tree on pinching the saw, and a fourth to assist generally. The larger-sized machines, for trees over 6 ft. in diameter, can be moved about easily, on a light timber jim, by two men, the weight being 5½ cwt. The smaller machines weigh about 3½ cwt. Messrs. Ransome also make a saw on the same general principle, but driven by power from shafting.

Turning to the more ordinary types of wood-working machines we illustrate in figs. 2 and 3, a double deal frame-saw, in which

being quite silent and less liable to get damaged or out of order.

In fig. 4, we illustrate a recent design of cross-cut saw-bench designed for joiners and boxmakers' work. The machines, with a slight modification for the special work, are also much used in cutting blocks for wood-paving. The principal feature in this is that the work is carried on a hard wood table, mounted on rollers, the latter running in planed grooves on the main framing. In this way complete accuracy

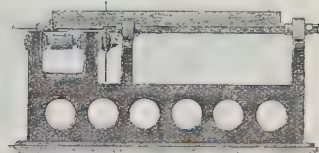


Fig. 4.

is ensured. The table is long enough to take pieces of considerable length, and is provided with a graduated scale for setting it to any angle, so that if there are several pieces to cut of the same shape no setting-out is required when once the machine is adjusted. For cutting short pieces to length a movable fence can be attached. Saws up to 20 in. diameter are mounted, and pieces of 24 in. by 6 in. can be cross cut.

An important wood-working machine tool, recently introduced by Messrs. Ransome & Co., is shown in fig. 5. This is an improved planing and trying-up machine, which will true up stuff, taking it out of winding and at the same time leave a surface smooth enough for gluing. The table on which the work is fixed is fed up and brought back by a rack motion, the difference in the speed of the forward and return motion being about five to one, according to the nature of the work. The speed of feed can be immediately altered at any time whilst the cutters are at work by means of the two diagonal levers shown in the illustration, which shift the belts on cone pulleys. This machine is run at a very high speed, and the irons are attached to an adze block of solid steel, the spindle of which runs in unusually long bearings. Cutters of any required shape can be used so as to cut mouldings, rebates, &c., at the same time that the work is being planed. With this machine, we are informed, one lad can plane and true up all the wood, including panels, for fifty doors in nine hours,—the material being used rough from the saw. This is undoubtedly very quick work. A feature in connection with this machine should not escape notice. Messrs. Ransome, as many of our readers are aware, have introduced very largely the pneumatic system of removing shavings, chips, and sawdust from the workshop. The apparatus consists chiefly of a series of sheet iron pipes laid down in convenient positions in which a brisk current is kept up by means of a centrifugal fan. In the machine we have just described, a cast-iron box or cover fits over the cutter block, and this leads into a branch pipe communicating with the pneumatic main. In order to compensate for the varying height of the work, an ingenious telescopic arrangement has been introduced, so that there is no inconvenience or loss from the draught being taken in above the cutters. The application is, of course, suitable for other machines of this nature. We have recently had some experience of its working on one of the machines last described, and can testify to the comfort and convenience of the system; indeed, the pneumatic system of clearing wood-working shops where machine tools are used is one of the greatest blessings that have been conferred on those engaged in such establishments. This fact was very fully illustrated during the recent Glasgow meeting of the Iron and Steel Institute, when those members who visited the wonderful Kilbowie works of the Singer Sewing Machine Co. saw vast shops containing hundreds of hands employed on all manner of wood-working machines, and not a chip or shaving to be seen in the place. The effect on insurance premiums that the introduction of such a system would have should pay for the installation many times over in the course of a few years.

The stand of Messrs. Samuel Worsam & Co., of Oakley Works, Chelsea, contains some excellent examples of wood-working machinery, which are shown in practical work. From their



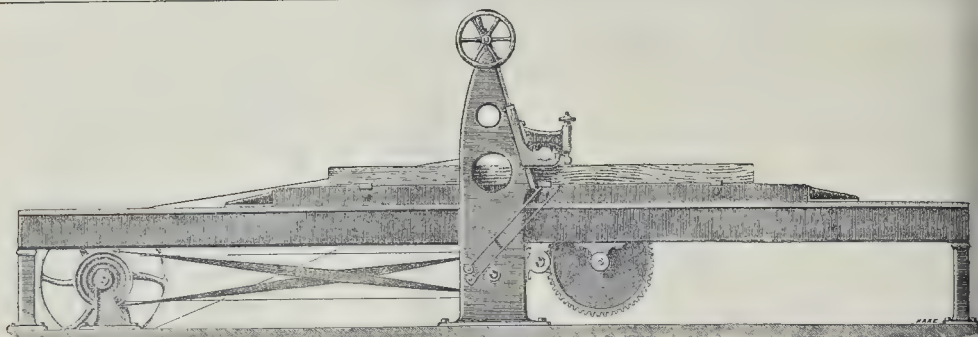


Fig. 5.

exhibit we select three examples for illustration. The general joiner made by this firm is shown in Fig. 6. It may be used for sawing with and across grain, mitring, chamfering, wedge-cutting, single or double tenoning, planing, straight or curved moulding, beading, re-

the shoulders are thus formed. The saws are easily removed, and cutter-blocks substituted in place of the vertical spindle saws, where any shaped moulding, straight or curved, can be executed. On the horizontal spindle of the large saws a cutter-block can be placed for

In Fig. 7 we show a canting-standard band saw machine, for cutting straight, curvilinear, bevelled, or twisted forms. The principal novelty in this consists of the manner in which the saw is canted for making a bevelled cut. In place of the table being moved to the required angle, as is usual in band-saw machines, generally, the frame of the machine is moved bodily, carrying with it the saw-pulleys, so that the saw itself is set to the required angle, the table being kept stationary. The movement can be made when the machine is at work or at rest.

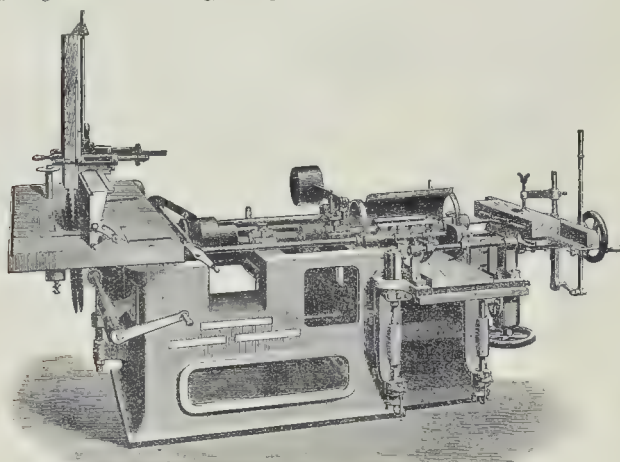


Fig. 6.

bating, grooving, and tonguing. The principal advantage in this machine is that two men can work with it continuously at one time. Thus one hand can be engaged in, say, planing, moulding, and mortising, while the other man is tenoning, grooving, or sawing, and this without interfering with each other when the tools have to be changed. This end is attained by the main spindle being in two parts with separate driving pulleys and countershafts. The bottom cutter-block on the planing side is placed in a slide or draw, so that the box can be readily withdrawn, and the knives set without, the man having to get under the machine: or an extra set of knives can be kept, and placed in immediately. There are four cutter-blocks for working all sides at one operation. There are spring pads for holding the wood down, and side spring rollers for keeping the work up to the fence. The mortise is made, as is usual with these machines, by slot drilling, the work being traversed on a slide by means of the vertical lever. This part of the apparatus is shown on the right of the engraving. With this plan the work is quickly and efficiently performed, but the ends of the mortise are naturally rounded, and have to be squared out by hand to fit the tenon if necessary.

In our illustration the apparatus is set for cutting tenons, a rail being shown in position as the operation is just completed. The work is mounted vertically in a clamp, which slides on the fence. It is first brought to the two larger circular saws shown, which make the long cuts to form the sides of the tenon. The rail is then carried on, and the cheeks removed by two smaller circular saws on vertical spindles, and

doing heavier mouldings. For grooving and rebating, a drunken saw can be mounted on the same spindle. The groove cut at one operation can be varied  $\frac{1}{4}$  in. up to  $1\frac{1}{2}$  in. The saw is caused to rock by means of a small screw passing through it, and which presses against the face of the flange on the spindle. The fence can be arranged at any distance from the saw, or it can be set at any angle, and clamped by means of the quadrant shown, so as to cut any bevel, or it can be removed entirely if necessary. For cross-cutting, a slide is provided in order to keep the work square. This is guided by a groove in the table. The table may be

The advantage of this arrangement is that heavy work can be dealt with without the wear pressing against the saw and so causing it to break, this being a frequent cause of accident in machines of the ordinary kind. The standard is moved by means of the rack and wheel shown, and it can be canted by self-acting motion if required. The arrangement is such that the motion of the canting-standard has its centre the point where the band-saw passes the surface of the table. This ensures the saw working at any angle through a constant centre, and the saw-guides above and below the table have not to be altered when a different bevel has to be cut. There is a simple arrangement of guide pulleys, not shown in our illustration, for keeping the driving-belt at the same tension when

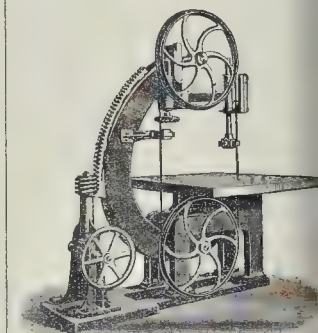


Fig. 7.

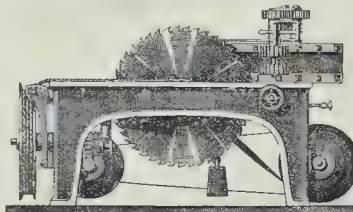


Fig. 8.

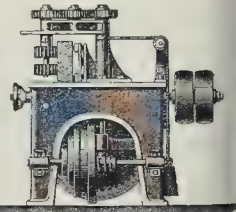


Fig. 9.

made to rise and fall by means of bevel-wheel gearing worked by a screw. The handle by which this is effected is shown in front of the machine. Different speeds for moulding or sawing, &c., can be got by means of cone pulleys.

ever the cant of the standard. This machine has been designed more especially for alwrights' work. The combined rope and rod feed saw-bench, made by Messrs. Worrell is also shown in motion on this stand. The machine we illustrate in figs. 8 and 9, which



front and end views respectively. When used on heavy work, such as sawing balks or other large scantling, the rope-feed is brought into play. For deal cutting the self-acting roller motion is used. This consists of vertical fluted rollers, the spindle of which is carried in bearings in a radial arm which pivots on a standard at the back of the fence. The motion is communicated to the rollers by a train of spur-wheels on the top of the swinging arm, the driving spindle being taken through the bracket referred to. The feed-rollers are kept to the work by a weight suspended by a rope running over pulleys. The rate of feed to suit different kinds of work is varied by means of conical pulleys. Another important machine shown on this stand is Martin's band-saw sharpening machine. This consists of a standard having two wheels mounted horizontally, one on each side. On these the saw is stretched as it would be if required to work, the distance the wheels are apart being adjustable to suit different lengths of saw. In the centre, and supported by the standard, is a suitable frame, which carries an ordinary saw file. This is given the necessary reciprocatory motion, the same as in hand work, by means of a crank and connecting-rod. The saw is fed to the file by a cam, which works a pawl engaging the teeth of the saw. This is capable of being regulated for different sizes of teeth of saw, and it can be made to traverse two teeth at once, the files thus missing one each time.

#### EDINBURGH AND GLASGOW DEAN OF GUILD COURTS.

The annual meeting of the Guildry of Edinburgh was held on the 21st ult. in the Council Chamber, Lord Provost Sir George Harrison presiding. The chairman, in accordance with the recommendation of the Council, moved the re-election of Mr. James Gowans as Lord Dean of Guild for the ensuing year. There was no doubt, he said, that Mr. Gowans had performed his duties in a most satisfactory manner. These had been, thanks to the prosperity of the city, very considerable, and it was very pleasant to know that everything he had done had been in accordance with their wishes, and they might safely say that the city had been in every respect very much the better for having so very active and so skilled a person at the head of their Guild Court.

Bailie Clark, Convener of the Public Health Committee, in seconding the motion, said that under Mr. Gowans the authority of the Dean of Guild Court had been vindicated as it had never been before, and now it was evident that the Court had authority over the erection of new buildings that it was hardly ever believed it possessed before. That had been confirmed by the Court of Session, and they were greatly indebted to the Lord Dean of Guild and the members of the guildry for obtaining this very important advance. Under the authority of the Court 223 new houses had been inspected during the past year, in addition to about five and a half miles of drains.

The motion was adopted unanimously, and Mr. Gowans, after thanking his brethren for his re-election, said that, besides what Bailie Clark had referred to, the Court had considered 594 cases, of which 137 had reference to new buildings. The more prominent new works at present were the Museum in Chambers-street, the Board School on the old Infirmary site, and the National Portrait Gallery in Queen-street. He might say that they had given particular attention to matters pertaining to the health of the city. They had considered plans with regard to sanitation, because the Court were of opinion that they could do a great deal as a body in preventing sickness and ill-health and even death itself by the attention that they gave to those matters. They had also given some attention to the architectural appearance of the buildings in Edinburgh, which they prized, too, owing to the beauty of their city, and they had attended not only to the fronts of the buildings, but also to their gables and backs, and especially to their chimneys; and he was glad to say that, on the whole, almost without a single exception, they had met with the hearty co-operation of the architects in the city.

A committee of five brethren was appointed to consider the possibility of compiling and printing a more or less complete history of the Guildry, which the Lord Dean pointed out was of older origin than their Corporation itself.

The Glasgow Dean of Guild Court met on the 22nd ult. for the first time under the presidency of the new Lord Dean of Guild, Dr. W. G. Blackie. After the Lord Dean and the liners were sworn in, the Court proceeded to elect an assessor. Dr. Marwick was proposed as sole assessor, but this office he declined to accept, and in the meantime Mr. Colin D. Donald, jun., writer, was asked to act as interim assessor until a regular appointment was made. The members of the Court are,—Dr. W. G. Blackie, Lord Dean of Guild; Mr. Wm. M'Ewen, Mr. Thomson Aikman, Mr. David Guthrie, and Mr. J. Guthrie Smith, as representing the Merchants' House; and Mr. James Sellars, architect, Deacon of the Wrights; Mr. Alex. Macara, time merchant, Deacon of the Masons; Mr. Alex. Eadie, wright, and Mr. Robert Murdoch, mason, as representing the Trades' House.

#### WOODEN STRUCTURES.

MR. BAXSTER FLETCHER, District Surveyor of West Newington and part of Lambeth, on Tuesday, the 27th ult., summoned Mr. P. Halahan, of No. 407, Fulham-road, at the Lambeth Police-court, for having erected a loft enclosed on four sides with wood on an existing stable building, on ground in the rear of 14, Pleasant-row, Lower Kensington-lane, Lambeth, which was not in conformity with the Metropolitan Building Act, 1855.

The defence set up was that a portion of the old stable on the ground-floor being enclosed with wood, the new loft on the first floor could not be built in brickwork as required by the Act, but the defendant was willing to enclose the building with corrugated iron; but the District Surveyor said he had no power to allow the building to be constructed in that form without the consent of the Metropolitan Board of Works had been obtained.

After examining the drawings of the building, the Magistrate (Mr. R. Biron, Q.C.) decided that the defendant must conform to the Act, as required by the District Surveyor, or make an application to the Metropolitan Board of Works for special permission to enclose the building with iron.

The defendant said he desired to make the application to the Board.

The Magistrate consented to an adjournment for one month to enable him to do this, making an order for 2l. 2s. costs to be paid to the District Surveyor.

#### QUARRIES.

SIR,—In your last issue (p. 597) the excellent paper on the above just refers to one way of collecting ancient glass, viz., by visiting the local plumbers' works.

Upon inquiry in every town "who has done the church work?" where there is an old church, I have in six years obtained more than enough ancient glass, quarries, &c., to fill a village church; that is, in Kent and Shropshire alone. If a systematic collection were made by members residing in various parts, of any of the archaeological societies, much instructive material would re-appear.

With regard to the Westwell quarries, in Winston's book of plates is a painting of a quarry and border window of unusual beauty, having rub of the best and thickest coating. A photograph of my own shows this quite perfect before the restoration of the chancel a few years ago. A visit since paid showed entire removal, I having sought the glazing in vain,—it was evidently stolen during the repairs,—my object being, as in several cases, to re-lead and re-insert the ancient glazing, nearly always removed for sickly "cathedral" glass, whatever that is.

At Little Kimble, Bucks, I lately found all the ancient quarry work well preserved, and it would repay a visit to any one in the district of Aylesbury, as well as an old quarry window in one of the inns of that town.

At Monks Risborough, Bucks, all the ancient glass had been cut about and put in one window, a practice very common, and equally ridiculous.

A few months ago a clergyman informed me that five windows in his church, which in each have effective borders of the fifteenth century complete, he would have removed, because "it was not burned in." As a matter of fact, the "enamel brown" in old examples is often badly fluxed; but more than 300 years has not caused it to peel, as in many modern windows not thirty years old.

I believe more old glass exists *in situ* at York than in any other English town,—in the parochial churches more especially. Some one resident might, if any of these edifices are to

be destroyed, secure the glass at least in its entirety.

The Hackington glass, as represented, is still existing, leaded up with copied quarries of present date.

It is only by going outside and looking closely into the weather-worn appearance that the old ones can be seen; the action of time cannot be imitated by any "ancienting," so frequently practised. Either the whole surface is crooked, or little holes are seen towards the centre, not so much at the edge, of each fragment; and where the yellow stain of the fourteenth century has been applied, this has arrested in many cases the erosion entirely, which causes the pattern to seem raised. Generally speaking, an unrestored church is the best place to study old glass, however lamentable everything else is in such places. From lack of such study many glass-painters are now making copies of ill-copied modern work, all feeling being utterly lost.

Not unfrequently we see bad fifteenth-century detail in glass inserted into very severe copies in stone, of First Pointed character: this is remarkable just round London more especially.

The early restorers copied the detail fairly well, but having only bad and thin glass to paint upon, the effect is nearly always in all cases found to be weak, particularly the works of the late Mr. Williment. F. G.

#### AUTOMATIC COUPLINGS.

SIR,—In your "Notes" of last week (p. 595) you refer to "the very practical recommendation in regard to the important question of automatic or improved coupling appliances on railways," made by the Amalgamated Society of Railway Servants, that, to my knowledge, has been repeatedly made by this Society. Several years since an exhibition of such appliances took place at Leeds, at the Society's instigation, — prizes and certificates were awarded, but nothing came of it in this country. The Colonial Railway authorities, however, are not so apathetic. The New South Wales Railway Department have adopted one of the "patent couplers" exhibited and certificated at Leeds, viz.,—Messrs. Thomas & Cowdery's,—and are gradually applying it to their plant. They have also applied for space, in the forthcoming International and Colonial Exhibition, in order to show it attached to trucks of full size and in working condition. It is said that the railway servants in the mother country are lukewarm in regard to pushing the adoption of automatic couplings, as these would, in all probability, reduce the number of employes now required, but for the truth of this allegation I will not vouch. METEER.

#### LA MONNAIE, PARIS.

SIR,—I see in your last issue [p. 598] you draw attention to what has been recently done to this building. When I was in Paris about three years ago, they were cutting off the Imperial N and crown, and recutting R. F. in its place. If they are going to do the same to all the buildings in Paris and elsewhere, there will be a grand confusion of dates for the next generation of antiquaries.

A. OLIVER.

\* \* We have received an important letter from Dr. John Brown in regard to the circular ward question, with special reference to the new Burnley Hospital, which we are obliged to defer to next week, for want of space.

**Builders' Benevolent Institution.**—The thirty-eighth annual dinner in aid of the funds of this Institution was held on Thursday evening last, in the Hall of the Worshipful Company of Carpenters, London Wall. Mr. Arthur C. Lucas, J.P., President of the Institution, occupied the chair, and covers were laid for about 170 persons. During the evening the Secretary, Major Bruton, announced subscriptions and donations to the amount of 1,000l. A report of the proceedings will appear in our next.

**Royal Institution of Great Britain.**—At the general monthly meeting, held on Monday last, Mr. Warren de la Rue, F.R.S., Manager and Vice-President, in the chair, Mr. Joseph Wilson Swan, Mrs. J. W. Swan, and General J. F. Tennant, R.E., F.R.S., were elected members.



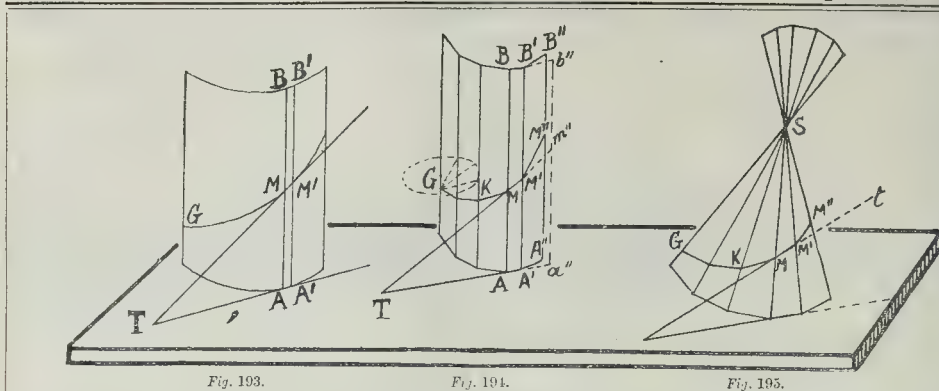


Fig. 193.

Fig. 194.

Fig. 195.

### The Student's Column.

#### DESCRIPTIVE GEOMETRY.—PART II.

XXIII.

##### Properties and Characteristics of Developable Surfaces.

IT is one of the principal objects of our science to study the properties of the surfaces and the lines which compose the essential parts of all structures, so as to be able to use them with discernment in making our designs. In the classification which we gave at the beginning of the second part of these papers (see June 6, 1885), we briefly described what were developable surfaces, and we studied afterwards the cone and the cylinder, which are the most commonly known of developable surfaces. We avoided investigating the general properties of these surfaces, because we were afraid that the subject would then seem too abstruse for our readers. But, these studies cannot be omitted; and, we think, those who have had the patience and industry to follow us up to this point will now very easily comprehend the reasonings by which we establish the properties of developable surfaces in general.

The mathematical definition of a developable surface is a *surface* (flexible like paper, but not extensible like India-rubber) which can be laid down on a plane without changing its superficial area. We have seen that a cylinder is such a surface, but we feel without a proof that a sphere is not.

We have seen (fig. 86) that the tangent to a curve can be considered as a straight line passing through two points of the curve infinitely close to one another, or a line which has one element in common with the curve. In other words, we may consider a curve as a polygon, the sides of which are infinitely small, and we may consider the tangent to the curve as one of those sides prolonged. Therefore, whatever is true of a polygon, independently of the size or number of its sides, will be true also of a curve.

We have also shown (fig. 91) that, in a surface, the divers curves drawn through a given point have their tangents all contained in one plane, which we have called the *tangent plane*. As every tangent contains an element of a curve, so we can consider that the tangent plane contains an infinitely small element of the surface to which it is tangent. In general, that element is infinitely small in all directions, but with cylinders it is a strip infinitely narrow, but also infinitely long, or, speaking less mathematically, as long as the cylinder itself. We have delineated, in fig. 193, the plane B A T tangent to a cylinder, and the elementary strip of the cylinder's surface it comprises.

To follow exactly what occurs when developing a cylinder, we have only to examine what occurs in developing a prism, as in fig. 194. If we want to know what becomes of a curve such as G M M' (fig. 193), when the cylinder has been developed, we have only to consider what becomes of the polygon G K M M' M'' (fig. 194) when the prism has been developed. When we turn the face A' A'' B' B'' of the prism round its axis A' A'' until it stand in the same plane as the neighbouring face A A' B B', the

side M' M'' of the polygon will have come to M' m''. Now M' m'' forms the same angle with the vertical axis A' B' as the side M' M'' did before the rotation, and we can conclude that, in developing the cylinder (fig. 193), the curve G M M' becomes a *transformed curve*, the tangents to which form the same angle with the generators as the tangents to the original curve did with the same generators of the cylinder before being developed. It is on this property we based our method of drawing the tangent in any point of the transformed curve in figs. 109 and 111. By examining figs. 193 and 194 we get also the two following conclusions:—

The transformed curve is *exactly of the same length* as the original one.

In right cylinders the portions of the generators MA, M'A', . . . comprised between the curve and the base remain in the developed cylinder equal to what they were before, and they are perpendicular to the transformed base which becomes a straight line.

With the exception of the base of a right cylinder, a curve drawn on the surface of a cylinder is transformed in another curve when it is transformed in a straight line. This occurs when (fig. 194) the element M' M'' of the curve forms the same angle with the generator A' B' as the element M M' does with the generator A B; in other words, when all the tangents to the curve form a constant angle with the generators. Such a curve is called a *helix*; that is, the thread of a screw.

From what we have said, we can see that a helix is the shortest line that can be drawn between two points on the surface of a cylinder, for in the developed cylinder it is transformed in a straight line, which is, of course, shorter than any curve according to which other lines are transformed.

We beg to observe also that a helix is always a *skew curve*, what we have called until now a curve of double curvature; this means a curve of which three consecutive elements, although they may be infinitely small, are not contained in the same plane. This we can see by fig. 194. Suppose that through a point G we produced three lines parallel to the elements KM, MM', M'M''; if these elements belong to a helix, they all form the same angle with the generators, and, therefore, their parallels through G would belong to a cone of revolution. Three generators of a cone of revolution cannot be in the same plane, so it is evident that the three elements KM, MM', M'M'' are not in the same plane.

There is but one case which forms an exception to the above law,—this is when the elements of the curve form right angles with the generators, then they are contained in one plane. This is the curve which we have called the base of a right cylinder, or the *orthogonal section* of a cylinder, and now we know that no other plane section but the orthogonal can be transformed in a straight line on the developed cylinder.

In fig. 194 we can see that in a *skew curve* two successive elements, such as KM, MM', or MM' M'M'', are always contained in a plane. The plane MM' M'' is, for instance, called the *osculating* (kissing) plane of the curve in the point M. For the point K the osculating plane would be KMM', and so on, so that the different osculating planes cut one another along an inter-

mediate element of the curve such as MM'. This is equivalent to saying that the *osculating plane* is the plane which passes through two tangents in points of the curve infinitely close.

The osculating plane must not be confounded with the tangent plane, which contains only one tangent to the curve, and is the plane tangent to the cylinder itself.

Observe also that any curve can have only one tangent in a point thereof, but it can have an infinite number of normals or lines perpendicular to the tangent through the point of contact. The normals are, of course, contained in a plane which is perpendicular to the tangent. This is the normal plane to the curve in a given point thereof.

The above is the reverse of what we have seen for a surface. This admits of an infinite number of tangents in a given point, all contained in the tangent plane; but, on the other hand, there is but one normal in a point of surface.

We have also, in fig. 195, analysed a portion of a cone by considering it as pyramid, with the following results.

All conical surfaces are developable, and in this transformation the generators or any portion thereof keep their primitive lengths.

Any curve drawn on the surface of the cone becomes a line, which we call the *transformed curve*, different from the original one. The length of the transformed curve is equal to the length of the primitive curve.

Each tangent to the original curve forms with the generator of the cone an angle which changes not when the cone is developed, and is, therefore, tangent also to the transformed curve.

A curve of the cone may be transformed into a straight line when the curve is developed. This occurs when (fig. 195) two consecutive elements of the curve, such as MM', M' M'', form equal angles with the intermediary generators. We mean when angle S M' M'' = S M' t.

A curve, such as the above, will be, of course, the shortest line between two points on the surface of a cone, but it will not be a spiral rising up to the vertex of the cone. In fig. 195 we see that the angle S M' t is necessarily larger than the angle S M M'; therefore, we find the curve begins by forming an acute angle with the generators, and that the angle gets larger and larger as we go up. When the angle will be a right angle, the curve will have attained its greatest height and will then go down again. It will be found that the shortest line from one point to another of a parallel of a cone of revolution is not the arc of the parallel but a certain hyperbola.

A curve which on a cone forms (similarly to the helix on the cylinder) a constant angle with every generator is a *spiral*. This spiral would approach indefinitely the apex of the cone without ever reaching it; and, in the developed cone, it is transformed in the logarithmic spiral—that is, a spiral which cuts all rays from its centre under the same angle.

**The Albert Palace.**—We are informed that the Art Committee of the Albert Palace are arranging for two exhibitions, consisting respectively of oil and water-colour views of London and its environs and portraits of theatrical celebrities of the seventeenth and eighteenth centuries.



RECENT PATENTS.  
ABSTRACTS OF SPECIFICATIONS.

0,835, Drain Scraper. G. Gowing.

A crescent-shaped scraper springs up against a handle when the latter is introduced into a drain, it stands out at right angles when withdrawn, the hands may be coupled up in lengths.

12,965, Water-waste Preventer. W. Vivian. The outlet-pipe projects into the flushing-tank, it is covered by a bell, which has an internal joint at the bottom. Siphonic action is started by using the water over the crown by pulling the plug up.

13,691, Disinfecting Water - closets. G. Gowing.

The tank to contain the disinfectant is placed in a suitable position, and connected to the closet-pipe by a pipe in which is an inverted T-piece. The valve is intercepted by a conical plug, connected by a spindle to the cap which slides down the T-piece its own weight, and closes the valve. The valve controlled by the same handle as that which opens the flushing-valve.

13,617, Siphon Water-waste Preventer. F. Rimer.

A siphon is formed of the shell at the end of the tank, and is started by a discharge of water into a leg obtained by raising the valve. When the charge-pipe is very long, it is provided with an inlet at a short distance below the cistern.

13,867, Paints made from Bitumen. A. J. Lull.

Mineral bitumen is utilised in the manufacture of preservative and other paints. A black paint is made by boiling a hundredweight of bitumen with a gallon of linseed oil, and mixing after with five gallons of turpentine; the mixture then ground in the usual manner. A damp-proof for ironwork is obtained by the addition of lin, red lead, and litharge, or other suitable material to the above.

13,095, Sanitary Houses and Bungalows. W. Lock.

The houses are built in the style of a bungalow, the chief material employed. A platform floor composed of slabs of slate is laid upon a number of vertical pillars, and upon it are erected the walls of the building, and the pillars for the verandah. The walls also are built of slate slabs which the edges rest in grooves, and are retained by skirting screws in place. Mouldings above the slabs divide the tops of the walls, and the others placed vertically divide the walls into panels. The ceilings are made of thin slabs. For separate climates the walls are single, but in either cold or cold climates they are double. In the first a cooling current of air is induced between the walls, and in the second the air is confined in order to utilise it as a non-conductor. Timber is as little used as possible, iron being preferably used. In the case of the perfect pipes connected with the tanks on the roof may run round under the ver, from which it will a cooling shower may be given against the walls. Under the building are rows in which the sewage is received, and which is successively removed at intervals.

NEW APPLICATIONS FOR PATENTS.

Oct. 23.—12,687, J. Brindle, Laying, Joining, and Removing Pipes, &c.—12,700, J. West, Ventilation and Construction of Buildings.—12,704, H. Marle, Set Squares.—12,706, J. Egan and Others, Kitchen or Room Fire-grates.—12,708, C. Barnard, Metallic Handles for Gimlets, &c.—12,716, R. Brough, Ventilators.—12,725, Blythe, Bricks for avoiding Side and End right joints.—12,737, E. Horsley, Window and Iron Fasteners.

Oct. 24.—12,754, G. Newman, Floor Springs for Doors.—12,762, J. Beldford, Furnace for bricks, Tiles, &c.

Oct. 25.—12,801, S. Bamford, Stench Pipes.—12,805, W. Wilson, Securing Knobs to Spindles.—12,811, D. Grove, Improvements in Shower-baths.—12,814, J. Wilson, Improved Process of Preparing re-clay for Potter's use.—12,832, B. Skipworth, Maching Window-fastener.—12,839, G. Wickham, Washing Cisterns and Water-waste Preventers.—12,844, W. Lake, Preservative Fluid for Woods.

Oct. 27.—12,855, T. Robinson, Cisterns and out-letters for Wood-working Machinery.—12,863, A. H. H. Improvements in Stair Railings.—12,864, C. H. H. T. Tops for Chimneys, Ventilators, &c.—12,903, W. Lake, Improvements in Doors, and in Anging and Closing same.—12,908, S. Pitt, Manufacture of Lime, Cement, Mortars, Hydraulic Concrete, and other Valves and Taps.—12,974, J. T. H. Improved Sash-fastener.

Oct. 29.—12,991, W. Kinsman, Sanitary Joint for kinds of Pipes.—13,039, G. Wishart, Ventilating Chimney Cows.—13,043, C. Cresswell, Improve-

ments in Stoves or Firegrates.—13,045, E. Edwards, Improved Folding Ladder.

PROVISIONAL SPECIFICATIONS ACCEPTED.

9,443, W. Fryer, Spring for Closing Doors, &c.—9,499, F. Beaumont, Improved Protractor.—10,905, C. Fellows, Sustaining Window-sashes and Shutters without the aid of Sash-weights.—10,988, W. Wright, Mounting, Balancing, and Securing Window-sashes.—11,149, W. Lea and J. Beech, Sash-fasteners.—11,229, P. Smith, Colouring, Painting, or Bronzing Letters and Figures in Relief.—11,684, W. Jones, Drying Bricks, Terra-cotta, &c.—12,008, W. Bruce, Drain Bends and Branches, with Traps combined.—12,118, G. Garrard, Machinery and Apparatus for the Manufacture of Tiles.—12,138 and 12,139, A. Williams, Improved Construction of Dust-bin.—12,252, A. Drummond, Improvements in Glazing.—11,046, H. Turner, Door and Gate Fastenings.—11,334, E. Sloan, Improved Window Fastener.—11,337, J. Colburn, Cooking-ranges.—11,530, W. Gill, Improved Push and Pull Action for Door Locks and Latches.—11,762, E. Hutton, Improvements in Ventilators.—11,829, W. McGinnis, Screw-threaded Nail.—11,848, R. Baillie and L. Chapman, Planing Machines.—11,974, C. Jackson, Floor Coverings and Sash-tracks.—12,285, H. Buchanan, Water-waste Preventers.—12,328, R. Lee, Construction of Fireproof Pillars and Columns.—12,405, J. Allen, Machinery for the Manufacture of Bricks and Tiles from Plastic Materials.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

15,441, T. Bear and H. Ransom, Combination Circular Saw, Press Saw, and Drill.—840, W. Lake, Steam-heating Apparatus for Warming Houses, &c.—2,349, A. Clark, Combination Truck and Ladder.—5,798, G. Crowther, Receptacle for Paints, Stains, and Brushes.—7,587, W. Farrow, Waste-water Preventer for Water-closets.—10,818, H. Moody and J. Pope, Construction of Roofs or Coverings for Houses, &c.—16,523, R. Holmes, Fire-grates.—16,602, G. Jennings and Others, Indicating Apparatus for Electric Bells, &c.—16,754, A. King, Indicator for Water-closet and other Doors.—1,173, W. Gillett and H. Moreton, Ventilating Apparatus.—3,493, J. Anderson, Automatic Saw Setting and Sharpening Machines.—4,443, G. Ellis, Portable Dry-earth or Carbon Closet.—9,244, A. Boulton, Machine Tools for Stone-working.—11,610, G. Redfern, Apparatus for Preventing Concussion in Water-pipes.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

Oct. 21.  
By FARMER, BROTHER, ELIZ, CLARK, & CO.  
Scotland, Redcliffe, near—"Bridgend Farm," about 41 acres ..... £3,000

Oct. 22.  
By CHURCH, GILBERT, & CO.  
Hordean, Hants—"Blendworth Lodge" and Sla, 2r. 34p., freehold ..... 9,000

Oct. 23.  
By HIRN & LEWIS.  
Hackney—165, 169, 171, and 177, Clarence-road, 90 years, ground-rent 27s. .... 1,850

Oct. 24.  
By S. ROBINSON.  
Hackney—A Profit Rent of 10s., term 11 years ... 35

Oct. 27.  
By C. & H. WHITE.  
Pimlico—23, Beesborough-gardens, 42 years, ground-rent 11s. 8s. .... 700

Oct. 28.  
By E. & H. LUMLEY.  
Sydenham—Freehold ground-rent, 60s., a year, reversion in 76 years ..... 1,000

Oct. 29.  
By A. RICHARDS.  
Edmonton—5 to 8, Elm-cottages, 67 years, ground-rent 7s. 10s. .... 270

Oct. 30.  
By F. J. BIRLEY.  
Borough—16 to 20, Queen's-court, freehold ..... 1,245

Oct. 31.  
By DENHAM, TAYLOR, & CO.  
City—4, Upper Thames-street, 67 years, ground-rent 200s. .... 2,800

Oct. 32.  
By ROBINSON & FISHER.  
Gordon-square—No. 27, 67 years, ground-rent 3s. 10s. .... 1,600

Oct. 33.  
By DENHAM, TAYLOR, & CO.  
City—4, Upper Thames-street, 67 years, ground-rent 200s. .... 2,800

Oct. 34.  
By DENHAM, TAYLOR, & CO.  
City—4, Upper Thames-street, 67 years, ground-rent 200s. .... 2,800

Oct. 35.  
By DENHAM, TAYLOR, & CO.  
City—4, Upper Thames-street, 67 years, ground-rent 200s. .... 2,800

Oct. 36.  
By DENHAM, TAYLOR, & CO.  
City—4, Upper Thames-street, 67 years, ground-rent 200s. .... 2,800

Oct. 37.  
By DENHAM, TAYLOR, & CO.  
City—4, Upper Thames-street, 67 years, ground-rent 200s. .... 2,800

Oct. 38.  
By DENHAM, TAYLOR, & CO.  
City—4, Upper Thames-street, 67 years, ground-rent 200s. .... 2,800

Oct. 39.  
By DENHAM, TAYLOR, & CO.  
City—4, Upper Thames-street, 67 years, ground-rent 200s. .... 2,800

By THURGOOD & MARTIN.  
Leicester-square—6, St. Martin's-street, freehold, £1,300

By BAKER & WILKINSON.  
Cavendish-square—The lease of 184, Old Cavendish-street, 74 years ..... 550

By A. WALTON.  
South Lambeth—10, St. George's-terrace, 76 years, ground-rent 7s. 6d. .... 600

Oct. 29.  
By A. BOOTH.  
East Ham—1 to 6, Talbot-terrace, freehold ..... 305

By A. BOOTH.  
Camden-road—8, Middleton-road, 61 years, ground-rent 2s. 6d. .... 660

By J. G. & A. PRYOR.  
Mile End—62 to 68, even, Sandy-street, freehold ... 885

By E. STICKSON.  
45, Tollit-street, 38 years, ground-rent 2s. 16s. ... 280

By E. STICKSON.  
Limehouse—41 and 43, North-street, freehold ..... 325

By E. STICKSON.  
Brixton—26 and 28, St. James's-road, 33 years, ground-rent 12s. 12s. .... 560

By E. STICKSON.  
1 to 8, Elfric-terrace, 5, Elfric-terrace, and 115, Dalberg-road, 11 years, ground-rent 16s. .... 1,150

By E. STICKSON.  
54 and 66, Vassall-road, 14 years, ground-rent 27s. 6s. .... 310

By E. STICKSON.  
Peckham—268 and 269, Commercial-road, 24 years, ground-rent 6s. 10s. .... 300

By E. STICKSON.  
Wandsworth—310, Wandsworth-road, 12 years, ground-rent 4s. .... 160

By E. STICKSON.  
Clapham—135, Grand-road, freehold, near 115, Pimlico—33, Sutherland-street, 48 years, ground-rent 8s. 8s. .... 3.0

By E. STICKSON.  
King's Cross—14, Acton-street, 88 years, ground-rent 8s. .... 600

By NEWBORN & HARDING.  
Hoxton-square—No. 6, freehold ..... 1,625

By NEWBORN & HARDING.  
Clerkenwell—113, St. John-street-road, 25 years, ground-rent 1s. 1s. .... 600

By NEWBORN & HARDING.  
Islington—21, Baxter-road, 74 years, ground-rent 6s. 6s. .... 325

By NEWBORN & HARDING.  
18 and 19, Albert-terrace, 62 years, ground-rent 4s. Barnsbury—104, Hemingford-road, 66 years, ground-rent 10s. .... 726

By NEWBORN & HARDING.  
An improved rental of 18s. 18s. a year, term 69 years ..... 850

By NEWBORN & HARDING.  
Pentonville—24, Aswell-street, 21 years, ground-rent 10s. 1s. .... 450

By NEWBORN & HARDING.  
Hackney—Ground-rents of 14s. a year, reversion in 81 years ..... 355

By NEWBORN & HARDING.  
Upper Holloway—Ground-rents of 18s. a year, reversion in 78 years ..... 445

By NEWBORN & HARDING.  
29, Campbell-road, 79 years, ground-rent 8s. .... 140

By NEWBORN & HARDING.  
Southwark—Ground-rents of 150s., reversion in 84 years ..... 3,680

By NEWBORN & HARDING.  
Lincolnshire—The Manor of Crowland, with its rights, &c. .... 13,650

By NEWBORN & HARDING.  
West Kensington—Freehold land, 7a. 0r. 9p. .... 14,000

By NEWBORN & HARDING.  
Brompton-road—No. 172, freehold business premises Bloomsbury—42, Devonshire-street, freehold, .... 3,350

By NEWBORN & HARDING.  
Kensal Green, Harrow-road—"The Tavistock Farm Dairy," freehold ..... 560

By NEWBORN & HARDING.  
81 Tavistock Villa "and Kennal Lodge," freehold "The Manor House," "Manor House Lodge," and 3a. 1r. 2p. .... 2,390

By NEWBORN & HARDING.  
Three plots of freehold land ..... 9,000

By NEWBORN & HARDING.  
Three plots of freehold land ..... 1,720

MEETINGS.

SATURDAY, NOVEMBER 7.

British Museum (Archaeo Room).—Miss J. E. Harrison on "The Parthenon Marbles." (I.) 11 a.m.  
Association of Public Sanitary Inspectors.—Mr. O. B. Jerram, Chairman of the Council, will deliver his Annual Address. 6.0 p.m.

MONDAY, NOVEMBER 9.

Surveyors' Institution.—Address by the President, Mr. E. A. Lusk, 8 p.m.  
Leeds and Yorkshire Architectural Society.—Mr. James Holroyd on "The Artistic Treatment of Ceramics in Relation to Architecture and Decoration." 8 p.m.  
Inventors' Institute.—8 p.m.

TUESDAY, NOVEMBER 10.

Institution of Civil Engineers.—Discussion on Professor Osborne Reynolds's Paper on "Indicator Diagrams." (2) Discussion on Mr. A. W. Brightmore's Paper on "The Steam Engine Indicator." 8 p.m.  
Manchester Architectural Association.—Conversation, 7.30 to 10 p.m.  
Anthropological Institute. 8 p.m.

WEDNESDAY, NOVEMBER 11.

South Kensington Museum (Lecture Theatre).—Miss J. E. Harrison on "The Mythology of the Lias as illustrated by Greek Vase Paintings." (II.) 5.15 p.m.  
Liverpool Engineering Society.—Mr. Thomas Duncan on "Service Reservoirs." 8 p.m.

THURSDAY, NOVEMBER 12.

St. Paul's Ecclesiological Society.—Mr. W. H. St. John Hope on "Medieval Chalice and Paten." 7.30 p.m.  
Society of Telegraph Engineers and Electricians.—Major-General Webster, R.E., on "The Telegraphs of the Nile Expedition." 8 p.m.

Bramley.—On Saturday night last the workmen engaged on a new house at Bramley, Surrey (which has been built by Mr. J. Bottrill, of Reading, for Captain Webster, of Bramley), were invited to a supper provided for them by Captain Webster. A very enjoyable evening was spent, and after supper a handsome testimonial was presented to Mr. Jenkins, the manager, from Captain Webster, in recognition of the satisfactory way in which he has carried out the work. The testimonial consisted of a handsome jug and two cups in oak and silver, with inscriptions.



## Miscellaneous.

**Tidal Approaches and Deep-Water Entrances.**—At a meeting of the Society of Engineers, held on Monday evening last at the Town-hall, Caxton-street, Westminster, Mr. Charles Gandon, President, in the chair, a paper was read on "Tidal Approaches and Deep-Water Entrances," by Mr. J. B. Redman, M. Inst. C.E. The author described the altered conditions due to the rapid increase of late years in the size of oceanic steamers and the transition of freightage and passenger traffic, from the 1,200-ton Indiaman to the 5,000-ton steamer, and noted the demand for increased deep-water depôts due thereto. The peculiarity of British tides was explained, and the great advantages they secured to this country. The character of various deep-water sites was analysed, and a comparison drawn between the London and Liverpool estuaries. The navigable properties of the Thames reaches were described, and the difficulties of docking ships on a tide-way referred to. A review was given of the rise, progress, and schemes for extension, of our metropolitan docks. The new Tilbury Docks, now approaching completion, were considered, especially as regards the approaches from seaward. The advantages of the Thames Haven and Shell Haven sites were pointed out, as the most seaward positions that could be obtained for metropolitan docks. The modern improvements in dredging plant were referred to, as showing the direction in which we must look for artificial aid in opening out our "Tidal Approaches," and the paper concluded with a brief notice of the various methods of deep water foundations by cylinders, caissons, crib-work, concrete in blocks, *pierre perdue*, squared blocks, *en masse*, or by bags and skips, by monolithic hollow blocks, or the section of quay or wall entire, and pointed out how largely these various methods would be extended and developed in the future for "deep-water entrances."

**The Central Criminal Court.**—The complaint of a witness that the accommodation at the Old Bailey for those giving evidence is disgraceful was fully endorsed by the remarks of the presiding judge. Owing to the governing authorities of the City being distinct and separate from those governing the rest of the metropolis, this disagreeable state of affairs would naturally object to devoting its funds to the reconstruction of courts which are not limited in their use to the hearing of City cases, and until it and the rest of London have a common fund and a common governing body, the difficulty is likely to remain. Were health merely concerned we should not expect much attention to be paid to the matter, but the interference to comfort and to the performance of the duties of the court is sufficient to make Londoners, who have no special knowledge of parochial boundaries, find but little consolation in the fact that such sacrifices must be made for the maintenance of civic institutions. London, indeed, is learning by degrees the inconveniences attending a divided government.—*Lancet*.

**Paved Channels in Town Roadways.**—Mr. J. M. Knight, Surveyor to the Vestry of Mile End, points out that, in the present days of steam road rolling, it is necessary to have all channels paved, if for no other reason than to prevent the curb from being disturbed every time the road is repaired. Channel-paving prevents small pools of stagnant water, which with the best roadmaking will always occur in macadamised roads, caused by the softness of the subsoil, which is caused by the openings for gas and water supplies. In these small pools the low forms of life germinate, and, when dry, are blown over the locality. It may be that no disease germ is incubated in these small deposits of decaying matter once in a thousand cases; but anything which produces objectionable smells at all times affects the health of the inhabitants, and by so doing may render them susceptible to disease.—*Metropolitan*.

**Sewerage Scheme for Rishton.**—The Rishton Local Board have authorised their surveyor (Mr. Helm, of Accrington) to prepare plans for the carrying out of a sewerage scheme for Rishton, which, it is estimated, will involve an outlay of about 5,000.

**Town-hall, Edmonton.**—In our brief description of the new Town-hall at Edmonton last week, it should have been mentioned that the lighting conductors were supplied by Messrs. R. S. Newall & Co., of 130, Strand, W.C.

**Friction and Lubricants.**—The usual fortnightly meeting of the Liverpool Engineering Society was held on Wednesday, the 28th ult., at the Royal Institution, Colquitt-street, Mr. W. E. Mills, President, in the chair. A paper by Professor Hele-Shaw (University College, Liverpool), entitled "Recent Researches on the Nature of Friction and the Action of Lubricants," was read by the author. The author in the first place briefly reviewed the steps which had been made in the progress of our knowledge of friction, and pointed out that General Morin's results and conclusions, both on the sliding and rolling contact of surfaces, published between 1830 and 1834, had until recent years been regarded as final. During the last ten years, however, many scientific men had worked at the subject, and much light had been thrown not only on the sliding and rolling friction of solids, but on the friction of liquids and gases. The author in the present paper confined his remarks entirely to the sliding contact of dry and lubricated surfaces of solids. Commencing with the friction of dry surfaces, it has for some time been admitted that the so-called laws of friction usually given in text-books are probably never exactly true under ordinary pressures and velocities, while they lead to very erroneous conclusions if applied beyond moderate limits, and the experiments of Ball, Douglas Galton and Westinghouse, Fleming, Jenkin and Ewing, Poiré, and others were alluded to in proof of this. In discussing the actual nature of friction of dry surfaces the author believed that more careful and elaborate observations of temperature at extreme velocities and pressure were needed. Coming to the subject of the contact of lubricated surfaces, a far greater advance had been made. The work of Thurston and the experiments made by the committee of the Institution of Mechanical Engineers were of great value, and the main results were brought forward. A striking feature in the progress of the subject was the increasing use of testing machines, and those of Thurston, Stapper, and Bailey were exhibited and described.

**Archæologists at St. Albans.**—Last week some members of an archæological society, in connexion with the "Leland Club," visited St. Albans. They first proceeded to St. Michael's Church. Mr. Patrick, who read a short paper, said the church was interesting on account of its great age and peculiar features. The oldest part was the early Norman nave, built fifty years or so before the Conquest. The church was peculiar in its construction. There was a particularly interesting old monument outside, built into the south wall of the chancel, which was once inside the church. About 1804 the edifice was restored, and a great many old monuments were destroyed, and the one in question was removed to its present position. There was an interesting old painting of the Resurrection to be seen. The churches about the neighbourhood of St. Albans were built of the ruins of the city of Verulam, and in the tower of that church there were to be seen courses of Roman tiles used. There was very little of historical interest connected with the church. The party then proceeded, some in carriages and some on foot, along Watling-street to the gate at the top of Verulam Woods, from whence they walked through the woods, inspecting the ruins of the Roman walls, and the remains of the fosse, to the causeway, and thence across the silk-mill bridge. Here Mr. Winston made a few remarks on the old city of Verulam. Rejoining the carriages, the party proceeded to the George Hotel to lunch, after which the Abbey church was visited. In the presbytery, Mr. Patrick read a paper detailing the history of the church. A vote of thanks was given to Mr. Patrick, on the motion of Mr. Wright, F.S.A., seconded by Mr. Reynolds, on behalf of the Bristol contingent of the party. The archæologists then walked through the church under the leadership of Mr. Patrick, who pointed out its principal features. The exterior of the building was subsequently viewed. The remainder of the day was spent in visiting the remains of Sir Richard Lee's Manor House, built on the site of Soppell Priory.

**The Hotel Métropole.**—Messrs. R. F. Dale & Co., of Bear-lane, Southwark, have fitted the windows of the Hôtel Métropole with Holland's "Lazy" ventilator, the patent of which they have purchased. This ventilator was described in the Builder for Dec. 1, 1883, p. 737.

**Institution of Civil Engineers.**—The sixty-ninth session of the Institution of Civil Engineers will be opened on Tuesday, the 10th of November, when the first business will be the formal presentation, by the President, of the premiums and prizes awarded for papers submitted last session; after which a discussion will be taken on the steam-engine indicator, and on errors in indicator diagrams.

**The Holborn Restaurant.**—The new grill room, just finished, at the Holborn Restaurant, is to be opened to the public this Saturday, November 7th. It forms the principal portion of the ground-floor of the new building fronting Little Queen-street, of which we gave a view in the Builder for January 31st last. The new grill-room will supersede the existing grill-room, which it is the intention to utilise as a reading-room. The new grill-room is a large and lofty apartment, and is very richly-decorated. The dado is in Grand Antique marble of the Pyrenees, with moulded black marble capping. The pilasters round the room are of Rouge Incarnat. The general wall-fining is of Campan Vert, with panels of Venetian enamel mosaic; the frieze is of Siena marble, with Campan Vert cornice. The ceiling is panelled with alabaster from Derbyshire, having centres of Venetian enamel mosaic; the four iron columns in the centre are encased with Vein marble, reeded and fluted, with gilt caps and bases. The cove round the room is of fibrous plaster, gilded, from the festoons of which incandescent electric lights project; the floor is of marble mosaic. The corridors in the upper part of the new wing have marble dados all round them, and the floors of these, as well as the new rooms, are marble mosaic. In the floors of the top corridors of all Hyatt's lights are effectively introduced in combination with panels of marble mosaic. All the mosaic and all the marble work have been carried out by Messrs. Burke & Co., of Newman-street. The architects for the work are Messrs. Archer & Green. It may be of interest to state that, including the buildings now completed, accommodation is provided for 2,000 persons to dine at once. Ultimately the buildings will be extended to the corner of Little Queen-street.

**Ventilation.**—Messrs. Robert Boyle & Son are at present applying their complete system of ventilation for ships to the two large new Transatlantic steamships *Champagne* and *Bretagne*, belonging to the Compagnie Générale Transatlantique, and also to the two new Transatlantic steamships *Gascogne* and *Bourgeois*, at present being built for the Société Anonyme, Marseilles. There will be fitted on these vessels ninety-six Boyle's patent air-pump ventilators of the largest sizes, and twenty-eight Boyle's patent downcast ventilators, also of the largest sizes. These companies have already used and approved of Messrs. Boyle's system, which is now generally used by all the leading steamship companies, and is also adopted in the British and foreign navies.

**Lifts.**—The American Elevator Company have just closed a contract for two of their Standard Hydraulic Elevators, one for passenger and one for goods use, to be erected in the Hôtel Bristol, in Paris. This hotel is well known to Englishmen as the head-quarters of H.R.H. the Prince of Wales when in Paris. It was intended to have had these lifts running for the use of H.R.H. during his recent stay there, but circumstances prevented.

## PRICES CURRENT OF MATERIALS.

| TIMBER.                      |                  |          |          |
|------------------------------|------------------|----------|----------|
|                              | Greenheart, B.G. | £. s. d. | £. s. d. |
| Tek, E.I.                    | 12 10 0          | 15 10 0  |          |
| Sequoia, U.S.                | 0 2 6            | 0 2 9    |          |
| Ash, Canada                  | 3 0 0            | 5 0 0    |          |
| Birch "                      | 3 0 0            | 4 10 0   |          |
| Elm "                        | 3 10 0           | 5 0 0    |          |
| Fir, Dantais, &c.            | 1 13 0           | 4 10 0   |          |
| Oak "                        | 3 0 0            | 5 0 0    |          |
| Pine "                       | 3 0 0            | 4 0 0    |          |
| " yellow                     | 3 15 0           | 5 5 0    |          |
| Lath, Dantais                | 6 0 0            | 6 0 0    |          |
| St. Petersburg               | 6 0 0            | 7 0 0    |          |
| Walnut, Riga                 | 3 0 0            | 4 10 0   |          |
| Deals, Finland, 2nd and 1st. | 8 0 0            | 9 0 0    |          |
| " 4th and 3rd                | 6 10 0           | 7 10 0   |          |
| Riga                         | 7 0 0            | 8 10 0   |          |
| St. Petersburg, 1st yel.     | 10 0 0           | 17 0 0   |          |
| " 2nd "                      | 8 0 0            | 9 15 0   |          |
| " white                      | 6 10 0           | 11 0 0   |          |
| Swedish                      | 7 0 0            | 17 0 0   |          |
| White Sea                    | 8 10 0           | 19 0 0   |          |
| Canada, Pine 1st             | 18 0 0           | 32 10 0  |          |
| " 2nd                        | 12 0 0           | 18 10 0  |          |
| " Spruce 1st                 | 7 0 0            | 10 10 0  |          |
| " 3rd and 2nd                | 9 0 0            | 12 0 0   |          |
| New Brunswick, &c.           | 6 10 0           | 8 10 0   |          |
| Battens, all kinds           | 4 0 0            | 13 0 0   |          |



| TIMBER (continued).        | 2. s. d. | 2. s. d.  |
|----------------------------|----------|-----------|
| Board, first .....         | 0 9 0    | 0 13 0    |
| Second .....               | 0 7 8    | 0 8 6     |
| Other qualities .....      | 0 5 0    | 0 7 0     |
| Star, Cuba, foot .....     | 0 0 3    | 0 0 4     |
| Honduras, &c. ....         | 0 0 3    | 0 0 4     |
| Australian .....           | 0 0 3    | 0 0 3 1/2 |
| Managua, Cuba .....        | 0 0 5    | 0 0 7 1/2 |
| St. Domingo cargo av. .... | 0 0 4    | 0 0 6 1/2 |
| Mexican .....              | 0 0 4    | 0 0 6     |
| Tobacco cargo av. ....     | 0 0 4    | 0 0 6 1/2 |
| West India cargo av. ....  | 0 0 4    | 0 0 6 1/2 |
| Rio .....                  | 7 0 0    | 17 0 0    |
| Bahia .....                | 6 0 0    | 15 0 0    |
| Latin, St. Domingo .....   | 0 0 8    | 0 0 1     |
| Porto Rico .....           | 0 0 8    | 0 0 1 1/2 |
| Valnut, Italian .....      | 0 0 4    | 0 0 5     |

| METALS.                         | 2. s. d. | 2. s. d. |
|---------------------------------|----------|----------|
| Bar-Pip in Southland .....      | 2 2 8    | 0 0 0    |
| Bar, Welsh, in London .....     | 4 15 0   | 6 2 8    |
| " " in Wales .....              | 4 7 6    | 4 12 6   |
| " Staffordshire, London .....   | 6 0 0    | 7 0 0    |
| Sheets, single, in London ..... | 7 10 0   | 9 0 0    |
| Hoops .....                     | 6 0 0    | 7 5 0    |
| Nail-roads .....                | 6 0 0    | 7 0 0    |
| COFFER—                         |          |          |
| British, cks. and ingt. ....    | 43 0 0   | 44 10 0  |
| Best sheet, in London .....     | 14 0 0   | 45 0 0   |
| Sheets, strong .....            | 82 0 0   | 0 0 0    |
| " India .....                   | 48 0 0   | 48 10 0  |
| Australian, fine cash .....     | 0 0 0    | 0 0 0    |
| Chil, bare .....                | 39 10 0  | 39 17 6  |

| METALS (continued).         | 2. s. d.  | 2. s. d.  |
|-----------------------------|-----------|-----------|
| YELLOW METAL .....          | 0 0 4 1/2 | 0 0 4 1/2 |
| LEAD—Pig, Spanish .....     | 11 5 0    | 0 0 0     |
| English, coin, brands ..... | 11 10 0   | 0 0 0     |
| SPELTER—                    |           |           |
| Silesian, special .....     | 14 6 0    | 14 7 6    |
| Ordinary brands .....       | 14 0 0    | 14 5 0    |
| TIN—                        |           |           |
| Straits .....               | 91 15 0   | 92 5 0    |
| Australian .....            | 92 3 8    | 92 12 6   |
| English ingots .....        | 94 0 0    | 0 0 0     |
| TRIPPLATE—                  |           |           |
| IC coke .....               | 0 15 6    | 0 17 0    |
| 1X ditto .....              | 1 1 8     | 1 5 0     |
| 1X ditto .....              | 0 17 6    | 1 0 0     |
| 1X ditto .....              | 1 6 0     | 1 7 0     |

| OILS.                        | 2. s. d. | 2. s. d. |
|------------------------------|----------|----------|
| Lincseed .....               | 23 0 0   | 23 10 0  |
| Cocooned, Cochua .....       | 31 0 0   | 0 0 0    |
| Ceylon .....                 | 27 10 0  | 27 15 0  |
| Copra .....                  | 26 10 0  | 0 0 0    |
| Palm, Lagos .....            | 29 10 0  | 30 0 0   |
| Palm-ut Kernel .....         | 28 10 0  | 0 0 0    |
| Rapeseed, English pale ..... | 25 0 0   | 0 0 0    |
| " brown .....                | 23 0 0   | 0 0 0    |
| Cottonseed, refined .....    | 20 5 0   | 22 0 0   |
| Tallow and Oleine .....      | 25 0 0   | 45 0 0   |
| Lubricating, U.S. .....      | 7 0 0    | 10 0 0   |
| " Refined .....              | 8 0 0    | 15 0 0   |
| TURBENTINE—                  |          |          |
| American, in cks. ....       | 1 5 8    | 1 8 0    |
| Tar—Stockholm .....          | 0 11 8   | 0 12 0   |
| Archangel .....              | 0 11 8   | 0 12 0   |

## COMPETITIONS AND CONTRACTS.

Epitome of Advertisements in this Number.

## COMPETITIONS.

| Nature of Work.      | By whom required.     | Premium.                 | Designs to be delivered. | Page. |
|----------------------|-----------------------|--------------------------|--------------------------|-------|
| New Offices .....    | Stretford Local Board | 37s., 20s., and 10s. ... | Dec. 5th                 | ii.   |
| New Law Courts ..... | Birmingham Corpora.   | Not stated               | Not stated               | ii.   |

## CONTRACTS.

| Nature of Work, or Materials.                    | By whom required.                      | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|--------------------------------------------------|----------------------------------------|-----------------------------------|--------------------------|-------|
| Making-up Streets .....                          | Wandsworth Bd. of Wks                  | Official                          | Nov. 10th                | ii.   |
| Kerbing, Paving, and Other Works .....           | Healdon Local Board                    | do.                               | Nov. 11th                | ii.   |
| Underground Drains, &c., Bactchep .....          | Com. of Sewers                         | do.                               | Nov. 13th                | ii.   |
| Weymouth, Woodbridge .....                       | Govan, Seckford Hospital, &c., Schools | do.                               | Nov. 14th                | ii.   |
| Construction of Branch Line, Barnstable .....    | Great Western Ry. Co.                  | do.                               | Nov. 17th                | ii.   |
| Kerbing and Asphalting Footpaths, &c. ....       | Tottenham Local Board                  | — De Pape                         | do.                      | ii.   |
| Agueduct, Thimere .....                          | Manchester Corpora                     | G. H. Hill                        | do.                      | ii.   |
| Wing Walls of Kitchen at Workhouse .....         | Lambeth Guardians                      | Official                          | Nov. 18th                | ii.   |
| Alter and Adding to existing Copper Plates ..... | Northwich Local Board                  | H. Bagroff                        | Nov. 21st                | ii.   |
| Wrought-iron Girders, &c. ....                   | Liverpool Corporation                  | Official                          | do.                      | xx.   |
| Pipe Sewers, &c. ....                            | Ramford U. R. S. A.                    | Broadell, Simmons, & Co           | Nov. 30th                | ii.   |
| Fire Pier, Lee-on-the-Solent .....               | E. Robinson                            | do.                               | Dec. 5th                 | ii.   |
| Erection of Farm Buildings .....                 | Glamorgan Lun. Asy.                    | J. Giles & Gough                  | Dec. 5th                 | ii.   |
| Iron and Glass Buildings .....                   | Folkstone Exhibn, 1886                 | Jos. Gardner                      | Not stated               | xx.   |
| Rebuilding Three Houses .....                    | W. Stevens                             | do.                               | do.                      | ii.   |

## TENDERS.

|                                                                                                                                                                 |             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| BLACKHEATH.—For the erection of two shops and premises at Tranquil Vale, Blackheath, for Messrs. Hinds & Price .....                                            | £1,200 0 0  |
| BRISTOL.—For the erection of new Sunday schools in connection with the Broadmead Baptist Chapel, Mr. Herbert J. Jones, architect, Bristol:—<br>Pitch Pine ..... | £2,347 18 0 |
| Red Deal .....                                                                                                                                                  | £2,287 18 0 |
| Fittings .....                                                                                                                                                  | 2,225 0 0   |
| W. E. Walters .....                                                                                                                                             | 2,127 0 0   |
| E. T. Hatherly .....                                                                                                                                            | 2,030 0 0   |
| H. A. Horse .....                                                                                                                                               | 1,969 0 0   |
| F. Williams .....                                                                                                                                               | 1,867 0 0   |
| Cowlin & Son .....                                                                                                                                              | 1,825 0 0   |
| Eastbrook & Sons .....                                                                                                                                          | 1,870 0 0   |
| J. James .....                                                                                                                                                  | 1,769 0 0   |
| Stephens & Bastow .....                                                                                                                                         | 1,769 0 0   |
| J. Bastow .....                                                                                                                                                 | 1,790 0 0   |
| Wilkins & Son .....                                                                                                                                             | 1,777 0 0   |
| E. Clarke .....                                                                                                                                                 | 1,774 0 0   |
| W. Church .....                                                                                                                                                 | 1,749 0 0   |
| G. Humphreys .....                                                                                                                                              | 1,738 0 0   |
| A. Krauss .....                                                                                                                                                 | 1,735 0 0   |
| J. E. Davis .....                                                                                                                                               | 1,728 0 0   |
| H. J. Rosier .....                                                                                                                                              | 1,724 0 0   |
| J. H. Brown .....                                                                                                                                               | 1,720 0 0   |
| J. Wilkins .....                                                                                                                                                | 1,693 0 0   |
| Walters & Son .....                                                                                                                                             | 1,647 0 0   |
| A. J. Bevan .....                                                                                                                                               | 1,640 0 0   |
| T. R. Lewis .....                                                                                                                                               | 1,444 0 0   |

\* Accepted conditionally.

|                                                                                                                                                                  |          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| BRISTOL.—For rebuilding fronts of Nos. 39 and 40, Wine-street, for Mr. Walter Varrier, Mr. Herbert J. Jones, architect, Bristol:—<br>G. Humphreys, Bristol ..... | £820 0 0 |
| [No competition.]                                                                                                                                                |          |

|                                                                                                                                                             |          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| BRISTOL.—For sanitary and decorative works at Winkfield House, Whiteladies-road, Mr. Herbert J. Jones, architect, Bristol:—<br>J. R. Criddle, Bristol ..... | £183 7 0 |
| [No competition.]                                                                                                                                           |          |

|                                                                                                                       |          |
|-----------------------------------------------------------------------------------------------------------------------|----------|
| CAMBERWELL.—For the erection of a cottage at Wells-street, Chamberwell. Mr. Willis, architect:—<br>J. A. Taylor ..... | £259 0 0 |
| King .....                                                                                                            | 235 0 0  |
| Smith .....                                                                                                           | 210 0 0  |

|                                                                                             |            |
|---------------------------------------------------------------------------------------------|------------|
| FINSBURY.—For the erection of a public-house at Finsbury, for Mr. Fordham:—<br>Voller ..... | £2,101 0 0 |
| Dove Bros. ....                                                                             | 2,095 0 0  |
| Harris, Old-street (accepted) .....                                                         | 1,966 0 0  |

|                                                                                                                                                                  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| HASTINGS.—For erecting the East Sussex, Hastings, and St. Leonard's Hospital, at Hastings. Messrs. Young & Hall, architects. Quantities by Mr. Morgan H. Young:— |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

|                                  | A.      | B.     | C.   | Total.  |
|----------------------------------|---------|--------|------|---------|
| Taylor Bros., Hastings .....     | £25,251 | £1,100 | £450 | £26,801 |
| Dove Bros., London .....         | 24,976  | 1,125  | 425  | 26,526  |
| J. Kenwood, St. Leonard's .....  | 23,600  | 1,689  | 460  | 25,749  |
| C. Hughes, St. Leonard's .....   | 23,200  | 1,377  | 415  | 24,992  |
| Grover & Son, London .....       | 23,162  | 1,018  | 477  | 24,657  |
| Punnett & Son, Tunbridge .....   | 22,548  | 1,571  | 409  | 24,528  |
| P. Jenkins, St. Leonard's .....  | 21,960  | 1,020  | 420  | 23,400  |
| Perry & Co., London .....        | 21,567  | 1,014  | 402  | 23,383  |
| Roida, Hastings .....            | 21,362  | 986    | 394  | 23,322  |
| L. H. & R. Roberts, London ..... | 21,394  | 1,031  | 372  | 23,297  |
| Eldridge & Crutenden .....       | 20,555  | 910    | 420  | 21,885  |
| H. L. Holloway, London* .....    | 19,634  | 895    | 458  | 20,987  |

\* Accepted, subject to certain alterations, reducing the amount to about 14,500l.

|                                                                                                                                                     |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| HOLLOWAY.—For repairs to the Royal Caledonian Asylum, Holloway. Mr. Alexander Peebles, honorary architect. No quantities:—<br>Kilby & Gayford ..... | £314 0 0 |
| C. H. Cole .....                                                                                                                                    | 296 0 0  |
| McCormick & Sons .....                                                                                                                              | 256 0 0  |

|                                                                                                                                                                     |            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| KENSINGTON.—For alterations to Nos. 95 and 97, High-street, Kensington. Mr. Alexander Peebles, architect. Quantities by Mr. W. E. Stoner:—<br>Clarke & Bracey ..... | £4,092 0 0 |
| Nightingale .....                                                                                                                                                   | 4,448 0 0  |
| G. Bowles .....                                                                                                                                                     | 4,197 0 0  |
| Brass & Son .....                                                                                                                                                   | 3,623 0 0  |
| J. Morter .....                                                                                                                                                     | 3,493 0 0  |
| Kilby & Gayford .....                                                                                                                                               | 3,383 0 0  |
| C. F. Kearley .....                                                                                                                                                 | 3,189 0 0  |

|                                                                                                                                                      |            |
|------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| LEE (Kent).—For the erection of schools and classrooms to Congregational Church, Lee, Kent. Mr. J. H. Seib, architect, Lincoln's Inn:—<br>Good ..... | £2,665 0 0 |
| Havill .....                                                                                                                                         | 1,810 0 0  |
| Jervard .....                                                                                                                                        | 1,776 0 0  |
| Renard Bros. (accepted) .....                                                                                                                        | 1,754 15 0 |

|                                                                                                                                                                    |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| LONDON.—For alterations in forming dry area at Infirmary, Hoxton-street, for the Guardians of St. Leonard's, Shoreditch. Mr. F. T. Smith, architect:—<br>Cox ..... | £255 0 0 |
| Arnold .....                                                                                                                                                       | 160 0 0  |
| Robson .....                                                                                                                                                       | 149 0 0  |
| Ivory .....                                                                                                                                                        | 145 0 0  |
| Dicksee & Dicksee .....                                                                                                                                            | 145 0 0  |
| Martin .....                                                                                                                                                       | 139 13 0 |
| Sharp .....                                                                                                                                                        | 125 0 0  |
| Reason .....                                                                                                                                                       | 124 0 0  |
| Linfield .....                                                                                                                                                     | 124 0 0  |
| Whicker .....                                                                                                                                                      | 123 0 0  |
| Doubladay .....                                                                                                                                                    | 120 0 0  |
| Deacon .....                                                                                                                                                       | 119 0 0  |
| Harbrow .....                                                                                                                                                      | 112 0 0  |
| Feary .....                                                                                                                                                        | 110 0 0  |
| Swan & Co. ....                                                                                                                                                    | 102 0 0  |
| Kilby .....                                                                                                                                                        | 101 12 6 |
| Stevens .....                                                                                                                                                      | 98 10 0  |
| Lyns .....                                                                                                                                                         | 98 14 0  |
| E. Walker .....                                                                                                                                                    | 87 0 0   |
| Forrest (accepted) .....                                                                                                                                           | 75 10 0  |

|                                                                                                                                                                                    |            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| LONDON.—For cooking apparatus and boilers at the workhouse and infirmary, St. George's-in-the-East. Messrs. Wilson, Son, & Aldwinckle, architects:—<br>Clements, Jenkes & Co. .... | £3,654 0 0 |
| Waller .....                                                                                                                                                                       | 3,361 0 0  |
| Christie .....                                                                                                                                                                     | 3,311 0 0  |
| Bradford .....                                                                                                                                                                     | 2,739 0 0  |
| May .....                                                                                                                                                                          | 2,680 0 0  |
| W. J. Fraser & Co. ....                                                                                                                                                            | 2,680 0 0  |
| J. F. Clarke .....                                                                                                                                                                 | 2,665 0 0  |
| Fraser & Fraser .....                                                                                                                                                              | 2,542 0 0  |
| Berry & Sons (accepted) .....                                                                                                                                                      | 2,180 0 0  |

|                                                                                                                                         |  |
|-----------------------------------------------------------------------------------------------------------------------------------------|--|
| LONDON.—For pulling down and rebuilding No. 2, Bond-court, Walbrook. Mr. Alexander Peebles, architect. Quantities by Mr. W. E. Stoner:— |  |
|-----------------------------------------------------------------------------------------------------------------------------------------|--|

|                             | Credit old materials. |
|-----------------------------|-----------------------|
| Clarke & Bracey .....       | £10,932               |
| Hall, Boddall, & Co. ....   | 10,822                |
| J. & J. Greenwood .....     | 10,369                |
| E. Lawrence .....           | 10,112                |
| E. Cander .....             | 9,965                 |
| Kilby & Gayford .....       | 9,966                 |
| Mowlem & Co. ....           | 9,918                 |
| Cox & Sons .....            | 9,517                 |
| Cox .....                   | 9,788                 |
| Patman & Fotheringham ..... | 9,783                 |
| Brass & Son .....           | 9,688                 |
| G. Gentry .....             | 9,653                 |
| B. E. Nightingale .....     | 9,596                 |
| J. Morter .....             | 9,337                 |

|                                                                                                                                      |          |
|--------------------------------------------------------------------------------------------------------------------------------------|----------|
| LONDON.—For repairs to the Church of St. Mary-at-Hill, City. Mr. Alexander Peebles, architect. No quantities:—<br>Colls & Sons ..... | £745 0 0 |
| J. & J. Greenwood .....                                                                                                              | 698 0 0  |
| Harrison & Spooner .....                                                                                                             | 673 18 0 |
| Kilby & Gayford .....                                                                                                                | 630 0 0  |
| Dove Bros. ....                                                                                                                      | 395 0 0  |

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|---------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| LONDON.—For works to the City of London Militia Barracks, City-road. Mr. Alexander Peebles, architect. No quantities:—<br>B. E. Nightingale ..... | £268 0 0 |
| J. Woodward .....                                                                                                                                 | 788 0 0  |
| J. & J. Greenwood .....                                                                                                                           | 627 0 0  |
| J. C. Ramsey .....                                                                                                                                | 697 14 6 |
| Kilby & Gayford .....                                                                                                                             | 678 0 0  |
| McCormick & Sons .....                                                                                                                            | 612 0 0  |

LONDON.—For alterations to No. 91, Old-street, St. Luke's. No quantities. Mr. W. D. Church, architect, South-place, Finsbury:—

|                         |          |
|-------------------------|----------|
| Gardner .....           | £390 0 0 |
| Taylor .....            | 270 0 0  |
| Gill .....              | 237 0 0  |
| Canham & Rickards ..... | 232 18 0 |
| Sabey (accepted) .....  | 200 0 0  |

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| Schools.             | Hall.     | Total.    |
|----------------------|-----------|-----------|
| G. Beale .....       | £7,895 10 | £2,333 10 |
| Wood Bros. ....      | 7,643 0   | 2,465 0   |
| Toten Bros. ....     | 7,465 0   | 2,440 0   |
| Thomson & Son ..     | 7,190 0   | 2,471 0   |
| Jackson & Son ..     | 7,100 0   | 2,424 0   |
| Lawrence & Sons ..   | 7,049 0   | 2,389 0   |
| Grover & Son .....   | 6,892 0   | 2,339 0   |
| J. T. Chappell ..... | 6,877 0   | 2,367 0   |
| T. Boyce .....       | 6,858 0   | 2,345 0   |
| Hall, Reddall, & Co. | 6,810 0   | 2,260 0   |
| Perry & Co. ....     | 6,792 0   | 2,203 0   |
| W. Shurmer .....     | 6,643 0   | 2,340 0   |
| J. Morter .....      | 6,739 0   | 2,243 0   |
| B. C. Nightingale .. | 6,647 0   | 2,197 0   |
| Brown, Son, & Blum-  | 6,620 0   | 2,183 0   |
| field .....          | 6,450 0   | 2,160 0   |
| C. Cox .....         | 6,450 0   | 2,160 0   |

LONDON.—For alterations, &c., at the Crooked Billet Tavern, Crooked-lane, E.C., for Mr. Chown. Mr. Geo. Treacher, architect, Carter-lane:—

|                       |          |
|-----------------------|----------|
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| Parker .....          | 385 0 0  |
| B. Cook (accepted) .. | 363 0 0  |
| Hulet .....           | 360 0 0  |

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|                       |          |
|-----------------------|----------|
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| Nightingale .....     | 143 0 0  |
| B. Cook (accepted) .. | 135 0 0  |
| Drew .....            | 123 0 0  |
| Deighton .....        | 116 0 0  |

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|                       |          |
|-----------------------|----------|
| K. & J. Shiers .....  | £815 0 0 |
| S. R. Lambie .....    | 735 0 0  |
| S. Godden .....       | 735 0 0  |
| J. Heath .....        | 687 0 0  |
| Ward & Lambie .....   | 698 0 0  |
| Spencer & Co. ....    | 660 0 0  |
| J. Walker .....       | 617 0 0  |
| B. Cook (accepted) .. | 631 0 0  |

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|                      |            |
|----------------------|------------|
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| Macdonald .....      | 1,978 3 9  |
| Allard .....         | 1,770 0 0  |
| Bamford .....        | 1,750 0 0  |
| Brown .....          | 1,742 0 0  |
| Goy .....            | 1,676 0 0  |
| Haynes .....         | 1,825 0 0  |
| Mattcock Bros. ....  | 1,691 0 0  |
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|                        |          |
|------------------------|----------|
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| B. Walker .....        | 213 0 0  |
| Edliss .....           | 188 0 0  |
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|                             |            |
|-----------------------------|------------|
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| G. Dyer, Weston-super-Mare  | 5,450 0 0  |
| W. Cowlin & Son, Bristol    | 5,433 0 0  |
| Brown & Harris .....        | 5,166 0 0  |
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|                                 |            |
|---------------------------------|------------|
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|                               |             |
|-------------------------------|-------------|
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| Scott & Edwards, Birmingham   | 36,895 0 0  |
| Ansell, Dipson, & Wainwright, | 34,370 0 0  |
| Innes & Wood, Birmingham      | 33,126 0 0  |
| Curral & Lewis, Birmingham    | 32,003 0 0  |
| Vernon & Co., London .....    | 31,978 0 0  |
| Jevons & Son, Dudley .....    | 31,523 0 0  |
| Trow, Sons, & Fereday, Wedne- | 31,180 0 0  |
| bury .....                    | 29,480 0 0  |
| A. Krauss, Bristol .....      | 27,938 0 0  |
| Hughes & Son, Low-Ground      | 26,900 0 0  |
| G. Law, Kidderminster .....   | 26,488 0 0  |
| A. Palmer, Birmingham .....   | 26,488 0 0  |

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# The Builder.

Vol. XLIX. No. 222.

SATURDAY, NOVEMBER 14, 1886.

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### Tiryns.



F all the series of remarkable excavations carried out by Dr. Schliemann, and of remarkable volumes in which these researches are recorded, none has such direct and genuine interest for architect as the just-issued volume on \* There is not, of course, the same our of association with the name which is about the subject of Troy; nor, let it be limited, is there anything in the details so far which can compare in artistic with the gold work of Hissarlik and the. The ornamental work discovered far confined to pottery and bits of walling of archaic design and workmanship, remarkable point in the work is the full intelligible nature of the architectural ns which have been unearthed, to which ional value is given by the learned ue, sometimes a little imaginative but rs suggestive, of Dr. Dörpfeld. For gene- the "Cyclopean Gallery at Tiryns" has and in all kinds of books on architecture, ar or scientific, as one of the most remark- and mysterious of ancient remains; yet world has been content to look at this ant and shake its head mysteriously about about taking any trouble to find out its ing, or to look for any further relics which throw light upon it. In March of 1884, Schliemann comes on the scene with apparatus of 20 crow-bars, one large and small windlasses, 50 large iron shovels, pickaxes, 25 hoes of a kind known in the as *Tschapa*, and "40 English wheel- with iron wheels" (which last item te as our only national connexion with matter, so we may as well make the most of it, and under the attacks of these weapons, mystery of Tiryns disappears, and its plan d bare, measured, drawn, and published. thing, of course, of the poetic interest of lace dissolves under this acid of investi- and criticism. *Omne ignotum pro fectio*; and the gallery of Tiryns, with mysterious epithet "Cyclopean" (which on the pious imagination like "that ed word Mesopotamia"), seems brought the mythical past into the light of on day. There is, of course, much room conjecture and for further investigation; on the whole, the wonder is that there

should still be so much of the plan of the citadel left, so clearly defined, after so many ages.

Dr. Schliemann's sketch of his mode of life while carrying out the excavations is as interesting and as graphic as usual, but we must pass over that to treat of the main subject-matter. He had, as some of our readers are aware, made some initial excavations at Tiryns in 1876, working there for a week with fifty-one men, but it was not till 1884 that he had time to get to work there again. Dr. Dörpfeld, of whose contribution to the volume we will speak later on, accompanied and resided with him there. The first work was to dig away the rubbish down to the floor of lime and small stones which spreads over the whole surface of the Acropolis, and which was covered, from 1 to 1½ metre deep,\* with fragments of brick, masonry nearly calcined, and black earth.

"It then appeared that the walls found in my excavations of 1876, consisting of large stones without mortar, were only the foundation-structure of an immense palace, occupying the whole of the upper citadel. Of its walls, the lower portion, built of smaller stones and clay about 0·50 metre high, had been remarkably preserved by the close covering of debris over all the building, which came down from the higher walls of the edifice, made of unburnt bricks, and from the flat roofs which consisted probably of clay. This preservation is also due to the conflagration by which the palace was destroyed, for its heat was such, whenever beams of timber fed the flames, that the stones were calcined, the binding clay burned into real brick, and the whole reduced to so hard a mass, that our strongest men had the greatest difficulty in breaking it with pick-axes. Many of these works thus burnt were visible on the surface, and had misled the best archaeologists, as they were assumed to be Mediæval, and it had never been imagined that they could be perhaps 2,000 years older, and belong to the palace of the mythical kings of Tiryns. In all guide-books for Greece, therefore, the opinion is expressed that nothing of interest is to be found in Tiryns."

As at Hissarlik, Dr. Schliemann considers that he finds at Tiryns traces of more than one age of inhabitation, without counting the Byzantine and other walls obviously more modern than the bulk of the structure. Traces, in the shape of clay floors, appeared here and there in the outskirts of the citadel, of a still older and primitive habitation; but this successive possession of the site by different people seems established by the entirely different types of pottery found. To these two types of pottery found, two separate chapters are devoted, and largely illustrated. The earlier forms Dr. Schliemann conjectures to have belonged to the aboriginal inhabitants of Tiryns, the latter to the builders of the citadel, a portion of "that great Asiatic

people which, about the middle of the second millennium before Christ, covered the whole of the mainland of Greece, as well as the islands of the Ionian and Ægean seas, with and which had already attained a high level of culture." Into this race question we do not enter here; but every one who examines the illustrations will perceive that the examples of pottery belong to two different peoples.

We turn now, however, to what constitutes the real architectural interest of the volume, the plan of the citadel and its chambers as laid bare by Dr. Schliemann. We cannot, of course, reproduce here the plan; to do that would be to deprive of its principal value a book which every archaeologist will desire to possess; but we can briefly follow Dr. Dörpfeld through his interesting disquisition on the buildings. The plan shows a long irregular enclosure running nearly north and south, within immensely thick walls, and divisible into a lower, middle, and upper portion, of which the upper portion contains an elaborate array of courts and chambers forming the residence. This latter portion is on the highest ground of the eminence, which slopes away rapidly on all sides, the thick outer walls being almost entirely built on a steep slope. These walls have one principal entrance on the east side, being otherwise entirely unbroken except by two narrow posterns, one at the northern extremity, the other in a semicircular tower projected from the walls on the west side, and as thick as the main walls themselves. The first thing that occurs to one on looking at the whole disposition of the plan is its remarkable similarity in general idea to the disposition of a Mediæval French château. In both we have the thick walls and towers descending to the lower ground, and the habitable portion securely placed within the least accessible portion of the enclosure on the higher ground. The lower citadel is still unexcavated, though shafts sunk here and there have shown that here also are the walls of buildings preserved beneath the accumulation of soil and debris. The walls remaining in the small intermediate portion which has been called the middle citadel were of inferior construction, and in bad state of preservation. But in the upper citadel remains the plan, nearly complete in essentials, of what may be called a palace of the Homeric age.

In regard to the outer walls Dr. Dörpfeld notes that the statement of Pausanias, that a yoke of mules could not move the smallest stone at Tiryns, is an exaggeration, as many of the stones can be easily moved by a single man; but on an average the blocks are of great dimensions, stones of from 2 to 3 metres long, 1 metre in height, and 1 metre in thickness, being found in great numbers. Concern-

\* The measurements throughout the English edition are given in metres.



ing these great blocks there are some remarks worth noting in Professor Adler's preface. He comments on the tale which they tell of the settled power of the ruler under whose reign they were built together. The citadel could not have been built in a hurry, in the sight of the enemy, or as the first stronghold of an invasion based on maritime supremacy; "the colossal walls tell every one able to read the language of stones, that their erection can only have been effected in a long period of peace, by a ruler with unusual resources of power, and who had trained workmen under his permanent control." In regard to the practical value of this employment of immense stones Professor Adler has a new suggestion to make. He conjectures that in the building up of these walls a strong mortar of loam or potter's clay was used as bedding material, which facilitated the laying, joining, and further piling of the stones, but which dried up afterwards and was gradually washed away. This would leave many interstices for footholes in the walls, and hence the desire to choose such large blocks for the lower and middle courses as should render the scaling of the walls by this means impossible. The largest blocks being only found in the lower and middle courses on the outside is a fact which certainly favours this hypothesis, in which we gather that Dr. Schliemann and Dr. Dörpfeld concur. Two other special points may be noted in regard to the outer walls. One is, that there occur in them several straight joints from top to bottom of the work, at tolerably even distances, leading to the conclusion either that towers were first built and afterwards connected by walls, or that the first outer fortification was of a slighter and more temporary nature, and the massive wall of masonry was subsequently built up in sections, as the materials could be got together, and as time and opportunity allowed. Another peculiarity is the existence, in the inner face of a portion of the eastern wall, of half a dozen large niches, the most southern of which can be accurately measured (3·20 m. wide by 3·70 m. deep); the rest are still filled with *débri*. Dr. Dörpfeld says that apparently these niches were finished in the form of a pointed arch, made by over-sailing stones as in the famous gallery, and that further south exists a niche (shown on the plan), which still retains its "ogival" vault. Without a knowledge, which we can never now possess, of the internal economy of the fortress and the ways of its inhabitants, it seems useless to make any suggestion as to the object of these large niches; but Dr. Dörpfeld, like a true German, must have his explanation of everything (*quot Alemanni, tot sententia*, as Mr. A. Lang recently said of German archaeologists), and he considers they were intended to economise material in building the wall, the object being to have as wide a platform at the top as possible. "Many nations have in later times built their fortress walls in a similar way; on the inner side the walls were strengthened by projecting buttresses, united by vaulted arches, and thus a wide surface above was obtained." As this construction only obtains for about one-twentieth part of the whole linear measurement of the walls, such an explanation is almost absurd; a construction deliberately adopted for such a reason would have been carried out consistently. The convenient piling of arms seems to us the most probable reason for these niches; certainly more probable than that which we have just quoted.

In regard to the meaning and use of the well-known gallery, the later excavations in 1885 brought to light a new and interesting fact, not at all suspected when Dr. Dörpfeld wrote his first series of remarks on the excavations, from which we have been quoting. He had formed the idea from a suggestion of Captain Steffen's, and expressed it pretty positively, that this gallery with its range of arches was a series of sally-ports, opening out to the platform of the lower portion of the outer wall, whence the defenders could

emerge on to this said platform in case the assailants had attained to it. This platform seems to have been a pure assumption, but, as the foundations of a great thickness of wall remain outside the line of the gallery, it was assumed that the wall was built in a kind of "two-decker" arrangement, the lower platform running beneath the line of arches of the gallery on the upper wall. The well-known gallery is near the south-eastern angle, but on the south face there has been discovered a similar gallery with rows of pointed *quasi*-arches. On clearing away the obstructions from these the excavators expected, according to their theory, to see the platform of "the lower wall" extended before them, instead of which they found each arch led into a pointed vaulted chamber, constructed in the same way, and with no communication, not so much as an arrow-slit, with the outer face of the fortifications. Thus "all that we had said on page 184 and following pages was proved to be untenable," a caution that should be remembered by theorists. There was no "upper and lower" wall at all; the whole thickness of the wall was carried up and honeycombed with what were obviously storage cellars, with a long passage, out of which they opened. The "Cyclopean gallery of Tiryns" is another of these passages, from which the masonry of the cellars on which it once opened has been removed in the course of ages.

To come, however, from the walls to the habitation,—for we have waited outside long enough. Entering the outer wall by the one main entrance on the eastern side, turning sharp round to the left, and going about twenty yards southwards between two high and thick walls, we reach a great gate, "which in dimensions and construction corresponds closely with the Lion Gate at Mycenæ." This is the doorway to the precinct of the habitation, leading into a long irregular courtyard stretching southwards, and at its southern end, turning to the right, we pass through a portico *in antis*, with two columns between *antæ*, into a second courtyard, and turning to the right again, and having now turned quite round and facing northwards, we see in the north-west corner of this courtyard (which is also very irregular in shape), another portico *in antis* leading northward into a nearly square court, with a colonnade round three sides, and on its northern side, centrally situated, again a portico *in antis* leading through a vestibule and inner vestibule to the large *cella* forming the principal chamber of the house, with a circular hearth in the middle of it. This Dr. Dörpfeld calls, and we think with probability amounting to certainty, the principal men's apartment; the principal women's apartment is not far from it, but reached by a circuitous route and its own open forecourt, but only a single vestibule. Around them is a labyrinth of smaller rooms and passages, the special use of which, except in one case to be mentioned just now, can only be mere conjecture. But the main features as we have mentioned them seem as clear on the published plan as anything can be.

The actual remains from which this plan is constructed are, of course, themselves more like a plan than a building; but there seems to be quite sufficient to reconstruct the main scheme of the building from. There are walls standing one metre, more or less, above the floor-line, and bases of pillars *in situ*; besides a number of interesting and suggestive details of various kinds, some of which we may briefly touch upon.

The entrance, before spoken of as analogous to the Mycæne gate, shows an immense threshold, 1·40 metre wide and more than 3 metres long, flanked by two door-posts of breccia, 3·20 metres in height: one still in its place, the other with the upper half broken off; these are rebated for the door-casing. On each side in the threshold are the pivot-holes on which the doors turned, and halfway up the door-posts are seen the cylindrical holes for the bolt or bar. The inner gate building of the house, the portico *in antis*, shows the bases of all the columns, and those of three of the *antæ*, *in situ*. The door-sill is a limestone block,

4 mètres long and two broad, with circular pivot-holes, 21 mètres, or nearly 8 in diameter, showing the weight and size of folding-doors which turned in these pivot-holes. The section of the pivot-holes is hemispherical, and the door turned on sockets shod in bronze. For in the sill of the entrance to "women's apartment" was found a bronze socket still in its pivot-hole, a cylinder cut out in the side of it for the bottom rail of door, and finishing below in a convex hemisphere working in the concave pivot-hole. The position of the pivot, with the square slot it turned diagonally, showed that the door half open when the fire destroyed it, is truly a remarkable instance of what may be found in remains of buildings of pre-historic date, if it is only looked for. Any one who had been commissioned to excavate on the site of Tiryns to discover how doors were some eight or nine centuries before the Christ era would probably have laughed the proposition to scorn; yet here was the door-pivot nonetheless.

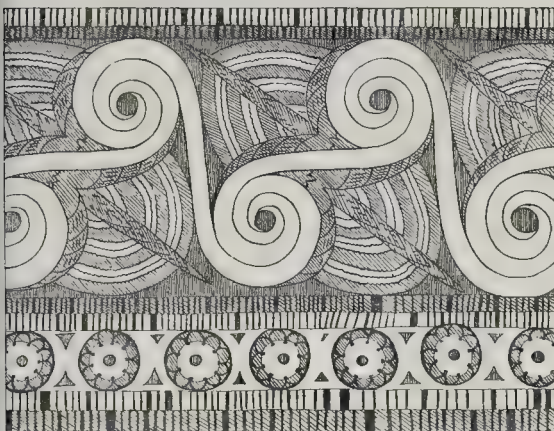
The forecourt of the men's apartment, which is about 15·75 mètres deep by 20·25 wide, is floored with a concrete in three layers, the lowest a coarse *béton*, as a foundation. The upper surface has a fall for carrying off water towards a point on the south side, where there is a vertical shaft covered with a bronze bell-trap found in it, but that there is almost expect next to hear that there is not seem to have been forthcoming. In regard to the court and its position relative to the main apartment, Dr. Dörpfeld refers to the description of Vitruvius of a Greek dwelling-house, in which the court had colonnades on three sides,—west, south, and east,—and the north a vestibule, to which the rooms adjoined. He might have been describing the plan of this portion of the Tiryns remains, which coincides even to the points of compass, and, as Dr. Dörpfeld remarks, states that the later Greek house was derived from that of the Homeric age.

The vestibule to the men's apartment, we said, a portico *in antis*, the bases of pillars and *antæ* are *in situ*. The former are irregular blocks of stone, with a circular hole worked out of them on the upper face. The irregular portion, we should imagine, was barely concealed by the floor originally. Similar bases are found around the circular hearth in the centre of the men's apartment and on their surface is an inner circular ring within which the stone is well preserved, the surrounding edge was eaten by fire, partly chipped away. We have here proof that the columns themselves were wood, and circular and smaller than the stone bases. In regard to the columns and *antæ* of the vestibule, it is remarkable that the centre line of the columns is set considerably back from the centre line of the *antæ*, so that any epistylum resting on the latter must have been appreciably in rear of the front face of the *antæ*. Dr. Dörpfeld offers several conjectures as to the arrangement. We are disposed to think the *antæ* were not treated as pilasters in the usual sense of the word, but were flanking masses of masonry, which, on the upper portion, formed a "stop" to the wall construction of the pillars and entablature. If, as is probable, the roof-beams ran at angles to the front, they would probably rest on the epistylum, and project forward forming a projecting eave, with the beam a line with the outer face of the *antæ*.

It is remarkable that the circular hearth in the middle of the men's apartment corresponds with a similar feature in the middle of one of the large rooms at Hissarlik, which is, therefore, now conjectured to have been an apartment forming a similar portion of a Trojan palace. In regard to the apartments of Tiryns there appear to remain plain indications of floor decoration. This consists of a cross series of lines scratched on the surface of the upper and finer layer of concrete which formed the finish; and Dr. Dörpfeld adds that there are distinct traces of red in squares left between the lines, and of blue lines. It thus formed, as he says, a "silk carpet-pattern." A point of mere style

\* This essentially Continental word for a pointed arch section should hardly have appeared in an English translation. English architects and writers have never adopted it.





Wall Painting in the Palace of Tyrins.

est in connexion with this apartment is the construction of the central portion over the columns which form the four angles of a square around the central circular hearth. Dr. Dörpfeld suggests that these supported a central roof, rising above the rest of the building and giving side "clearstory" lights. Mr. Fergusson dissents from this view, in some places printed as a footnote, as he thinks a large scale of the apartment would have rendered the construction, at that period, difficult. We are disposed to think so; but these four columns supported nothing, the question is what? Mr. Fergusson prefers the theory that the men's room rose higher than the surrounding rooms, and had upper lights at the sides. Light from the door, through the two vestibules, one within another, is out of the question; and a hypothetical opening over the roof seems exceedingly improbable, as it would have destroyed all the comfort of the apartment in some states of the weather. It is alluded before to one other apartment of which the use seemed pretty obvious; this is the room assumed to be the bath-room. It is a small room about 3 metres by 4 in. placed a little out of the way to the east of the forecourt of the men's apartments, and in such a position that a visitor could readily be conducted to it on his way to the main apartments. It is floored with a block of limestone averaging nearly 2 ft. thickness, the under side rough, the upper side levelled and polished. At the north-west corner is a square gutter cut out in the floor, and leading into a stone pipe carried high up the wall. The theory is that the bath was placed on the floor, and after use was emptied on to the floor, and the water used to drain away. By a fortunate chance, Dr. Dörpfeld, we found a fragment of such a terra-cotta, and that its form nearly resembled a modern bath. This is proving a little much. The fragment found is given in the illustration, plates, and the assumed outlines of the remainder shown in dotted lines; but the fragment is too small to afford this evidence in so absolute a manner as is assumed. Around the margin of the stone floor are a number of dowel holes, in lines, at regular intervals, and these we are "evidently to secure to the floor a wooden wainscoting." Why so? That would be the most likely kind of material to be specially to line a bath-room with. The reason for supposing it to have been so is that the adjoining stones show signs of the effect of fire. What is still more remarkable is the assumption that if the dowel-holes had been carried completely round the four walls, then we might have assumed this apartment was a reservoir for water!

This is about the oddest notion of constructing a reservoir for water that was probably ever suggested, and shows that Dr. Dörpfeld's conclusions are not always based on practical knowledge. As a matter of fact, the dowel-holes are interrupted at a point where a door from the next apartment would naturally have been placed. But all this proves nothing as to its being a bath-room. The solid stone floor and the gutter point strongly to that conclusion; the idea of a wooden wainscot is rather against it than otherwise, and, as we are inclined to believe that it really was the bath-room, we are for that very reason disposed to doubt if the meaning of the dowel-holes has been correctly expounded.

Among the architectural remains illustrated is one Doric capital, found piecemeal but in sufficient preservation to put it together, and which is analogous in character to the Sicilian Early Doric work. No trace of a shaft belonging to this column has been found, nor of any other capitals of the same class; possibly more may be found if the excavations are continued. This capital does not belong to the date of the main buildings of the palace which has been excavated. In all probability it was part of some small temple subsequently erected in or near the precinct, after the stone Doric style had penetrated into Greece; and being of less "Cyclopean" build than the walls of the more ancient palace, its fragments were more readily looted after the general ruin. It is curious to find what is generally regarded as archaic Doric thus appearing as the modern work, so to speak, of the site.

As an appendix to the book are a number of admirably-executed plates, many of them in chromo-lithography, of various details of wall-painting and pottery which have been discovered. One of the most curious and interesting of these represents a man performing apparently a kind of acrobatic dance on the back of a galloping bull; both man and animal are ill-drawn and archaic in outline, but not without a considerable amount of spirit in the representation. Of the decorative details we give a reproduction in black and white of one, a band of mural ornament, of which there are sufficient fragments for a complete restoration. The colours are red, blue, buff, the parts left white in our sketch being shown with a faint tinge of cream colour. The black portions are black in the original. In the main band of the design is seen that continuous spiral which is to be found, in one form or another, over so large an area of pre-historic Europe.

We must close our brief sketch of this remarkable publication, in which we can assure the reader that we have merely given an inadequate summary of the interesting matter, both in text and illustration, with which it abounds. It is a book that every archaeologist and architect who takes serious

interest in architectural history should possess, and which combines learning and research and shrewd suggestion with all the interest of a romance. Our notice would be incomplete if we omitted to mention that the book is dedicated by Dr. Schliemann to Mr. James Fergusson, "in grateful acknowledgment of his interest in my labours and the help derived from his scholarship and profound archaeological learning since the commencement of the discoveries at Troy."

## NOTES.



RECENT report from the United States shows that the great wave of depression which has been so marked (and, indeed, still is) in this country, has not been without its corresponding effect on the other side of the Atlantic, although there is always this difference between the two, viz., that a certain amount of new building is rendered necessary, however bad the times may be. We see the result of this in the fact that, whereas in the old-established cities there has been more or less stagnation, with a few exceptions, in the newer ones, further west business has been much more brisk. A marked and an unwished-for feature in the situation is that there is a notable increase in wooden and nondescript structures of a low cost. The stranger landing at New York would, however, be struck with the large amount now being expended either in huge business premises or residential apartments; and, indeed, if the same activity existed in other places builders would have no reason to grumble. The figures for the last three years and a half are as follow:—

| Year | Number.                      | Cost.        |
|------|------------------------------|--------------|
| 1882 | 2,777                        | \$44,783,000 |
| 1883 | 2,813                        | 44,344,639   |
| 1884 | 2,897                        | 41,481,208   |
| 1885 | 1,898 (for first six months) | 26,783,706   |

The expenditure of over 50,000,000 dols. (supposing that the rate keeps up to the end of the year) shows that the American capital has no intention at present of checking its upward growth. Philadelphia has also increased its assessment of real estate from 562,687,555 dols. in 1883, to 587,749,828 dols. in 1885, although new buildings will not account for all this, which includes works of transportation, water, gas, and sewerage. The total increase of buildings in the three years and a half is 18,173 which is far in excess of any other city in America, although for the present year the construction of new buildings has been the largest at San Francisco. Both St. Paul and Minneapolis are in a most flourishing state as regards the building trades, and there can be little doubt that ere many years are past these two north-western cities will join forces, and in time perhaps rival Chicago in size. The estimate of the new buildings in these two places will quite warrant such a prophecy:—

| City        | 1882          | 1883  | 1884  | 1885* | Total†        |
|-------------|---------------|-------|-------|-------|---------------|
| St. Paul    | 2,611         | 3,460 | 2,383 | 1,635 | 10,089        |
| Minneapolis | 2,155         | 3,420 | 2,341 | 1,670 | 9,586         |
|             | * Six months. |       |       |       | † Four years. |

Nearly 20,000 new buildings, within four years, in cities not half a dozen miles apart from each other, give a fair idea of the rapidity of American settlement. The following list comprises the number of new erections and their cost through the United States for the last three years and a half:—

| Year              | New buildings. | Cost.         |
|-------------------|----------------|---------------|
| 1882              | 20,281         | \$97,835,000  |
| 1883              | 24,998         | 102,460,000   |
| 1884              | 28,020         | 102,866,000   |
| 1885 (six months) | 14,919         | 42,279,000    |
| Total             | 68,198         | \$345,432,000 |

(exclusive of Philadelphia). It must be owned that the expenditure of 69,086,570*l.* in three years and a half speaks volumes for the general extension of the country and of the building trades in particular.

MR. FERGUSSON'S article on Westminster Hall, in the current number of the *Nineteenth Century*, should be read by all who are interested in the subject. Those who are against the absurd treatment proposed by the late Government will find their opinions



supported in Mr. Fergusson's paper; those who are in favour of the said scheme may possibly learn something from Mr. Fergusson, if they are not too bigoted to learn. Mr. Fergusson takes the view that we have expressed all along, that the scheme proposed by Mr. Pearson, or by some one else who instigated him, was mainly founded on superstitious reverence for a portion of Norman walling, of no special interest beyond the fact of its being Norman. We are surprised, however, that Mr. Fergusson does not say anything about the most crying practical sin of all in the scheme, the proposal to break up the area of Westminster Hall by projecting two staircases 15 ft. into it, as a means of communication with the small and ill-lighted rooms which it is proposed to make into committee-rooms. It is very difficult to get the public to understand a matter of this kind on paper, but we predict that if this foolish scheme of false archaeology is proceeded with there will be a public outcry when people discover what is actually proposed, and find that the area of the Hall is to be permanently destroyed to furnish steps to get to rooms which will be ill-placed and utterly inadequate for their purpose.

IT appears from a list recently issued by the Railway and Canal Traders' Association that about one hundred of the candidates for Parliamentary honours are chairmen or directors of railway companies. These figures are exclusive of Ireland, and the statement is possibly otherwise incomplete, as the present Parliament includes among its members about one hundred and thirty railway officials. The Association is following up the circular issued a month or so back by another address to traders, giving the particulars just referred to, and accompanied by a reprint of a very forcible article on the subject of preferential rates which appeared in the *Sheffield Daily Telegraph* of September 26th last. A list of questions for ascertaining the views and intentions of the candidates with regard to this and kindred matters is given, among which appears the following:—"Whether, in view of the fact that such a rate would prove fairly remunerative to the railway companies, they will assist the promotion of any legislation having for its object the institution of a rate per truck per mile,—which would give traders the alternative of sending, at their own risk, any kind of goods without reference to class, and immensely simplify the question of carriage." This appears to be a novel idea, and we shall be curious to know how the companies regard it. The carrying capacity of a truck varies so much that the advantage of such a system would often be doubtful, while the fixing of the rate would be a matter of great difficulty, and would, in all probability, frequently fail to give satisfaction to all. At the same time there is, doubtless, much that is practical in the suggestion, or it would not be made by such an eminently practical association. We observe that candidates of entirely different shades of politics have already announced their intention of taking up arms on behalf of the trading interest, and it is probable that when the battle of rates is resumed in the House the railway companies will have to act on the defensive.

THE use of liquid fuel for steamers, of the preparation for which change we gave some particulars on the 12th of January, 1884, has now made such advance that an Association has been formed, under the title of the Hydro-Carbon Syndicate, in order to supply apparatus devised to utilise all kinds of crude petroleum, shale oils, residuum from oil refineries, and the like. The advantages claimed are, first that, weight for weight, the liquid fuel will do twice or two and a half times the work of coal. Secondly, that there is a great saving of time and expense in taking the fuel on board, as well as an absence of smoke from the combustion. Thirdly, the oil may be carried in the water-ballast tanks, which are to be filled with water when the oil is pumped out, and the storage capacity of vessels may be thus increased. Some particulars are given of a recent voyage of the *Himalaya* from Barrow-in-Furness to the Black Sea and back,

in which 447 tons of coal were burned, at a cost of 456*l.* It is said that such a voyage could be done by the use of 180 tons of oil, at a cost of 270*l.* This saving in fuel is thus estimated at 186*l.*, to which is added a saving of 222*l.* in firemen's wages, and an increase of 164 tons in the carrying capacity of the vessel, which, at 1*l.* per ton each way, would come to 328*l.*, showing a balance of 550*l.* for the double trip in favour of the oil. The price, however, here allowed for the oil is considerably higher than that of the Russian petroleum refuse, which is cited as one-third that of coal; which would give an additional 118*l.* as against coal, taking the other figures as correct. Certainly liquid fuel has to be looked at as a probable factor in the navigation of the future, and the prospect of obtaining it in large quantities at Sibiri is one of no little interest to the United Kingdom.

WE have received the following circular from the Hon. Secretaries of the Royal Meteorological Society, to which we are glad to give further publicity:—

"A committee has been appointed to take into consideration the question of the supposed diminution of water supply and the suggested increase of floods. The committee is desirous of obtaining as much information as possible, and will, therefore, be very glad to receive any data that you may have bearing upon the subject, and showing the past and present state of the water supply, either from gaugings of wells or springs; the height of flood-marks in rivers, streams, and lakes; the records of low-water periods; or any historic data which you may have collected relating to the subject. Information relating to the period between 1825 and 1835 would be extremely valuable, in order to enable the committee to fill up a gap in the diagram accompanying the report in the *Quarterly Journal* for July, 1885."

Communications on the subject should be addressed to the Assistant Secretary, Mr. W. Marriott, at 30, Great George-street, Westminster.

THE Hounslow Local Board, at its meeting on Tuesday night last, resolved to apply to the Local Government Board for sanction to raise a loan of 77,000*l.* for carrying out a new drainage scheme for the combined districts of Hounslow, Heston, and Isleworth. The scheme which has been adopted was designed by Mr. Bromley, the Surveyor to the Board, and has received the approval of one or two well-known engineers to whom it was submitted. Notice has also been given to the Local Government Board of the Local Board's intention to acquire a piece of land in the district as a site for the precipitation works. The consideration of the question as to whether a dust and sludge destructor, by which the refuse from the dust-bins and the sludge are burned together, or sludge-presses, should be adopted, has been delayed pending a thorough inspection of both systems. The Brentford authorities are at present constructing sludge-presses similar to those at Chiswick. The Richmond and Kingston authorities have had under their consideration separate schemes for the drainage of their respective districts since the dissolution of the Thames Valley Sewage Board, but have been unable to come to a definite decision over rival schemes. The scheme now adopted by the Hounslow Board is that which the Surveyor (Mr. Bromley) prepared for the inspection of the Committee of the House of Commons, for the purpose of showing that the district could be drained more efficiently and economically in a separate scheme than by the proposed combined scheme of the now defunct Thames Valley Sewerage Board.

THE total gross fees received by District Surveyors for the year 1884 was 46,792*l.* 11*s.* 6*d.* in respect of 26,363 works, of which more than three-fourths were completed within the year. The gross fees received in thirty-nine districts varied from 22*l.* to 592*l.* In two of these the receipts did not amount to 100*l.*; in four districts the receipts were less than 300*l.* each; in nine less than 400*l.* each; in eleven less than 500*l.*; and in thirteen less than 600*l.* each. In thirty-one districts, the receipts ranged from 608*l.* to 2,237*l.* The largest amount of fees received was by the

District Surveyor of Camberwell, Mr. J. whose income for 1884 was 2,237*l.* 1*s.* 6*d.* next to him comes the District Surveyor of Fulham, with an income of 2,043*l.* 11*s.* 6*d.*

A COMPETITOR in the recent Liverpool Labourers' Dwellings Competition, a letter complaining strongly of the action of the Town Council in refusing to award premiums on the ground that, "although of the plans submitted show considerable merit, not one of them is in complete accordance with the conditions requiring that buildings must in all respects comply with Building Regulations in force in this City. We confess this appears to us hard measure on the competitors who are admitted to 'shown considerable merit,' considering amount of work they must have thrown out, and we think a more liberal view might have been taken by a wealthy corporation. At the same time, if the conditions set absolutely that the Building Regulations in Liverpool were to be complied with, we see that competitors who overlooked this condition have any technical ground for complaint. Our correspondent points out that there is a special by-law giving the Council power to make exception to the Act as regards Labourers' Dwellings. But if this power of exception dealing was not contemplated or included in the instructions to architects (and we prove it was not), the competitors cannot claim in their favour.

THE recently-reported case of Street v. Union Bank of England and Spanish interest in men of business at the present time when so many firms are adopting registered telegraphic addresses. The bank in question adopted the registered address of "4, London," and Messrs. Street & Co., 30, Hill, London, moved for an injunction to prevent the bank from using this address to prevent the inconvenience which was to them by it. But Mr. Justice Pearson, that a more inconvenient address for the bank might be, he could not interfere there was no attempt to injure trade, a legal injury done. It is probable that this is not the only clashing of a registered address with an existing name, and it would prove convenient to all parties if the Post Office were to make a rule by which a registered address should be altered if it was so as to an existing and previous name as to cause of real inconvenience.

IN regard to a recent burglary with violence a correspondent writes to suggest that country houses should have their approach drives well lighted at night. At present the large house of the district is often the one to which it is possible for people of felonious intentions to approach after midnight under cover of absolute darkness, even in early hour in the evening. "In the village public-house and small shops are always people moving about, up till ten or eleven at night. The mansion only is dark and silent. The dinner guest has often to find his way to a dark avenue or drive. When he is at other guests are occupied about dinner, the attention of the domestics mostly concentrated on the kitchen department, and the attendance, the burglar finds his way to the same unlighted approach. The suggestion seems worth the attention of dwellers in country mansions.

STEPS are being taken both at Milan and Mantua to erect statues in memory of Garibaldi. In the latter city the movement has proceeded so far that the committee appointed to arrange matters has entered upon the execution of the monument to the known sculptor, Bordini, of Verona. The first it was intended to have a colossal statue, but it was eventually decided to have a more moderate sized one, of 28 ft. or 30 ft. length, of which the figure will be a little 10 ft. Its proposed situation is in front of the Teatro Sociale, between the Piazza S. Sylvestro and the Piazza Leonea.



E Christmas number of the *Art Journal* which is already out (Christmas numbers presently be published at Midsummer, we find), is a monograph on Sir John Millais's works, containing some admirable drawings from his leading or best known works, and also some facsimiles of sketches studies, which are of interest. Among the illustrations is a beautiful reproduction of the "Christ in the House of His Parents" of 1849.

OM the *Admiralty and Horse Guards' Gazette* we learn that the Duke of Connaught, in response to an appeal made to him by Captain Armit to assist in providing for the purpose of building "humanities" for the poor of Windsor, "now crowded together in slums lying at the very foot of the Royal Castle," has replied through H. Ponsonby that he shall be happy to do the subject before Her Majesty "when time for improvement has been matured by the authorities of the borough." We hope the reply will tend to stir up "the authorities of the borough" to a sense of their moral obligations in a matter of this kind.

#### BURNMOUTH UNDERCLIFF DRIVE COMPETITION.

US is a competition under an engineering act, submitted for decision by the promoters of the Burnmouth Undercliff Drive, and won by Messrs. T. Prof. Johnson, however, does not mean that the field was properly theirs, as the designs bear marks, we think, of architectural than engineering character, while some, perhaps, could lay claim to either.

Two things may be said at the outset, — that plans have been a carefully and thoroughly prepared and a most fairly conducted competition; and that the designs evince careful and conscientious study and execution. Of course a subject of this kind is necessarily viewed in very various lights by men of different professional training and habits of thought, but the simple practical view seems that which should prevail over all others, and this appears to have been the case in Sir Joseph Bazalgette's examination of the designs, and in his careful report upon them; and the labour is not light of thoroughly comparing twenty-nine separate sets of drawings weighing the pros and cons of their various merits of design and construction. The prizes offered were liberal in amount, viz., £1,000, and £500, and their award rested entirely with the assessor, who strictly adhered to the terms of the invitation. The whole object of this competition seems one which it will serve as an example for other such competitions, but which too often, unfortunately, is a very different spectacle. The designs arranged for exhibition under numbers, beginning at the lowest, the order of merit, however, broken for the purpose of giving the three successful plans together. The length of the proposed drive is about 1½ miles.

1. "Steadfast," shows a drive 36 ft. wide at footway of 13 ft., the height above O.D. ("Ordnance datum," we presume) not stated. The communication with the beach is opened at twenty-two points; the road is of metal and the footway of 2-in. tar. The sea-wall is of Portland cement concrete, at a cost per cubic yard calculated at 14s. The road surface is put at the low rate of 1s. per yard superficial, and of the footway at 1s. 6d. The total estimate (which, however, is noted as not complete) is £22,649l., viz., 17,649l. for the works on beach, and 5,000l. for those of the cliff. The estimate appears surely much below any previous achievement, and the second very low, in opinion, for what must be done.

2. "The Current," &c., has the roadway down to the level of the sands, constructed mainly at 5s. per yard, the footway of tar at 2s.; the sea-wall of concrete at 15s. 6d. per cubic yard, or 20s. per yard run. The drive is lighted by seventy gas-standard. The estimate is at 27,608l., being 25,570l. for the works on beach, and 2,038l. for cliff works; the road to be 30 ft. wide and the footway 10 ft.

This roadway has a tortuous appearance on plan, following closely the line of the cliffs, and it would, of course, much less interfere with the picturesque appearance of the sea front than other more raised roadways; but it would be far more exposed to encroachment by drift sand in storms, and be far more difficult to keep in working order, and much less command the sea view. The sea-wall is again very deficient in foundation depth, and the quantity of concrete per yard lineal should be nearly doubled to ensure an efficient sea front. Surface paving is shown on the top of the cliff, with railing shoots to convey the water to the foot drains under the road. The cliff difficulty in its reality is not here met.

No. 3, "Experto Crede." — A 40-ft. carriage-way and 10-ft. footpath, steps, and three slopes to beach; but no access to beach at the ends. The slopes to accommodate bathing-machines. Tarraced macadam roadway at 1s. 9d. per square yard; tar-paved footway at 10d. per yard; Portland cement concrete sea-wall at 12s. per cubic yard. Lighted by 120 gas-standard. The passage under pier would involve bridging one span of the latter by bow-string girders, which would add 1,500l. to the estimate of 28,070l. 5s. 1d., made up to 26,070l. 5s. 1d. for drive, and 2,000l. for cliff works. The sea-wall is more substantial than in the two previous designs; but the proposed outlay for cliff works far too low if to be efficient.

No. 4, "Practical." — An elaborately worked-out design, giving evidence of much care in its preparation. This is, in fact, the sixth design in range of cost; but Nos. 4 and 5 in that range are the second and third premiated designs, and stand eighth and ninth on the walls. This design shows a 32-ft. roadway and 6 ft. 6 in. footpath, the latter certainly too narrow. The road is raised 11 ft. above Ordnance datum, both tracks being of tarraced macadam, the carriage-way at 2s., and the footway at 2s. 6d. per yard super. Concrete sea-wall at 10s. per cubic yard, and 20s. per yard lineal. The estimate is 26,976l. for the drive, and 2,184l. for cliff works, — total, 29,150l. The sea-wall is designed, certainly, too light, and is founded on the surface of the substratum of clay instead of being sunk several feet into it, the only safe plan. The approaches to the drive, on each side of the pier approaches, are well designed. The cliff sections indicate an intention of cutting off several feet of the cliff front to supposed more solid matter behind, and a retaining-wall at the cliff-foot is worked hollow so as to form a continuous oval drain, with catch-pits at intervals. Here, again, the real cliff difficulty, of which we shall speak presently, does not seem to be understood or grappled with.

No. 5, "1885." — A 30-ft. drive and 16-ft. foot-wall raised 8 ft. above O.D., with steps to beach at fourteen points, and five inclines for bathing-machines. Tarraced macadam is proposed for both tracks, at a uniform cost of 3s. 6d. per yard. Concrete sea-wall, at 8s. per cubic yard. Has no access to beach at the ends; is lighted by sixty-five gas-standard. Estimate, 28,812l. 17s. for drive, 2,000l. for cliffs; total, 30,812l. 17s.; fourteen sheltered seats provided. The drive is near the level of the sands, and thus incurs the disadvantages referred to with respect to No. 2. A belt of plantation is proposed between the cliff foot and the drive, with storage space for bathing-machines behind it in the recesses formed by the hollows in the line of cliff. This would advance the sea-wall in these places 125 ft. or 130 ft. on the beach, quite taking away the sands at high-water of spring tides. The seat-shelters are designed in the not very desirable style of the pier approaches, which, however, may be supposed to indicate the local taste (!).

No. 6, "Relevant." — A carefully-prepared design, showing a 36-ft. roadway and 14-ft. foot-wall, raised 10 ft. above O.D. Drive surface, tarraced macadam; footway, tar paving. Concrete sea-wall. Details of estimate not given. There is no access to the beach at the ends of drive, — a serious omission surely here and elsewhere. Estimated cost, 27,377l. for drive, 3,779l. for cliffs; total, 31,156l. A very good line is kept in the sweep of this drive, a point not enough regarded in several designs, and needing good study to secure. The sea-wall shows a massive section, but is founded on, not deep in, the clay substratum. Of course a great additional cost is involved in this addition to the quantity of walling, but all expe-

rience (and at Bournemouth it is not many miles to seek) proves its necessity, and no design or estimate based on less secure arrangements could be safe to work upon.

No. 7, "Utile Dulce." — The first premiated design; it stands No. 13 in order of cost, but with the other prize winners makes a group out of the ordinary course of numbering. This design is not nearly so ambitious in appearance as several others, but, we think, justifies, on examination, the precedence given it, as it is eminently practical and well thought out. Sir Joseph Bazalgette's report on it is its proper introduction here, and some extracts from its designer's description may apply follow. Sir J. Bazalgette says:—

"The design under the title of 'Utile Dulce' provides a carriage-way 30 ft. wide with a 10-ft. foot-way raised 10 ft. above mean sea-level. Flights of steps, extending along an aggregate sea frontage of from 8,000 to 9,000 ft., give access from the footway to the sands. These are broken by five inclines for boats and bathing-machines, each 200 ft. wide, viz., seven on the east side of the pier and one on the west side, in addition to one opposite Darley Chine, 120 ft. long. Also by seventeen projections for sheltered seats each 40 ft. in length. The steps would be largely used as seats by nurses and children in fine weather. This design, taken as a whole, deserves first prize, although it would not be well to carry the roadway under the pier as suggested."

The author of the design writes in his "report,"—

"It will be seen by the plan that the beach is not interfered with more than is absolutely necessary for affecting the required objects, and does not alter the natural features of the cliff in any way, and, except at very high tides, the beach will have a broad expanse of sand outside the marine drive."

"There are twenty rustic concrete sheltered seats provided under the cliffs, with seating accommodation for eight persons each, or sufficient for 160 persons, and seventeen rustic shelters glazed with oak seats on the south side of the promenade upon a kind of barbacan, with seating accommodation for sixteen persons each, or sufficient for 272 persons, making a total of permanent seating accommodation for 432 persons."

The drive is formed of tarraced macadam at 4s. a yard; the footway of tar paving at 2s. 9d.; the sea-wall of concrete at 15s. 6d. per yard cube, and the lighting is by seventy gas-standard.

The estimate is for drive 33,270l. 6s. 8d.; for cliff works, 1,872l.; total, 35,142l. 6s. 8d. As regards the cliff drainage he says,—

"This part of the proposed work is the most important to deal with. In the first place, if the cliffs are over-drained the sand will become so dry that it will very soon be blown away, which is seen to be the case in many parts of the cliffs. In the second place, if sufficient drainage is not done as early as possible, before very long there will not be any walks past the coastguards' station and the Royal Bath Hotel. I have provided seven deep pumps, as shown on plan, to be dug from the top of the cliffs down to the mean sea-level, with adits driven in east and west at the top of the clay strata, thus tapping the source of the springs which crop out on the sea face, causing the wasting of cliff at those points. The pumps are of sufficient capacity below the top of clay level to hold the rainfall, which is 26 in. to 29 in. per annum, to get rid of the water by percolation at the sea-level, which is always found to be the case where water at such a little distance from the sea will keep lower than the ordinary sea-level; and the other part of the drains I propose to have open channels leading diagonally down the face of the cliff to the back of the wall, thence under road to face of wall, which will prevent the furrowing and destruction of the cliff front. To preserve the face of the cliffs, it is proposed at all those places where the various kinds of earth are at an angle of rest to spread mould mixed with road sweepings over the cliffs, and then sown with sea sand grasses as a land winner, and planted with such kinds of shrubs as I believe would thrive."

In comment upon this we must say that the sea-wall seems deficient in mass, and is based only on the clay bed under the sand, instead of entering, as it ought, several feet into it, thus saving greatly on what we think a sufficient estimate should be for that part of the work. And with regard to the cliff drainage, we are quite unable to think that this outlay of less than 2,000l. can suffice; the adits at the clay-level are not described as to length, &c., and we are confident that these must extend the whole length of the broken clay-bed. The design is no doubt a meritorious one, in many ways, but, for the reasons named, we consider the estimate inadequate and misleading. There has been a good deal of local correspondence since the award, and it has, we think, been distinctly shown that the spaces for bathing-machines are very inadequate in frontage, and will lead to a very undesirable crowding together of the bathers, who will too, at high tides, be fully in sight of the road.

No. 8, "Ad Rem," the second prize design, of which Sir J. Bazalgette writes:—

"Next should be classed the design of 'Ad Rem,' which proposes also a 30-ft. road and a 10-ft. esplanade raised 6 ft. 6 in. above mean sea-level. It provides four lengths of inclines in convenient places for boats and bathing machines, giving an aggregate length of frontage to the sands of 2,210 ft., and twenty-eight flights of steps, each of about 80 ft. length of frontage, or a total of 2,620 ft."



and the line of wall is broken by thirteen projections with sheltered seats and steps to the sands."

This design has a better-designed sea-wall than the last, founded in the clay, but still not deep enough. There is a stone (or concrete block?) guard-wall at the foot of the cliffs and back of the drive, which would, we think, prove of little use, so far as waste of cliffs is concerned. The drive surface is of tarred macadam, at 1s. a square yard; the footway of asphalt, at 10d.; the sea-wall of Portland cement concrete, at 11s. per yard cube, and 13s. 6d. (we presume per yard lineal). There are thirty-two sheltered and seventy open seats, and seventy-three gas-standards. This design stands fourth as to estimated cost, being put at 23,572l. 10s. for the drive, and 4,953l. for cliff works, making a total of 28,525l. 10s. We consider the walling would need a considerably increased rate for security. There is little of much moment in the competitor's "report," as regards the drive, but with respect to the cliffs and their waste, he is of opinion that it is possible to stop the future formation of "chimes," and to reduce to a minimum the surface damage by wind and rain. The general drainage is dealt with, and his scheme suggests,—

(a) In the case of depressions in strata, and considerable quantity of water, to absorb and catch the water, before it reaches the front, by shafts behind the cliffs.

(b) In other cases, to intercept and cut off back water on intermediate levels by adits driven in over the benches of impervious strata, and also by forming collecting-drains on the benches themselves.

(c) To intercept the water running over the top of the cliffs by a drain, in the positions shown on the plan.

(d) By a series of small surface-drains, to intercept and carry down small quantities of water which may pass the previously-described works, and which may collect from rain-fall upon the surface of the cliffs themselves.

This shows (with too the item of nearly 5,000l. appropriated to this use) a better apprehension than usual among the competitors of the difficulties to be encountered, and a better promise of meeting them; and the paper closes with observations on the necessity of treating each part of the cliff according to its local peculiarities, with too a reference to planting on the cliff face, which we think not very much to the purpose; but the design is one of the best thought-out among the whole submitted.

No. 9, "Fidelitas vincit," takes the third premium, and stands fifth in the range of cost of estimate. Sir J. Bazalgette writes of it:—

"The third place should be awarded to 'Fidelitas vincit,' which provides a roadway 31 ft. wide and a footway of 12 ft.; but raised only 3 ft. above main sea-level. The line of sea-wall has twenty-seven flights of steps, each giving 150 ft. of frontage to the sands, or a total length of 4,950 ft., but each 300 ft. of wall is broken by circular projections for seats. The approaches to the pier are well arranged."

The drive is proposed to be formed with 9 in. of gravel, and the footway to be of tar paving; a circular drive, with a band-stand in the centre at each extremity, and this seems the only design in which urinals are provided, or at least named. The estimate comprises 19,573l. for the drive, and 9,077l. for cliff works,—a much more likely amount, we deem, than most named, making a total of 28,650l. We have a note as to the pier approaches in the same terms as the arbiter employs. The design for band-stands is, we consider, needlessly elaborate, but the one may, as seems the case in other instances, be taken from the overdone style of the existing pier offices, showing how evil example bears fruit.

The selected designs are respectively the work of (1) Mr. John Stewart, C. and M.E., temporarily resident, we believe, at Bournemouth in connexion with railway contracts; (2) Mr. T. J. Soones, A.M.I., of Bristol, who has designed a similar work for Weston-super-Mare; (3) Messrs. Rowell & Harding, C.E., of Wimbeldon.

A very general resemblance almost of necessity pervades the designs, with a very general defect also as to sufficient depth of foundation for the sea-wall, a point greatly affecting the estimates. More difference exists in regard to the treatment of the cliff drainage.

No. 13, "Archimedes," is remarkable for its sheet of some forty or more sections of drive, &c., which might well have awaited an order to prepare working drawings.

No. 14, "Utility," is a very careful design with a good sea-wall, formed on a flat curved batter, but still wanting depth in the clay bed. The sheltered seats are well designed, but some "carpenter's castalated" detail disfigures parts of the accessories. The system of drainage for the cliffs is about the best thought-out of all submitted.

No. 18, "Say ye and do ye," has the road raised

between two retaining-walls, clear away from the cliff, an arrangement well worthy of consideration. The sections do not show the clay level, nor is the cliff drainage detailed in the drawings, being probably left for explanation to the written report.

No. 20, "Progress," and No. 21, "N.B.," both have better sea-walls than most designs, and both carefully detailed. No. 20 a good deal in the style of the existing pier, an example more honoured in the breach than in the observance.

No. 24, "Labore Vincas," is a very careful design; the road carried on flat segmental concrete arches of some 30 ft. span, admitting of the flow of the tide within them. An overcliff drive is also provided for, carried in part also on arches filling in between projections of the cliff. While doubting the perfect security of this scheme, we must admit the picturesque effect it produces. This design rises to an estimate of 68,142l.

The remaining designs present no features calling for particular notice except that they rise in the amount calculated for their execution until "Prudentia Simplicitate" reaches a total of 116,741l., more than five times that of No. 1, "Steadfast."

Since these notes were begun it has transpired that the design "Utile Dulci," to which the first premium was awarded, is a reproduction of one prepared by the local surveyor for the Commissioners some time ago, and lent, for the purpose of putting into form for competing, by its author, to Mr. Stewart, and drawn under that gentleman's inspection, by the surveyor's son, in his overtime, Mr. Stewart at the same time being engaged on the design we have noticed under the motto "Utility." The question was seriously mooted by the Commissioners whether their surveyor had not broken faith with them, in this use of his design, and they submitted that question to Sir F. Bramwell, who, asking himself a legal opinion, gave as a result his view that there was no breach of duty. However, it seems a pity, if the surveyor wished to help a friend by the use of his design, he could not keep his counsel when the design proved the most successful, as the result is that neither his friend nor himself gain anything; the award, it appears, being set aside, the second premiated design, "Ad rem," being now put first; the third, "Fidelitas Vincit," placed second, and a new third prize plan having to be selected by Sir J. Bazalgette.

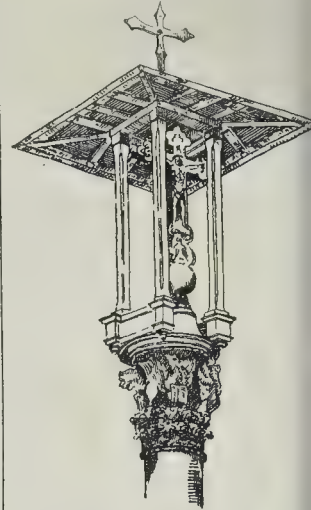
This scheme if carried out will at once and for ever alter the sea-front of Bournemouth from a natural and picturesque one to one artificial and formal, and with, in our opinion, a very uncertain prospect of real advantage. The cliff drainage, to secure the face from waste by falling, will, we are convinced, prove a much more difficult (if, indeed, at all practicable) problem than it is generally thought to be, as the level of the retentive clay-bed is variable in an extraordinary degree, and much of its concealed character as yet unknown; while on a complete exploration of its peculiarities only can any at all reliable system of drainage be founded. The cliff-front also being subject to the destructive action of both rain and frost may completely baffle all attempts at its preservation; and it must be remembered that this drive, being devised very much as an invalid resort, any proof of insecurity through its invasion by heavy falls from the cliff above it, would surely lead to its desertion for such a use, and the loss of that accession of visitors which it is aimed to secure, and render the outlay upon it an unprofitable burden to the town.

**Brentwood.**—The foundation-stone of a new drill-hall for the F Company of the First Volunteer Battalion of the Essex Regiment has been laid. The plans for the building were prepared by Lieut. E. N. Cubitt, of Brentwood, who is acting as architect and surveyor, and the work has been entrusted to Mr. William Wood, builder, of Chelmsford. The first section only of the building is at present in hand. This will comprise a basement containing a temporary armoury, with a dressing-room on each side, and above the basement, which is at the far end of the building, will be a stage 20 ft. by 30 ft., to overlook the spacious drill-hall, 80 ft. by 50 ft. This forms the first portion of the scheme, and the cost will be 1,200l., or, including a proposed residence for the Sergeant-Instructor, with recreation-rooms and armoury, 2,000l.

#### ITALY: FOR STUDENTS.\*

In times that are now somewhat distant, but not beyond living memory, the architect student, whatever he may have neglected, was not allowed to overlook the great works of Imperial Rome, which furnished the most important items in his stock of ideas. Nor could he easily overlook the styles which, after the revival of learning, grew naturally on Italian soil, and were more or less adapted to the wants of modern life. Men who seriously intended to fit themselves for the profession of architecture went abroad for many months, and even years, the main object of their journey being to become thoroughly familiar with Italian architecture of the Classic type. Since those times one and another phase of architectural thought has had its day and its decline; but there has been no period in which the architecture of kindred arts of Italy, ranging over some twenty centuries, have failed to influence the very materially modern architects. It would be waste of time to dwell now on the importance of such studies. Those who feel no warmth of interest in them, those with whom a journey to Italy has not been the dream of their student life, would not be brought to a better mind anything we could say in these few minutes.

But while these studies have more than been their ground, while English architects have during the last half-century, enormously in-



Upper Part of an old Shrine in Florence.

creased, and buildings that claim some architectural character have increased still more, number of those who have sought their knowledge of Italian art at the fountain-head undoubtedly diminished, so that at the present time a vast and ever-growing majority dependent on books and pictures for their knowledge of some of the most remarkable manifestations of genius of which the history of architecture has taken any account. A between the period to which I have referred and the present day, the art of travel progressed enormously, and yet, through unaccountable neglect of opportunity by great bulk of English architects, railways and all that belongs to them have, so far as personal contact with Italy goes, existed vain. As it happens, we are able to measure this improvement in the means of travel very precisely.

In the month of November, 1834, the year in which the Royal Institute of British Architects was founded, the late Sir James Hudson made his celebrated swift journey to Rome, carrying the offer of the post of Prime Minister to Sir Robert Peel. After an amo-

\* A paper by Mr. Thomas Blashill, read at the meeting of the Architectural Association on the 6th inst., as where mentioned. We have interspersed the report of this paper with various small sketches as a kind of original commentary on it; they are taken from the sketch-book of Mr. H. A. Gregg. The views of Florence are the Claudian Aqueduct, and the mosaic figure, are printed from photographs.





Florence.

of exertion and endurance that can now hardly be necessary in any civilised country, he arrived on the ninth day. How far the most fortunate of travelling students of that time fell short of the headlong speed may not be precisely known; but a journey in which he would see even the limited list of things then thought essential was a very costly enterprise, and a serious break in the routine of his life. But any ordinary passenger who started for Rome direct before noon on the day before yesterday, would arrive before noon to-day,—in hardly more than two days,—and may have easily driven before dinner through all the most celebrated localities of ancient and Mediaeval Rome, and enjoyed some of the finest and most suggestive views to be seen in the world. Except for two nights spent in the train, his land journey will have been free from all discomfort. He will have

revelation to ordinary minds. There is now probably no class of work in Italy that is not fairly well illustrated by sketches, by drawings to scale, and by photography,—an entirely modern art,—so that you may possess at the cost of a few pence more valuable information about a building than can be put into the most careful drawing. Besides our own library, those at South Kensington and the Institute are easily accessible to all students, and if any really use-

of a building are caught and fixed by the camera a good deal better than can be done by hand. Now, the proper use of all these appliances is not to act as substitutes for the inspection of the things they represent, but as records of what we have actually seen. They are useful as an artificial memory to give life and interest to all that we may read after about the originals. It is only by seeing these originals that any very useful notions can be formed of them, and this personal contact with them we persistently undervalue and neglect.

When I was last in Rome I inquired of persons who would be most likely to hear of the visits of English students, and found that some half-dozen per annum was all they knew about. French and German students go in very considerable numbers,—the former having a share in the costly establishment maintained



Ducal Palace (Lower Arcade), Venice.

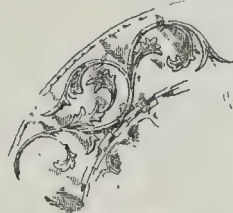
traversed, at a very leisurely pace, some of the finest lake and mountain scenery in Europe, meals always waiting for him at meal times, and with no need to use a word of any language but his own. The travelling student who desires to make stoppages on the way can avail himself of the same speed, comfort, and economy.

Other facilities for study have increased vastly beyond this proportion of four or five to one. Except for the rather cold, but needful, treatise of Sir William Chambers and some other books, to which not one in a dozen men like ourselves could have got access, the travelling student of fifty years ago would have to sketch and measure for himself any Classical building from which he desired to learn. Street's "Brick and Marble Architecture of Italy" had not then come as a



One of the Buttresses of the Frari Church, Venice. All in red brick, excepting corbels and lower band, A.

ful book is absent from the last named, I will answer for the willingness of the Library Committee to beg, borrow, or, if necessary, buy it for them. Sketching, as an intellectual exercise, can be practised near home, and though it is of infinite value for fixing on the mind a knowledge of the characteristics of a foreign style, it is no longer necessary in every particular instance, for the details and proportions



St. Mark's Church, Venice.

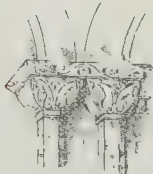
by their Government in the Villa Medici, which advertises the fact by its fine position on the Pincian Hill. Our own Royal Academy sends one architectural student in two years. The Institute has two annual travelling studentships, and this Association has one, which may help the winners to Italy if they are so disposed. By the kindness of Mr. Aldwinckle, we have an additional one for this year, but, both this and our own studentship are limited to the very months when Rome is avoided by all prudent travellers, so that Mr. Aldwinckle's special studentship for Italy, which the Institute can award this year, is the only one that, if awarded, insures a visit to that country. I should be surprised to find that a dozen English architects per annum get there at their own cost.

In these circumstances, I have for some time



past advocated a systematic arrangement for such visits,—visits arranged specially for those who, up to this time, have never gone to Italy, and who are not likely to go on the usual terms as to time and cost; visits that will occupy weeks instead of months, which will not seriously interfere with office arrangements, nor cost more than the ordinary student can afford. I would, indeed, set before every pupil in architecture the near prospect of seeing for himself, if only for a short time, the very objects that he is studying from books and pictures, perhaps with no very great enthusiasm. As the young doctor gets his anatomy from real bones and tissues, as all other students acquire their knowledge by actual inspection of the things that are needful to be known, so should the student in architecture see the objects of his study, not through pictures only, but with his own eyes.

Such a system as I suggest would in no way interfere with the ideas of the travelling student who can go for a longer term. On the contrary, I hope it would tend to encourage him, for it would render the details of travelling



St. Mark's Church, Venice.

more popular among us, and therefore more easy, and the man who could do good work while on an extended tour would, on his return, find an audience well able to appreciate his results.

I hope, therefore, that we may gain the cordial co-operation of some of our more fortunate friends, though I am well aware of the objection with which the suggestion of these short tours will be met. Some years since, when I was thinking of a journey that would only allow a stay of six days in Rome, I applied to several friends for advice. The most candid of them gave me the inner mind of all. He said, "My dear fellow, don't do anything so ridiculous. Wait till you can go thither for six weeks. You will come away, as I did, with the tears in your eyes." I will only say of this advice that it had the effect of being impracticable. If I had listened to it I should have been waiting now. It is bad advice, however well-intentioned; for it fails to take into account the actual circumstances of young men who are carrying on their professional education probably under some difficulties, and have a very serious list of things against each of which they must write "done" before they can pass the examination to which they are now



Cornice, St. Mark's Church, Venice.

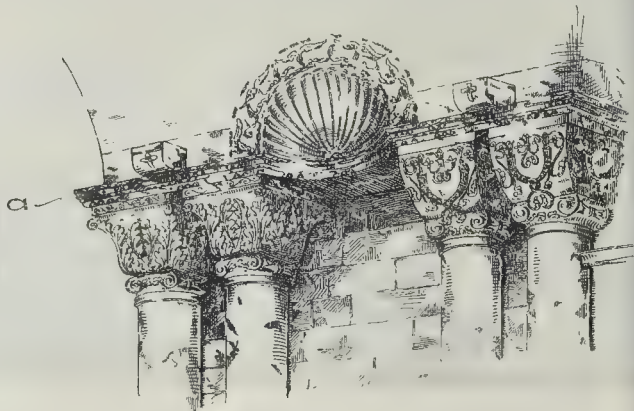
subjected. It is chiefly for their sake that I offer this paper.

What is the amount of time and money that the ordinary architectural student may be expected to afford for this one item in his professional education? I believe that few will be able to get away for more than three weeks at one time, or to spend more than 20*l.* or 25*l.* upon one journey. Adopting these figures, I propose to show what may be done in the time at that cost.

Out of twenty-one days four will be spent in travelling, leaving seventeen days available for work. On the map of Italy the roads to Rome are beset with towns, the meanest of which has some claims to be visited. Of large towns Turin will best bear to be omitted, for though pleasantly situated and provided with fine modern arcaded streets, there is nothing that cannot be seen to better effect in other towns. Milan, Florence, Pisa, and Genoa are the places most likely to be selected for a short stay; but

Siena, Perugia, Orvieto, Assisi, Pistoja, Bologna, and Piacenza contain work that may cause either of them to be chosen. If, out of our seventeen days, a week is given to Rome, five or six of these towns may have from one to three days each, Florence being made the chief object after Rome. The cost of a second-class circular ticket will be 13*l.* or 14*l.*, with a saving of about 35*s.* if the Newhaven route is adopted. The bare expenses of living at hotels, according to the experience of some of our friends, will be from 8*l.* to 9*l.*, and if we allow 2*l.* for purchases, the total cost for the tour will be within the limits I have named. But it is possible to see Rome, Florence, Pisa, Geneva, and Turin on much easier terms. I can state

Early Renaissance will prefer Florence. The architecture of Venice can be appreciated without any very elaborate preparation, and the whole aspect and arrangements of the city are strange and full of beauty. Verona has that kind of beauty which tempts one to sketch rather than merely rest and admire. As to Vicenza, which is sacred to the memory of Palladio, I should rather advise the student to read carefully all that Street says to extenuate his neglect to visit that town,—then to make a short call there himself,—as Street did on another opportunity. Out of seventeen days in Italy, Venice may have a week. Ravenna may be seen either on the tour to Venice or that to Rome. Its churches and baptisteries are filled



St. Mark's Church, Venice: Four Columns in the Atrio.

that the actual cost of a journey (via Newhaven) which occupied seventeen days, of which six were spent in Rome, was (exclusive of purchases) about 18*l.* Such a journey was rendered possible by a new system of excursion trains, of which three now run annually at Carnival time, Easter, and Whitsuntide, at fares of 4*l.* from Paris to Rome and back. I went with two pupils on the first of these excursions, and we had every reason to be satisfied with the arrangements made by Messrs. Cook & Son, who provided hotel accommodation and a good many other things that we could not have managed so well without their help.

If the three weeks' tour can be extended for a few more days, Naples, the busiest city in Italy, can be seen, with Pompeii, Herculaneum,

with mosaics, six or seven centuries older than those in Venice. The cost of the three weeks' tour, including Venice, should be under 20*l.* I have seen an estimate of a tour twice the length over the same ground, that would cost only 30*l.*, including purchases.

I may meet the common objection against hurrying over these most interesting routes by saying that there is really no hurry in the business. It is true that you cannot see so many things, nor return to the same thing so often, nor take so many notes, as if the time were longer; but all that is done may be done easily in the time allotted to it, and we must not expect that one sovereign will go as far as three. The first edition of Street's "Brick and Marble Architecture" "was the work," as the author



St. Mark's Church, Venice: The Knockers on one of the Brass Doors.

and the Greek temples at Paestum. The neighbourhood of Naples abounds with Roman remains, and some of its churches are remarkably rich in Medieval sculpture; but there is no reason why the time available for Rome should be diminished for the sake of seeing these things, which may very well be left for another opportunity.

Taking Milan as starting-point, another tour may be made amongst the towns in North Italy that lie within sight of the Alps and the interest of which is chiefly Medieval. The chief of these are Brescia, Verona, Vicenza, Padua, and Venice. Mr. Street was probably right in considering Florence, Verona, and Venice of about equal interest in their very different kinds. He who is well acquainted with the history of Italian art during the period of the

says, "of a little more than one short month," which may perhaps mean, at most, five weeks, but a great deal of that time was occupied in very slow travelling and many stoppages at small towns. I have no doubt that half a dozen Italian towns could now be as well seen in three weeks.

We may now consider what the student may reasonably be expected to do on one of these short tours. He could not make elaborate studies of particular buildings, nor take sketches of everything that he might wish to remember, nor explore places of antiquarian interest; but he would make himself well acquainted with the most valuable example in each locality, and not to be entirely dependent for the future on illustrations for his knowledge of them. I am, of course, supposing that each



he would prepare himself well before going away by consulting the best works on the subject to be visited, and that he would pursue the subject after his return. In that way, there should be no difficulty in his acquiring a really useful knowledge of the styles which he has been able to study from their best examples, and for the future he may venture to have an opinion of his own, whereas he has previously had to go by the opinions of other men; but there are many things that he would learn besides the details of styles.

One of the most striking peculiarities of our fellow-countrymen is their fear of big things. A young architect have his way, and he is more likely to contrive some little piece of ornament than a building or monument of grand dimensions. Set him to design some large building, and he will probably manage to make it look like a group of five little buildings, designed by as many architects, at intervals of

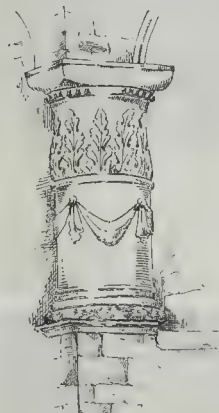
with us. On the Continent we find everywhere marble window-sills, dados, and columns. I have seen in the remotest corners of Holland marble steps and pavements in little common shops and at cottage doors. Our general range of choice is from rubbed Portland to toolled York. In the ruins and the churches of Rome there is a most magnificent collection of coloured marbles and hard stones,—porphyry, green serpentine, cipollino, verde antique, Africano, giallo antico, pavonazzo. Enormous blocks of the hardest porphyry, that can only be cut with diamond or sapphire, have been sculptured at an incalculable cost. Such churches as those of the Certosa of Pavia, the Scalzi and the Gesuiti at Venice, enable one to judge how far this was worth while; but only those who have seen them can so judge. The same may be said of the abundance of gilding and coloured decoration, of which the church of the Annunziata at Genoa is an extreme example.

the Romans have gloried in beautiful pavements, the tesserae hard and thick, and of fine contrasting colours. After a night's rain I went out early and dug from the macadamised roads as many examples as I wanted of stones once actually used in floors and wall linings. These things should be seen once at least in a lifetime.

An afternoon spent in Genoa will enable one to see such examples of noble entrance halls,



Corner of an Old Palazzo (Venice).



Detail of Dwarf Column.



Detail of Angle Corbel of Balcony.



Angle Corbel supporting Pulpit, Church of Sta. Stefana, Bologna.



Eaves Moulding, Bologna.

pillared courtyards, and marble staircases of palaces as cannot be seen elsewhere in the same compass. The fine staircase of Goldenmiche's Hall gives us an idea of what one kind of Italian staircase is like. Such brickwork, often mixed with marble,—as we see at Verona, Padua, and Piacenza,—is particularly instructive for those who work in a brick country. The arcades which, as in Pavia and Bologna, line the streets, are worth more attention than they have ever received in our climate, where they could give shelter from the rain, though the few attempts to naturalise them here have mostly failed. I might give a long list of things that strike one at first sight, and need no long contemplation to impress themselves on the mind.

Now, the practical question is,—What ought to be done to increase our knowledge of Italy on the terms I have suggested,—if such suggestions are worth consideration? If asked the best time for a young man to visit the great examples of Classical architecture, I should say, As soon as he has learned enough as a pupil to enable him to appreciate what he will see, and to make it a part of his education. He will learn more from books and classes after such a visit than he could possibly do before. When I was going through the architectural course at University College, we had amongst us the Count de Paris, who had already travelled a good deal. Occasionally Professor Donaldson would stop in one of his descriptions to say, "You'll remember, monsieur, this fine hall,—or portico." I thought how much better it would be for them if the whole class would respond, as the French Prince did, to these pleasant little reminders,—better, perhaps, for the Professor as well. There is a venerable superstition that has done a world of mischief: the idea that you should fully explore your own country before going abroad. You should not neglect English



Sta. Stefana, Bologna.



Archivolt, Bologna.

architecture, but go abroad as soon as you get a chance. The mode of arranging for a journey to Italy remains to be considered. I should suggest that a class be formed, under the ordinary rules of the Association, for the study of the whole subject. You will want to know all about routes, fares, and hotels; to determine on the towns best worth seeing, and the most notable buildings in each town. I always like to know my way about a place before I set foot in it. This only involves a careful study of the map, which is amply repaid. If any interest is felt in

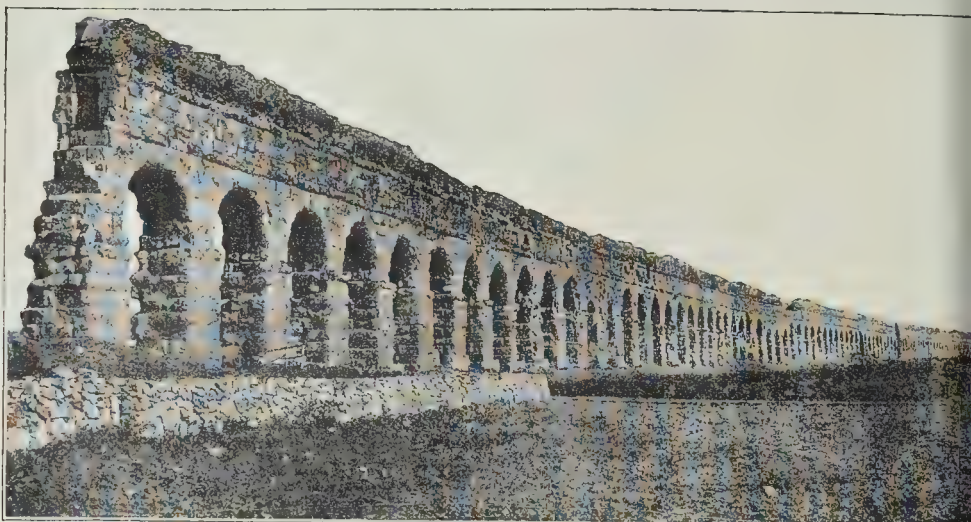
half a generation apart. One visit to Rome will teach him something about the effect of grand dimensions. The Pantheon would contain in its one room a couple of ordinary-sized London churches, with their towers and spires, and plenty of room to spare. The Baths of Caracalla, the Colosseum, the great structures on the Palatine Hill, Hadrian's Villa at Tivoli, the great basilica of St. Paul outside the Walls, cannot fail to afford useful lessons, and though mere size may be vulgar rather than sublime, the man who has seen these things will be a better authority on such a question of taste than the man who has not.

Another very remarkable characteristic of Englishmen in recent times, is their insensibility to beauty in the materials of a building. Our old mansions and town houses were fitted with mantelpieces and hearths of handsome breccia and veined marbles, which were also used in monuments, until the taste died out

Mr. Brindley, of the Westminster Bridge-road, with whom I looked over some of the marbles in the churches of Rome and Naples, has been so good as to lend us some instructive examples, chiefly of antique marbles. The sources of many of these have lately been rediscovered, so that the quarries from which the Romans got their wealth of marbles and harder stones are now only waiting the commands of those who take pleasure in them. I have no doubt that with a proper demand for marble flooring materials, they can be delivered in London cheaper than in Rome.

St. Mark's at Venice contains two acres of mosaics. How many acres of opus Alexandrinum (the pavement of which we have one specimen in the choir of Westminster Abbey) may exist in the churches of Rome I know not. The great frescoes in St. Peter's have been reproduced in mosaic, which is made to copy slavishly the touch of the painter. In all ages





Claudian Aqueduct, Rome.

this subject, we should have no difficulty in arranging special terms as to hotels, and getting a kind of "house of call" in the larger Italian cities. Our past-president, Mr. Phené Spiers, has for years past helped many of us with these

intending traveller. Through the introduction of Mr. l'Anson, a vice-president of the Institute, I made some inquiries in Rome, and feel sure that we could make such arrangements there as would place students, travelling with letters

facilities for seeing some of the objects of interest in Italian cities would be given to members of a recognised body such as this. A set of friends who may prefer to work independently may gain a good proportion of the same advantages.

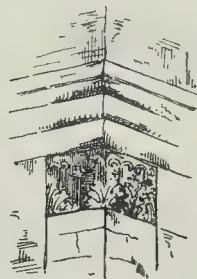
I have mentioned the cheap excursions that sometimes go to Rome, and I think a man who cannot spare three weeks might do worse than go by one of them, especially if a few comrades would go together; but I think the best would be for a few young men to go for three weeks under the conduct of some one who has been in Italy. Mr. Stannus took such a party to Milan a few years ago, and I believe the journey was a great success. Our President who has done so much for this Association by carrying on the system of excursions originated by the late Mr. Sharpe, will know much more than I do as to the practicability of this plan.



Mosaic, Church of San Vitale, Ravenna: Head of Empress Honoria.—Sixth Century.

small details of information. He tells me he is now prepared to open a register at the Royal Academy for entering them, and also all the objects of interest that might be overlooked, which register he will be happy to show to any

from the Association, in communication with the resident English artists using rooms and books of reference to which we might make such contributions as our use of them might justify. I have no doubt also that special



Quoin from an old Palace, Ravenna.

I hope, however, that we shall make the excursions so easy that one or two students may be able at any time that suits them to go to Italy with such special advantages as we may be able to get for them.

I will add a few practical hints on other points. The best time to go to Rome is in the winter, or, at least, avoiding the four summer months. I should prefer to arrive just after Easter, when the crowd of English visitors is leaving for the north. Naples is getting unbearably hot by the month of May. There is nothing specially attractive in Rome at Easter. Florence is pleasant at Easter, just before it begins to fill with visitors. Venice and the northern towns may be visited at any time if excessively hot seasons be avoided. The climate especially in Rome, is very treacherous. You have to use warm clothing, and keep out of cold winds, and not to go out of the heat of the sun into cold buildings thinly clad. At any time of the spring and autumn a downpour of rain may set in for a week.



I might give a list of books useful for study; to every one who has the idea of going to Italy may see such a list in the Calendar of the Institute for this year (page 67), and will now where he can consult the books, choosing according to the special branch of architecture he may have in his mind. To further encourage him (I give this hint especially for the benefit of any who may not be quite awake to what will soon be expected of them) the said Calendar points out that the candidate, whatever his favourite style may be, should be familiar with the principal works of Brunelleschi, Bramante, Sansovino, San Michele, Palladio, and Vignola, besides Inigo Jones, Ren, Chambers, and other great masters of the art." Now, my idea of becoming familiar with a building, is to go and see it,—in and out, and to do this you must go to Italy on the first terms you can; but if you read through the eight pages of that Calendar, which lays down the various branches of education in which a candidate for examination should show his proficiency, you will probably agree with me that he had better get his Italian experience systematically, cheaply, and quickly, so that he may have time and means for other necessary, though, perhaps, less delightful, tasks. If he has his way to make a more prolonged tour, I should be sorry to advise him to make it shorter; but I would by all means encourage those to whom a long tour would be a very serious difficulty, to go when they have a chance, to go again and again if possible, so that they may get some idea of the beauty and the grandeur of the country left to us from past ages in the cities of Italy.

[For a report of the discussion which followed, and for extracts from letters by Mr. Nicholson, A.R.A., and Professor Roger Smith, see p. 698.]

#### THE SURVEYORS' INSTITUTION.

The opening meeting of this Institution for the present session was held on Monday evening last, when an address was delivered by Mr. Edward P'Anson, President.

Mr. P'Anson, in the course of his address, said:—The report of our Council, presented to the last general meeting, sets forth so fully the increase during the past official year of the number of new members, the loss by death of old members of the Institution, and our financial condition, that it is unnecessary for me to offer any observation on these points, nor on the substantial results which have been derived from the system of Examinations which has now been established for five years; but I may just note that, after being established only twelve years, this Institution obtained a charter, under which we have worked for five years, having now close on 1,200 members, and a library of special books containing about 3,500 volumes. This may be a fitting place to allude to an impression which I understand to some extent exists, that membership is no longer obtainable except by examination; and although this is true as regards Professional Associates, it does not hold in respect of surveyors already in practice, to whom the Fellowship remains open on the old terms for another five years.

You are aware, gentlemen, that my own professional practice has not been in connexion with land as agricultural land, but with buildings and building land; and even that has been confined to a comparatively limited area, for I am essentially a Londoner. I must, therefore, rely on your indulgence if you find me ignorant and wanting in that branch of our profession which deals with the great interests involved in agriculture and farming; but the wise constitution of your Institution is such that you admit members who practise in any branch of the profession of surveyor, and, as each branch requires a special knowledge, we can hardly be proficient in all.

Born, as I was, in the City, and having lived there all the days of my youth, and having there carried on my professional work, naturally my experience has been chiefly of City of London life; and it may not be uninteresting to look back and think what a vast amount of professional work there has been in the City of London during the last two generations for surveyors to do.

Consider what London was the two generations ago I have referred to, and how it has imperceptibly grown and increased, until, so engorged is it with traffic, both vehicular and

pedestrian, that nothing but the most careful management of the police would enable, in some parts of the City, the choked vehicular traffic to circulate at all; and, as regards foot traffic, as you are aware, in the neighbourhood of the Mansion House, it is proposed to form subways, so as to remove the real danger which exists in pedestrians passing in this crowded locality from one side of the way to the other. All this has come so gradually that it is difficult to realise the London of two generations ago, when, as I recollect, my nursemaid used to lead me as a child to walk either on Fishmongers' Wharf, which extended up to old London Bridge, and had willow-trees growing on the river bank, or to Custom House or Tower Wharf, which was then so near the green fields of Essex, that the sweet scent of the new-made hay was wafted from them.

It was some twenty years after the Napoleonic Wars ceased with the battle of Waterloo before any decided start was taken in civic improvements, somewhere about the time the old Houses of Parliament were burned down. London improvements had, however, begun then, but the development has been much greater since, and has certainly furnished, since about 1836, abundant employment not only for surveyors, but for architects also, who since then have had much of old London to rebuild; but, while the surveyor's work in city improvements can hardly be again what it has been, there still remains much for the architect to do in rebuilding many of the city houses, which, for the most part, date back to the Fire of London in 1666, and, although still structurally sound, are unfitted to the requirements of the present time, and unprofitably occupy much valuable ground.

As regards the value of land in London, I do not think it has declined, but it is not so elastic as it was some fifteen or twenty years ago; in the best parts of the City of London it still maintains its value, and, although it has often realised and still does realise 30% a square foot, and has even under special circumstances reached 40%, a point it had reached several years ago, there it remains. Of course rentals are high in proportion to the large value of the land, but, large as it is, I believe it does not materially vary from the value of land in the other great seats of commerce and industry, such as Paris or New York; and I was struck, when some years ago I visited Moscow, to find that the land in the great bazaars realised much the same price as in London. The area where these large prices are obtained is very limited in London, and although at present there is a decided want of elasticity, still, however, as new streets are formed and new or improved lines of thoroughfare opened up, increased values are obtained; but I consider the greatest improvements in value are about the north-eastern parts of the City of London in a line between the City and the vast dock extension which is taking place.

What is, however, most noticeable is the immense development of houses in the suburbs, some idea of which may be formed by considering the District Surveyors' annual returns. The number of districts into which the area under the control of the Metropolitan Board of Works is divided is sixty-two, superintended by sixty-one District Surveyors,—one District Surveyor, one of the oldest of the body, and elected before the creation of the Metropolitan Board, holding two districts.

The total fees received, which are regulated by the Building Act, vary considerably in amount, the most profitable districts being those which naturally should be so,—namely, those suburban districts where a large amount of new buildings of a small class have been erected. According to the last return I have before me, namely, that of 1883, the fees received in the districts of St. Giles, Camberwell, West Hackney, Hammermith, and Fulham, were the largest. The district of Fulham produced over 2,000; at the other end of the scale, one district, being a detached portion of Clerkenwell, near Muswell Hill, produced only 147. 8s. 9d., and some other districts, namely, the Tower Liberty, St. Martin's and St. Anne's, Soho, East Wandsworth and Tooting Graveney, West Kensington, North St. Marylebone, Whitechapel, Spitalfields, with Mile End New Town, Putney, and Roehampton, produced fees under 300l., varying from 117l. 8s. 3d. to 286l. 9s. 9d.

The number of building operations, including new buildings and alterations to old buildings,

was, in 1856, 14,654; in 1883, it was 26,479, as shown by the following statement:—

| Year. | Works. | Year. | Works. | Year. | Works. |
|-------|--------|-------|--------|-------|--------|
| 1856  | 14,654 | 1866  | 20,188 | 1876  | 21,819 |
| 1857  | 15,330 | 1867  | 21,393 | 1877  | 24,248 |
| 1858  | 16,690 | 1868  | 21,915 | 1878  | 24,629 |
| 1859  | 15,558 | 1869  | 19,947 | 1879  | 27,271 |
| 1860  | 15,039 | 1870  | 18,599 | 1881  | 28,249 |
| 1861  | 14,908 | 1871  | 18,948 | 1881  | 29,275 |
| 1862  | 15,707 | 1872  | 18,298 | 1882  | 28,519 |
| 1863  | 17,954 | 1873  | 17,354 | 1883  | 26,479 |
| 1864  | 18,984 | 1874  | 19,950 |       |        |
| 1865  | 19,260 | 1875  | 20,383 |       |        |

The year of greatest activity seems to have been the year 1880, when the number was 29,249; the increase in the twenty-seven years from 1856 to 1883, has been in the rates of nearly 14½ to 26½, or considerably over 50 per cent.

The approximate proportion of new works and alterations has been, since 1875, as follows:

| Year. | New Buildings. | Additions and Alterations. |
|-------|----------------|----------------------------|
| 1875  | 8,907          | 8,384                      |
| 1877  | 10,658         | 8,930                      |
| 1879  | 10,445         | 8,850                      |
| 1879  | 10,710         | 9,882                      |
| 1880  | 11,890         | 11,288                     |
| 1881  | 10,331         | 11,100                     |
| 1882  | 9,852          | 11,395                     |
| 1883  | 8,760          | 11,100                     |

being an average of over 9,000 new houses during the eight years preceding the year 1883. Since then I have no returns to which I can refer. The actual number of building works, as will be seen in comparing the two statements, does not agree, but in the list of new buildings, alterations, and additions, the number given is of those only on which fees have actually been paid.

The district which I hold is the district of Clapham, in the midst of which is Clapham Common, the almost classic ground of the Thorntons and the Wilberforces, and of the other leaders of Slavery Emancipation, and of the Low Church. Alas! how changed it is. And on the common itself,—one of the fine houses which Peter the Great, when he saw them, considered palaces, is now a Roman Catholic nunnery. There is more than one large Roman Catholic school, and close on the verge of the common rises the elegant spire of a beautiful Roman Catholic church. Many of the fine mansions which surrounded the picturesque common have been pulled down, roads driven through the formerly beautiful grounds on which these old houses stood, and rows of houses built on the sites; a tramway runs from the Borough on to the common itself, and a large number of comparatively small houses have sprung up on its western side. The tramways on the high-road have spoiled it for it for carriages, most of the finer houses have gone, and the glory of Clapham is departed. But the value of the land has enormously increased. Land on main roads which, less than twenty years ago, was not worth more than 1,000l. an acre is now worth 3,000l., or more. The green lanes, the trim, well-kept gardens, are gone; and rows of small houses, and towering School Board schools now occupy what, twenty years ago, was mainly pasture-land. I speak of Clapham because it is the district which I know best; but Clapham is by no means the only suburb which has greatly increased in population and value. I believe that in the Hampstead and Highgate districts the value of land has risen considerably higher than 3,000l. an acre. What is most remarkable is the immense increase of houses of a small class, and of houses up to 30l. to 38l. a year in value; indeed, of houses of this class there seems no end.

All this indicates, I take it, a vast increase in the labouring population, and shows a great improvement in the comeliness, comfort, and sanitary condition of the houses inhabited by this part of our population. There is one district, called the Shaftesbury Park Estate, in Battersea, which contains some 2,000 two-story small houses, which, although not well built, are designed with considerable taste, and are placed in well-distributed streets planted with flourishing trees, forming altogether, to my mind, much more agreeable residences than the more substantial, lofty, stone-staircased Model Improved Industrial Dwellings in London, and, I consider, going nearer to realising suitable residences for the poor.

Let me now refer to the works carried out during the last generation by the Metropolitan Board of Works, which was created by the Metropolitan Local Management Act of 1855; and up to the end of 1882, I am, from their



published reports, enabled to give an account of the work done by them.

The following-named are among the new streets which have been formed or widened:—

|                                                                                                          | Net cost, after allowing for Land sold. |
|----------------------------------------------------------------------------------------------------------|-----------------------------------------|
| 1885. Garrick-street, Covent Garden.....                                                                 | £24,938                                 |
| 1882 } and } Southwark-street .....                                                                      | 209,000                                 |
| 1864. } } Burdett-road, a new street from Lime-house to Victoria Park .....                              | 38,204                                  |
| 1869. } Queen Victoria-street, from Mansion House to Victoria Embankment .....                           | 1,005,303                               |
| 1871. } Kensington, the widening of High-street .....                                                    | 123,323                                 |
| 1865. } Whitechapel, the extension of Commercial-road .....                                              | 201,567                                 |
| 1871. } Hamilton-place, widening, so as to form a better opening from Finsbury to Hyde Park .....        | 110,787                                 |
| 1867. } The removal of Middle-row, Holborn.....                                                          | 75,417                                  |
| 1862. } Victoria Embankment.....                                                                         | 1,144,433                               |
| 1869. } Albert Embankment.....                                                                           | 1,007,692                               |
| 1874. } Chelsea Embankment.....                                                                          | 279,978                                 |
| 1876. } Northumberland-avenue .....                                                                      | 315,438                                 |
| 1877. } Widening of Wapping High street and Lower East Smithfield—total cost to 31st October, 1878 ..... | 672,967                                 |
| 1877. } Shoreditch, the widening of High-street .....                                                    | 170,059                                 |
| 1879. } Widening of Bethnal Green-road.....                                                              | 140,393                                 |
| 1879. } " " Willow-walk .....                                                                            | 390,222                                 |
| 1879. } " " Old-street .....                                                                             | 701,396                                 |
| 1879. } " " Oxford-street .....                                                                          | 701,396                                 |
| 1877. } Harrow-road, widening at its junction with Edgware-road.....                                     | 164,554                                 |
| 1877. } Newington Butts, widening of street .....                                                        | 8,632                                   |

This body has also contributed to the expense of the recent very important improvements in widening the east end of King William-street (City), Eastcheap, Little Tower-street and Great Tower-street, and of forming a new street from the southern end of Mark-lane to Trinity-square; and they are at this time engaged in forming a most important line of communication between Regent-circus, cutting through Rupert-street, Dean-street, and Greek-street, all in the parish of Soho, up to Broad-street, St. Giles's.

The great work, however, for which the Metropolitan Board was primarily created was to enable them to carry out a system of main drainage by which the contents of the sewers are prevented from passing into the River Thames within the limits of the metropolis, and to convey them to points many miles below London. Of the magnitude of these works some idea may be formed when it is mentioned that it comprises upwards of eighty miles of main intercepting sewers, some as large as 11 ft. 6 in. diameter, and four pumping stations, two on the north and two on the south side of the Thames, and 165 miles of old sewers have been reconstructed, deepened, and covered, at a total expenditure reaching five millions and a half sterling.

The Thames has been embanked in part, and certainly it is far the grandest embankment which exists, surpassing in many respects the quais of Paris, or the embankments of the Neva at St. Petersburg. The cost of this great work and of the new streets, of which I have already given some details, exceeds ten millions. Amongst the other important works accomplished by the Board is that of rendering the toll-bridges free; a great boon to the public, procured at a cost of one million and a half.

All rights in the already existing open spaces, such as Blackheath, Clapham-common, London-fields, Hackney, Peckham-rye, and others, have been acquired, so that now in and about London the public, of their own freehold right, have access to 1,578 acres of open and, for the most part, well-planted land, which has been acquired at a cost of nearly half a million, making an aggregate of ten millions sterling most usefully and beneficially spent on the permanent improvement of our great metropolis, so that we too may certainly boast, as once did St. Paul when speaking of Rome, that we are citizens of no mean city.

Negotiations are, I believe, pending for the acquisition of a further large area, which it has been thought desirable to add to Hampstead-heath; but, as the purchase-money required amounted to 350,000*l.*, this scheme is for the present abandoned.

After giving some statistics of the rise and fall of the rental value of land in Essex, Lincolnshire, Oxfordshire, and Northampton, Mr. Anson went on to say:—

Although for agricultural purposes the value of land has so materially decreased, the case is very different in the value of land required for residential purposes. I have in my mind a district on the Surrey hills on the borders of Hampshire, and near to a

lofty summit on the old Portsmouth road, called Hind-head, where some land which, for the last generation or two, has been in the hands of owners who were both unwilling and incapacitated from selling has lately come into the market. It is land of no agricultural value, covered with heath and ferns and furze and the whortle-berry, some oak-scrubs, and a few Scotch fir, which twenty years ago, when obtainable, did not fetch more than 5*l.* or 10*l.* an acre. Now, on account of the land having come into the market, and the singular beauty and salubrity of the situation, it realises as much or more than 40*l.* an acre. This is, of course, no criterion of the agricultural value of the land, but rather of the growing wealth of that middle class who are investing in land; and it goes to show that land may have a value outside its value for mere agricultural purposes. This land is more than forty miles from London. Another instance I may quote of the rise in value,—in a district which can hardly be considered residential,—is that of a farm of 150 acres, situate between Farnham and Aldershot, about twenty acres of which is hop land, the rest arable fir plantations and some heath land, lately sold for 8,000*l.*, or 55*l.* an acre; so there is some value in land still.

Several Bills during last Session were introduced into Parliament, dealing with property in land in a manner requiring our gravest attention. There was a Bill ordered to be printed in February of 1884, to amend the Copyhold Acts, and to promote the enfranchisement of lands of copyhold and customary tenure, and of lands subject to customary and other incidents of rights, the first clause of which provides that the lord, admitting or enrolling a tenant after the last day of the year, is to give notice of enfranchisement, and in default of doing so the land not to be subject to fines, &c. Now, this, on the face of it, seems a very arbitrary proceeding, and it is easy to see that it might operate injuriously both to the lord and the copyholder; and, notwithstanding other useful provisions in the Bill, still its arbitrary character is a very prominent feature.

There was another Bill for the enfranchisement of leasehold building land ordered to be printed in April of this year. This Bill was very short; but I can hardly think it could have been well considered, and it is indeed surprising how any gentleman returned to the House of Commons as a fit and competent representative of his constituents could propound such an unreasonable scheme. What happened with it in the House I do not know; but the Bill provides that any person holding an agreement for a building lease may, at any period during the continuance of the lease, have the power to purchase the fee-simple of the land comprised in the lease, by giving six months' notice of his intention to do so; and that he shall acquire the freehold by payment of an amount equal to twenty-five years' purchase of the annual ground-rent reserved by the lease. To illustrate the utter unreasonableness of such a proposition, take the case of lease of which, say, there are only a few years to run. It is no unusual thing that a house may be worth, say, 300*l.*, and be held at a ground-rent of 50*l.*, or even less. Assume there are five years of the term unexpired. Then, by payment of 50*l.* x 25 y. p. the lessee would acquire a freehold house for 1,250*l.*, which five years afterwards would be worth 6,000*l.* Such a proposition is altogether too unreasonable. And observe that, although I am assuming the lessee to give his notice so long as five years before the term expires, if the lessee can do better than invest his money to pay 4 per cent., which is what he does when he redeems at twenty-five years' purchase, his interest is to defer the enfranchisement until within six months of the expiration of his lease; in which case the difference between the actual value of the freehold and the sum at which the lessee can enfranchise becomes more striking still.

Perhaps, however, the most important Bill as affecting the value of land in the metropolis is Mr. Broadhurst's Bill, ordered to be printed in October of last year, entitled "A Bill to enable Leaseholders of Houses and Cottages to Purchase the Fee Simple of their Property." The provisions of this Bill having been already very fully considered and discussed in this room, it is unnecessary for me to dilate fully upon them, but seeing the very large support this, in my judgment, dangerous Bill received in the House of Commons, it shows how large a sympathy there exists with the provisions this Bill sought

to enact, and we may anticipate further propositions of a similar character will come under consideration of Parliament. It has been alluded to constantly in the addresses of candidates for seats. I have not, however, observed any cogent arguments in its favour.

There is another point of view where the leasing system financially produces the results, and without which many, perhaps many of the palatial blocks of buildings known to City offices could not have been carried out, nor could the numerous limited liability companies who are the owners, and the most part the prosperous owners, of these useful and important buildings, have been enabled to erect them. These offices, to a great extent, are leaseholds. The lessee takes the ground: he obtains a year's peppercorn to enable him to erect the buildings,—to that point he has no capital to find,—the freeholder, who is content with 3 or 4 per cent. has found the capital for buying the land. Soon as the buildings are sufficiently advanced to entitle the lessee to a lease, he can raise a large portion of the money he requires, and the buildings, when completed, are well let, may raise, in some cases, all he has actually spent on them. If his speculation has been moderately successful one, he may make 8 or 10 per cent. on his actual outlay.

Let us assume the case of a building which costs £10,000, and this is only a moderate-sized building:—

|                                                                                                 | £.  | s. | d. | £.    |
|-------------------------------------------------------------------------------------------------|-----|----|----|-------|
| Take ten per cent. on the outlay as the net rent, that is, per annum .....                      |     |    |    | 1,000 |
| Deducting the ground-rent, which we will assume to be a third of the rental value, or say ..... | 266 | 0  | 0  |       |
| Four per cent. interest on borrowed capital of 10,000 <i>l.</i> .....                           | 400 | 0  | 0  |       |
| Leaves a net profit of .....                                                                    |     |    |    | £334  |

This is perhaps an exceptionally favourable case, but it is sufficient to illustrate the advantages of the system. The freeholder has his ground-rent well secured, besides a reversion which grows more valuable every year. The mortgagor places his money at a good rate of interest. The lessee, having to find only temporarily a small portion of the capital required for covering the land, earns a profit which would be considerably reduced if he had to find the whole, which he probably never could do; whereas, with a comparatively small capital to enable him to start the building, he enabled to make such a transaction profitable.

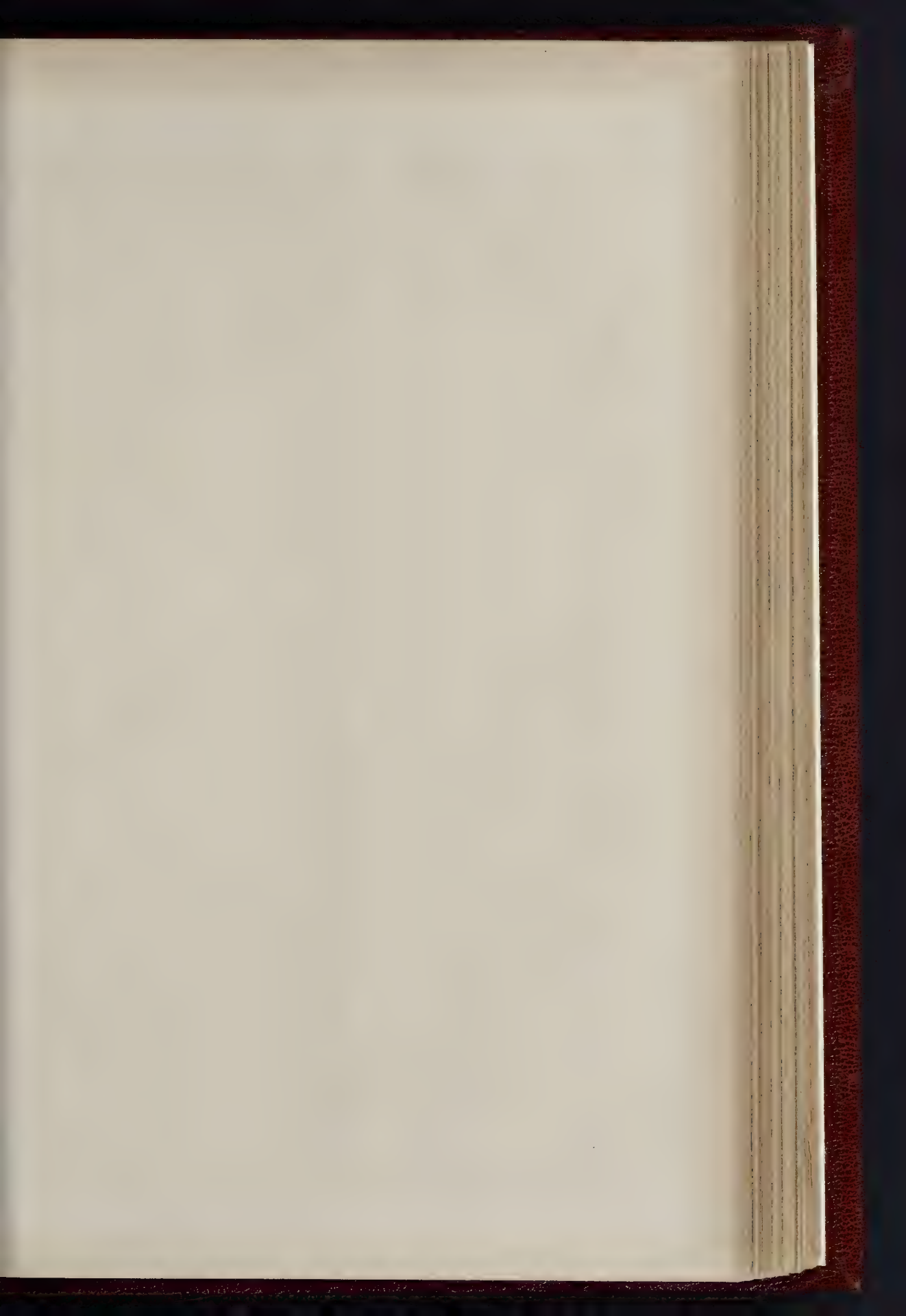
So I hold the leasing system to be an advantageous system, at least in London. There is, however, no doubt, a feeling that it is unjust that a lessee who on ground which the time it was leased was of small value, and on which he had made a large outlay, and who has therefore very greatly exceeded the original interest of the lessor in his land, should at any time be deprived of a property which his energy and capital had so largely increased in value. This is a deep-rooted feeling, and must not be unworthy of consideration; but certainly Mr. Broadhurst's Bill is far, to my mind, from solving the question with any approach to equity.

In conclusion, Mr. Anson dealt with the land question generally.

#### The Proposed Hudson River Tunnel.

No less than 1,500,000 dols. have already been expended on the partial construction of the proposed tunnel under the Hudson River, at the sum necessary for its completion is estimated at 2,200,000 dols. The total cost of the work will thus be seen to amount to 3,700,000 dols. or 925,000*l.* At the commencement of the undertaking upwards of 300 workmen were employed, and everything went well, until the latter end of 1882, when, unfortunately, owing to the death of President T. W. Park, work was suspended, all the employees, with few exceptions, being dismissed. About the middle of July, 1883, the remaining workmen were discharged, and since that time nothing has been done towards the completion of the project. At the north end of the tunnel, on the Jersey side, 1,547 ft. have been finished whilst on the New York side, 150 ft. of the north and 23 ft. of the south have been excavated. There are still 3,913 ft. in the north, and 5,012 ft. in the south tunnels to be completed. It is calculated that it will occupy no less than three years and a half to accomplish the work.







F. K&S. del.

INTERIOR VIEW OF THE PORTICO OF THE P.



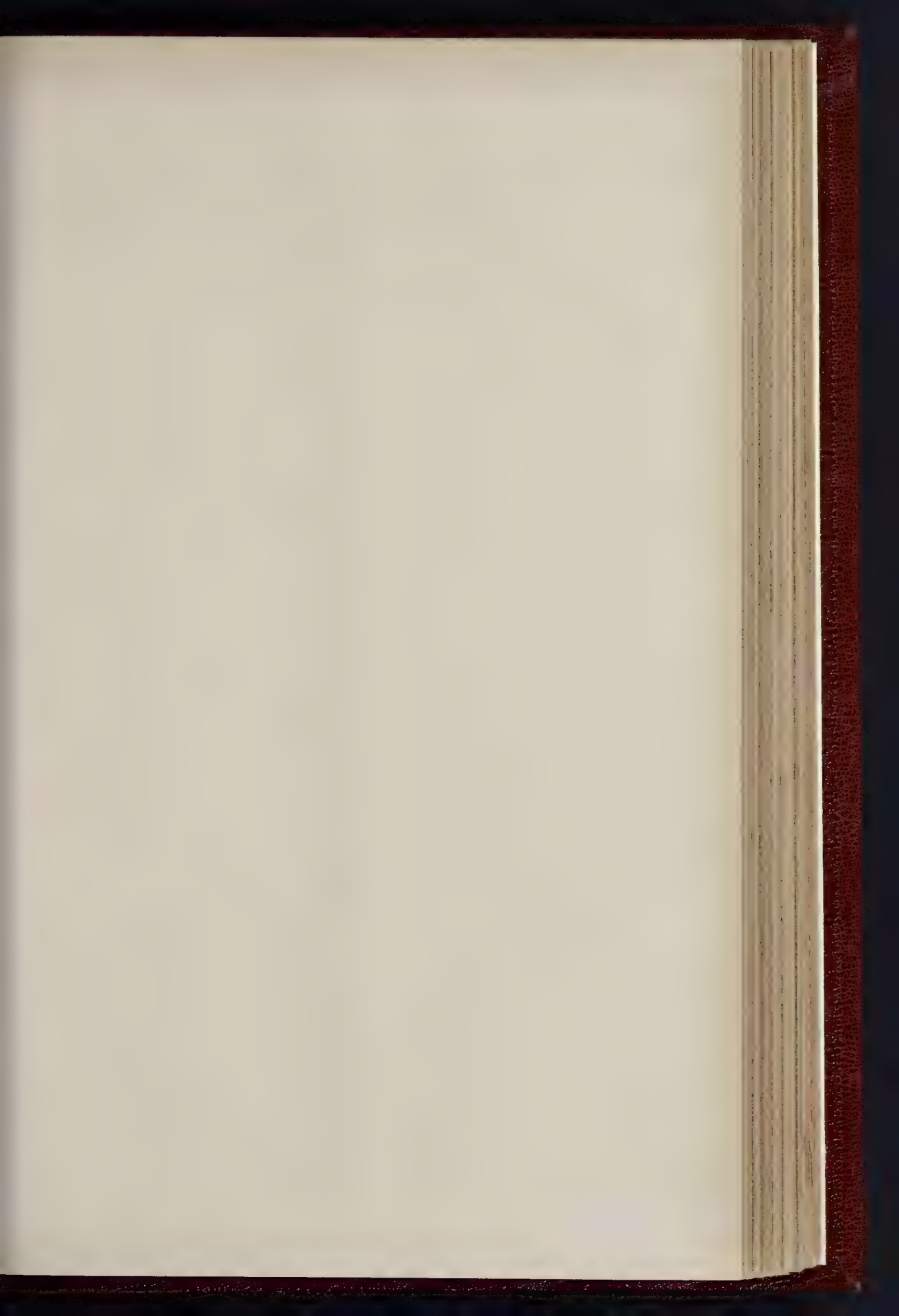


ME. REPRODUCED FROM AN ENGRAVING BY ROSSINI.

8 Castle St. Holborn London E.C.





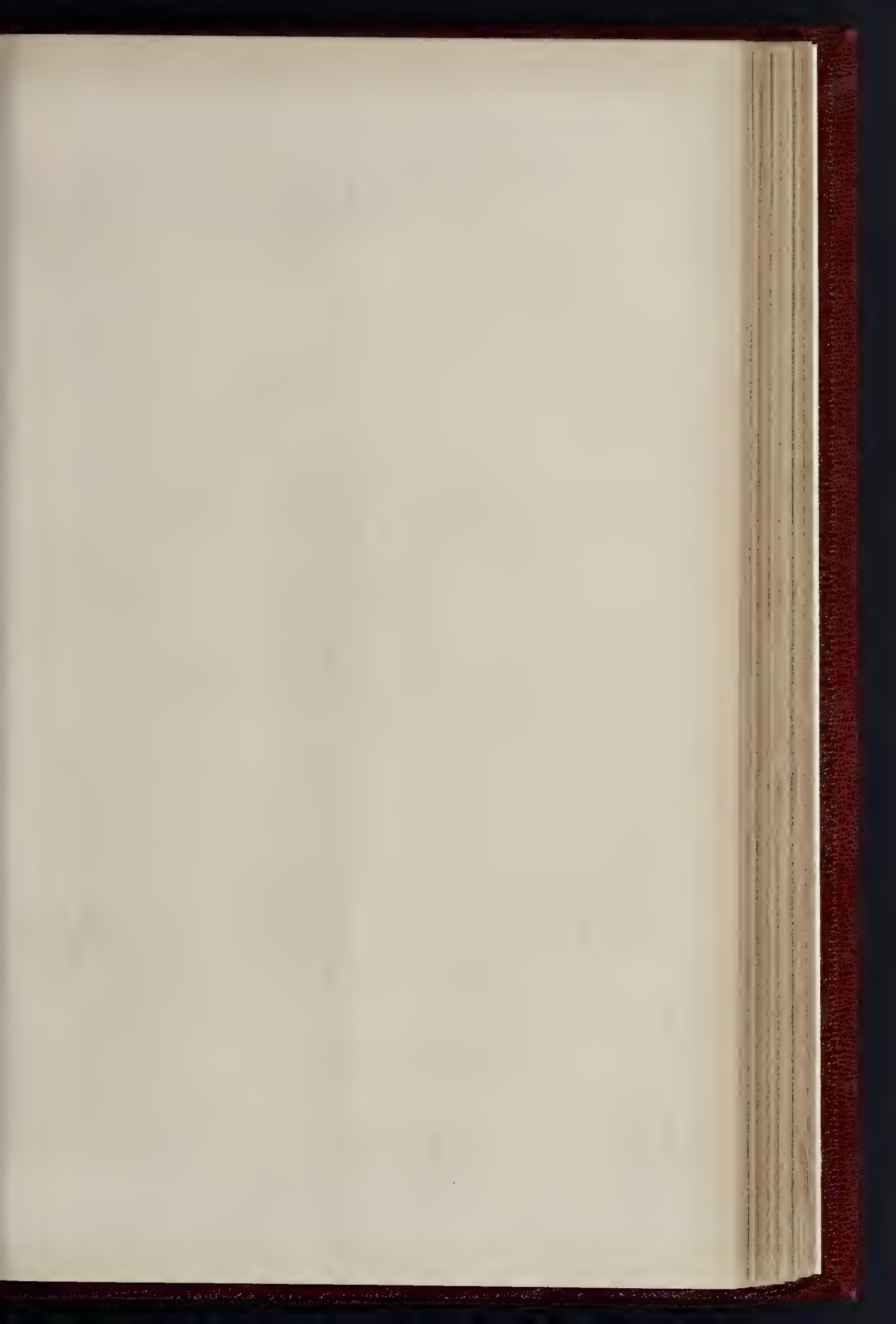


THE BUILDER, NOVEMBER 14, 1885.



St. Mary's Church for the Tottenham Mission. Architect, J. Edward K. Cutts.



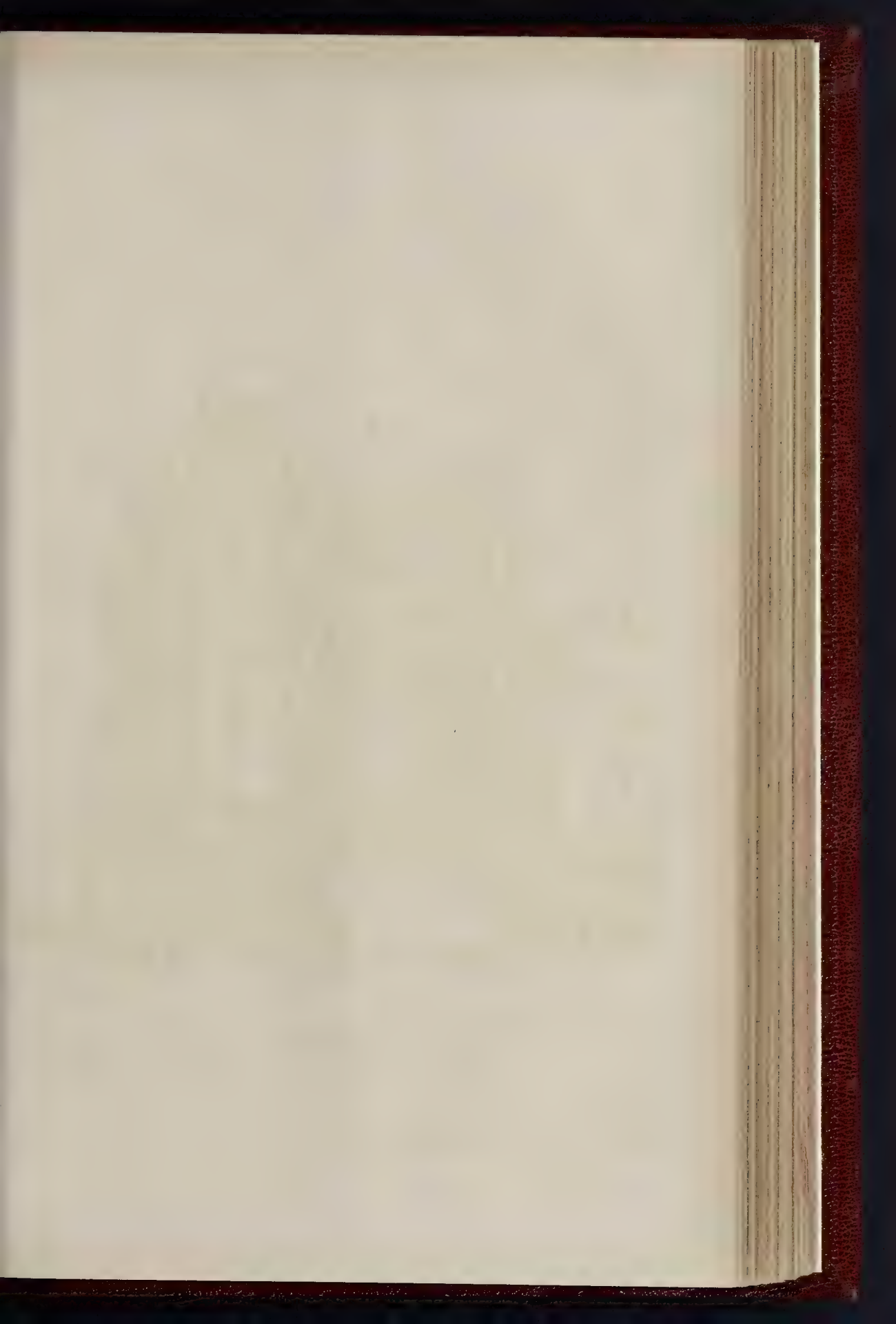


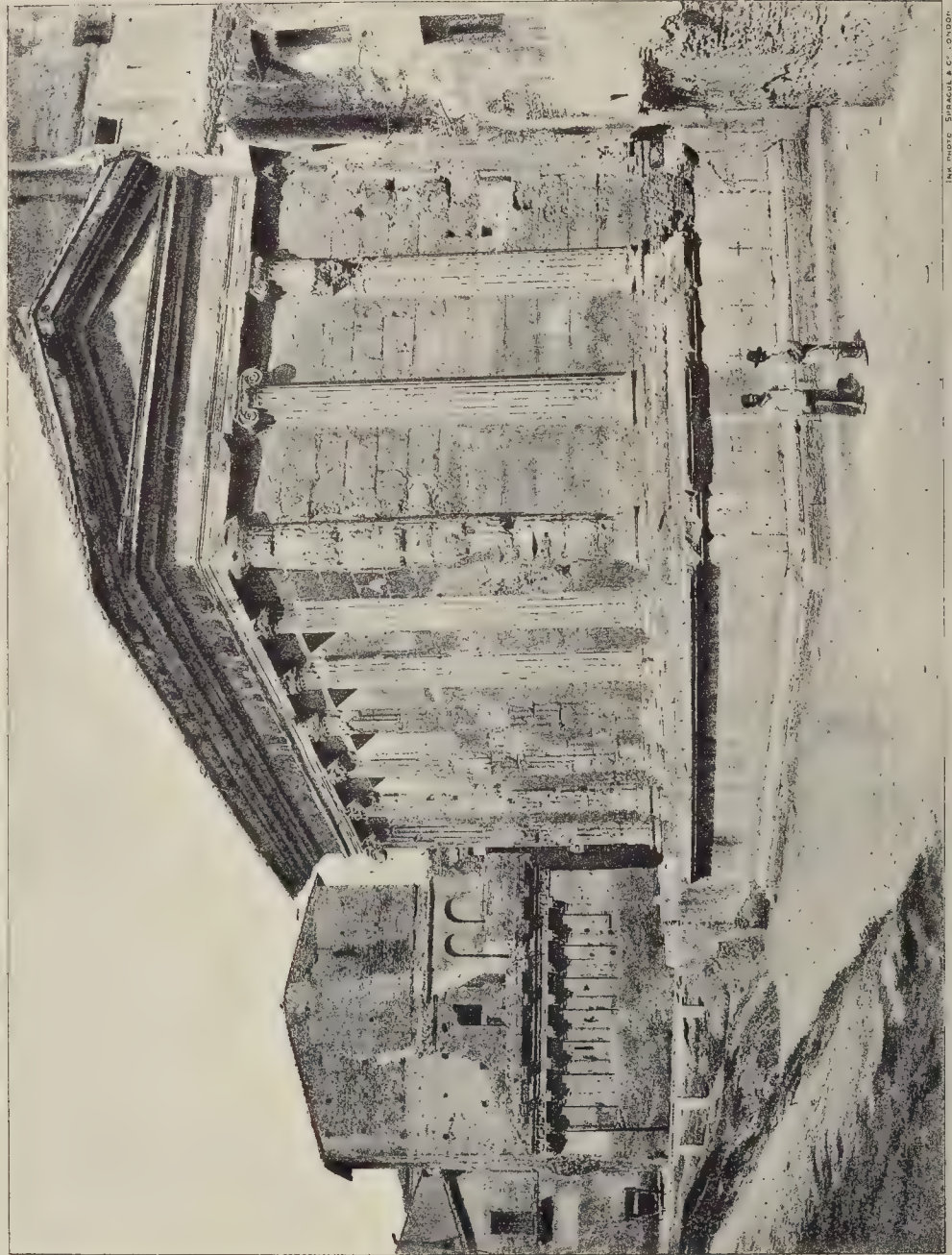


INK PHOTO SPRAGUE & CO LONDON

BUSINESS PREMISES, LEWISHAM HIGH ROAD.—MESSRS ROMAINE WALKER & TANNER, ARCHTDS











PORTA MAGGIORE, ROME



THE PHOTO SPRAGUE & CO LONDON

SARCOPHAGUS IN THE VATICAN MUSEUM.





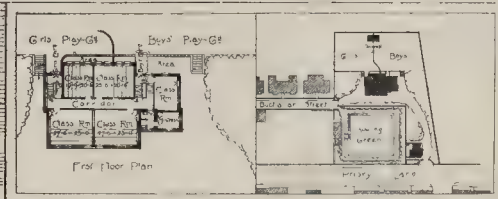


THE PHOTO. SPRAGUE & CO. LONDON

BUSINESS PREMISES AND ENTRANCE TO WAREHOUSE YARD, CALEDONIAN ROAD KING'S CROSS.  
MESSRS. ROMAINE-WALKER & TANNER, ARCHITECTS.

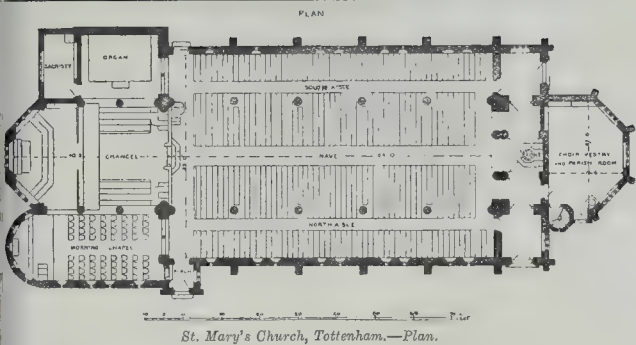












St. Mary's Church, Tottenham.—Plan.

**Illustrations.**  
**ILLUSTRATIONS OF ROMAN REMAINS.**  
We give two or three plates this week of prominent remains in Rome as a kind of commentary on Mr. Blashill's paper Italy, printed in this number.

**THE INTERIOR OF THE PORTICO OF THE PANTHEON.**  
An interest apart from the purely architectural one, as it is a reproduction by photography from one of a fine and now rather scarce set of old engravings of Roman subjects by Rossini. The one reproduced is from a series belonging to Mr. Jas. Burchell. The point of view, in the interior of the portico, is also unusual; there are plenty of engravings and views of the Pantheon in existence, but none of the interior, and no perspective drawings; but we do not remember elsewhere to have come across a view taken in the interior of the portico. The Pantheon has been recently accepted as having been originally the great entrance-hall to the Baths of Trajan, which are immediately in the rear of it. One of the most recent students of Roman objects, Mr. J. T. Middleton, in his just published work on "Rome in 1885," combats this view, and asserts that the Pantheon was never in actual connexion with the Baths. As we all notice Mr. Middleton's interesting work length shortly, we reserve the further consideration of the point till then.

**TEMPLE OF FORTUNA VIRILIS.**  
This small temple, of which the name is probably an accidental corruption, and which was, probably, dedicated to "Fortuna" singly, without any "Virilis," is an example of one of the earlier classic buildings of the Romans, and it still were more influenced by Greek precedent and precedent than in their later notices. It may date from a century B.C., and it stands in the Forum Boarium, near the river and at the foot of the Palatine Hill. It is of an Ionic order, much more pure and refined in style than Roman work generally.

**PORTA MAGGIORE.**  
The external view of the Porta Maggiore is the finest and most interesting amongst the ruins of Rome. The inscriptions show that it was part of the two aqueducts through which flowed the *ager Claudia* and the *Anio* were constructed by the Emperor Claudius in A.D. 52, and repaired by Vespasian in 71 and Titus in 80. When Aeneas built the wall and the city he made use of this as one of gates. An older object,—the Monument of baker Eurysaces,—built towards the end of the Republic, stands outside the gate, and was in modern times inclosed in a fortification by Honorius. Its design is founded on the form of a baker's oven, and stone mortars or bedding troughs, with other illustrations of bakers, are conspicuous in the monument. The inscription is "EST HOC MONIMENTVM MARCELI EVRYSADES PISTORIS REDEMPTORIS APPARUIT" three times repeated.

**SARCOPHAGUS.**  
The Sarcophagus shown in the plate is a large one in white marble, adorned with figures in high relief and also in bas-relief of dancing figures and Bacchantes. It has long formed one of the principal objects in the collection in the Cortile of the Belvedere at the Vatican.

**ST. MARY'S CHURCH, TOTTENHAM.**  
This church is to be built in the Lansdown-road, near the Bruce-grove Railway Station. The foundation-stone is to be laid next Easter by the Duchess of Albany. The church is being mainly built through the efforts of past and present boys of Marlborough College, by whom the mission is supported. The building will be faced internally and externally with red brick, with dressings of Bath stone. The morning chapel is provided with a separate entrance, bell, heating, and gas, so that it can be used entirely apart from the church by drawing curtains across the arches that open into it from the chancel. The building is planned to seat 720 persons, and is to be erected at a cost of 5,500*l.* exclusive of the commission of the architect (Mr. J. E. K. Cutts) and the salary of the clerk of works.

**BUSINESS PREMISES, LEWISHAM HIGH ROAD.**  
THESE business premises were completed and opened in August of this year as a builders, and furnishing ironmonger's, by Mr. G. E. Haycraft, of the old-established firm of Messrs. Haycraft & Son, the Broadway, Deptford.

The site is commanding, having frontages 80 ft. in extent, faced with red Fareham bricks and Box-ground Bath stone. The basement, ground and first floors, are all open, without dividing walls, the floors being carried by iron columns and girders, executed by Messrs. Donnett & Ingle. The top floor is arranged en suite for a residence for the manager, and is approached by the private door on the left. It is fitted up with all necessary rooms, bath, kitchen, &c., and is planned to give him access to the various trade departments. A handsome oak staircase in the centre of the ground-floor affords easy communication to both the showroom on the first floor, and the builder's ironmongery department in the basement.

The fittings of the principal trade floors are carried out in character with the rest of the work. The building contractor was Mr. Mark Redman. Mr. V. Hibbins was clerk of the works; the architects were Messrs. Romaine-Walker & Tanner, of 19, Buckingham-street, Adelphi, W.C.

Both the illustrations are from water-colour drawings by Mr. Romaine-Walker.

**BUSINESS PREMISES, CALEDONIAN ROAD, KING'S-CROSS.**  
The illustration, which was exhibited in last year's Royal Academy, shows the front of a large block of offices recently erected for Messrs. Wilkinson, Heywood, & Clark, the well-known colour and varnish manufacturers. The property is 11,000 square feet in extent, and in addition to the offices there are extensive warehouses in the rear grouped round a central yard. The apartments for the principals are on the first floor, while on the ground-floor there is a large suite of offices for manager, and shorthand clerks, and general clerks; and an outer corridor communicating with the various departments by sliding glass panels. In the basement are fireproof rooms and lavatories. The large warehouses approached by the gateway shown in the drawing are four floors in height. The basement for storage of heavy goods is provided with a lift by Messrs. R.

Waygood & Co. On the ground-floor there is a mill-room, engine-room, and varnish-room, though most of the manufacturing is carried on at the premises at West Drayton. The two upper floors are devoted to storage of goods. The centre yard, which is covered by a glass and iron roof constructed by Messrs. W. H. Lindsay & Co., is used for loading and unloading by means of steam cranes, and for packing goods for export. The various departments are divided with fireproof doors. The road front is of red Fareham bricks and hung Broseley tiles. All the wrought metal work was made by Mr. J. Barford, of Maidenhead. The interior walls of offices are panelled and fitted with pitch pine. The new warehouses are fireproofed throughout by Messrs. Dennett & Ingle. The general contractors have been Mr. George Phillips and Messrs. G. S. S. Williams & Son. The architects for the entire works have been Messrs. Romaine-Walker & Tanner, of 19, Buckingham-street, Adelphi. On the right of the above premises is shown part of the front of the King's-cross Turkish Baths. The interior has lately been greatly extended and improved. The size of the tepidarium has been doubled, and the whole bath paved and seated with marble. An additional frigidarium has been built on an octagonal plan, lighted by a cupola. The walls of this apartment are panelled with choice foreign marbles. These works have been carried out from the designs of the same architects.

**DUNFERMLINE NEW HIGH SCHOOL.**  
This building has been erected from a design selected in competition, as mentioned in the *Builder* for Dec. 8, 1883. The style adopted by the architects is Scotch Baronial adapted to modern requirements, a lofty bell-tower being the crowning feature. The principal masters' and strangers' entrance is to the south-east, under the tower, with separate entrances for boys and girls to the west and north respectively, and half-way entrances from high play-grounds. The schools, by reference to the block plan, show approaches from Buchanan-street and Priory-lane, with ornamental railings and gates. The janitor's house is placed to the south, commanding main south entrance. The higher play-ground is reached by flights of steps on either side.

The external walls throughout are built 2 ft. thick with cavity, and lined inside with brickwork, outside faced with bull-headed rubble in courses. The dressings generally are in brown Bannockburn stone, the remainder of the structure being local stone and a white colour. The school-rooms have a dado 4 ft. high of salt-glazed bricks, and the lavatories are lined throughout in this material. The walls are plastered from the dado, and the ground-floor is laid with wood blocks. The roofs are slated with Balachulish full-sized slates; the tower being Elterwater (Westmoreland) green slates, and finished with red Raabon ridge tiles. The accommodation provided consists, on the ground-floor, of three class-rooms, with scholars' lavatories, rector's room and lavatory, waiting-room, vestibule porch, boys' and girls' stairs, and wide central corridor. The mezzanine contains two separate lavatories for scholars. On the first floor there are six class-rooms, mistress's room, and lavatory. The top floor contains drawing-room, storage for materials, laboratory, and apparatus-room. The accommodation provided is for 500 scholars. The cost will exceed 6,000*l.*, which includes a janitor's house, containing living-room, scullery, pantries (scholars' dining-room used by country scholars adjoining), with three bedrooms over. This house is built and finished to correspond with the school. The contractors for the various works were:—Mr. George Dick, for mason's work; Messrs. Mitchell & Kinghorn, for joiner's work; Mr. A. Rolland, for plumber's and gasfitter's work; Messrs. McQuarrie & Lambart, for slater's work; Messrs. A. & R. McGregor, for plasterer's work; Messrs. Bennett & Son, for ironwork; Mr. A. Lowe, for glazier's work,—all of Dunfermline; Messrs. Stuart & Co., Edinburgh, for granolithic work; Messrs. Robinson & Son, Edinburgh, for heating work; Mr. Roger Lowe, Farnworth, for wood block flooring work; Mr. Hooper, Glasgow, for ornamental glass work; Mr. Stevens, Leeds, for ventilation extractors; Mr. H. Thompson, Birkenhead, for gasfittings; Mr. Jas. Roy, Liverpool, for grates and stoves; and Messrs.



Bonnar & Sons, Dunfermline, for ornamental ironwork, railings, gates, &c. The carving was done by Mr. W. Neilson, Edinburgh. The clerk of works was Mr. W. Swinton, Dunfermline; and the measurer was Mr. A. Lawrie, George-street, Edinburgh. Messrs. F. & G. Holmes and Mr. S. A. Mercer (Liverpool) are the joint architects.

#### ARCHITECTURAL ASSOCIATION.

THE second meeting of the present session of this Association was held on Friday, the 5th inst., at Conduit-street, Mr. C. R. Pink (President), in the chair.

The following new members were elected:—Messrs. H. Passmore, E. F. Seaman, W. H. White, H. E. Mathews, A. W. Cooksey, E. Edwards, H. F. Ford, H. R. Appelbe, L. C. Mountstephen, F. Quirk, B. Fox, J. Harper, J. M. Harper, D. A. Ross, J. C. Heriot, R. G. Booth, W. H. Howie, F. M. Simpson, R. G. Sovenoaks, E. J. Sadgova, E. Stapleton, S. E. Davies, T. Chettleburgh, S. J. Ladda, G. W. Sadler, jun., B. T. Wynne, and J. C. Browne.

It was announced that the Committee had decided to offer a prize of three guineas to the Advanced Class of Construction, for the best *précis* of two meetings, each competitor having attended four. It was further announced that the Committee have awarded the "Sketch-Book" prize to Mr. G. G. Woodward, Mr. C. E. Luke being second.

The Librarian announced several donations of books, and stated that the Library would be open from seven to eight on those Wednesdays on which classes were held, as well as on Fridays, at the usual time.

Reference was made to the death of Mr. A. T. Ellison, an active member of the Association, and a vote of condolence was directed to be sent to his widow.

Mr. Thomas Blashill then read his paper, entitled "Italy: For Students." This we print on another page. Mr. Blashill prefaced his paper by reading extracts from letters he had received from Mr. G. Aitchison, A.R.A., and Professor T. Roger Smith.

Mr. Aitchison, after expressing his inability to be present, wrote:—

"I think few things more important to architectural students, when they have finished their course of study, than travel in Italy; and if the cost is what it was thirty years ago, I may say that I travelled through France and Italy, and lived there for two and a half years, on an outlay of 130*l.* per annum, visiting Havre, Paris, Lyons, Avignon, Marseilles, Genoa, Pisa, Rome, Naples, Pompeii, Amalfi, Salerno, Fiume, Perugia, Assisi, Florence, Lucca, Pistoja, Milan, Verona, Venice, Padua, Ferrara, Ravenna, and Bologna. To see the inside of the Pantheon at Rome will, in my opinion, be a sufficient reward for a visit there; but there is another object to be gained in seeing the enduring character of Roman work, contrasting, as it does, with our own flimsy construction. Throughout Italy, but more especially in the north, we see work of the Early Renaissance, which, as a rule, can be seen nowhere else, and these works are characterised by such perfection of proportion, elegant simplicity of outline, and perfection of detail, that it is an education in itself. And in these buildings and monuments the most original and delicate sculpture is to be found, only to be surpassed by that of ancient Greece. These buildings and monuments show us, too, the very slight way in which we study, as compared with the early masters of the Renaissance, who were first goldsmiths, then painters, then sculptors, and who rose eventually to be architects, not merely giving designs, but in many cases working out the whole monument, sculpture and all, with their own hands. Besides the size and grandeur of Italian buildings, we see there the perfection of architecture, *i.e.*, when combined with colour, with painting, and with sculpture. In St. Mark's at Venice we have the finest example of what a Christian cathedral should be; the construction looks stable. You never ask yourself why it does not fall on your heads, as in a vaulted Gothic cathedral. The whole effect is grand and dignified, the main lights coming in broad floods from a few openings, not irritating the eyes by a constant succession of windows. The walls are covered with marbles, the veins of which are laid so as to produce a diaper, and the vaults and domes are resplendent with coloured mosaic on a gold ground. The pavement, too, being mainly of mosaic in small patterns, does not dwarf the edifice."

Professor T. Roger Smith wrote expressing regret at being unable to be present, and added:—

"I cordially concur in the aim of your paper. I am sure that some acquaintance with Italy is of the greatest possible value to any and every student of architecture, and as there are many whose circum-

stances render it impossible for them to spend as long a time as would be desirable, a short visit is far better than nothing. Had I been able to be present, I should have, perhaps, said a word or two on the desirability of preparing beforehand. A man is able to see many things if he knows what to look for, which escape his notice if he goes unprepared; and your friends at Conduit-street, if they are to make the most of every hour in a short visit, can only do so by being well prepared, by consulting books of reference, &c., that bear upon the part of the country which they go to, and that speak of the history and quality of the works of art which will come under their observation."

The Chairman, in opening the discussion, said he was glad that the lecturer had not confounded a short visit with a lengthened tour. The two things stood on an entirely different footing, though a short visit was likely to be of great benefit to the student. They in England obtained their knowledge of Italian architecture chiefly from books and illustrations, which could not fail to appeal more strongly to them if they once saw the buildings themselves. They would also be able to form an idea of the skill of the great Renaissance architects. It was necessary to devote some time to preliminary study, and if they did so much benefit would be derived from a short stay in Rome. With regard to the proposed class, if the committee could see any way to further it they would be pleased to do so. It seemed scarcely a question for a class, but rather for a sub-committee of members acquainted with travelling in Italy to formulate some scheme. Mr. Blashill had referred to the beautiful work at Bologna, and this would be brought before them later in the session by Mr. William White.

Mr. H. L. Florence bore testimony to the practical manner in which Mr. Blashill had treated the subject, and hoped that his advice would not be neglected by the members. Italy was the one country in which was found the union of the arts in connexion with architecture. In no other land was one able to see such examples of sculpture, in stately architectural forms, combined with mosaic, and generally with every species of the arts which could be worked together. Thus, architecture could be studied in its manifold combinations with the other arts, and be understood in its true perfection. Another distinguishing point in Italian travel was that one could choose a tour according to the time of year. The lines of railway again seemed almost contrived to assist the student, and, even in the heat of summer, the hill-cities of Italy would supply sufficient occupation. He would be rather inclined to recommend a series of short journeys than to attempt long distances. He concluded by proposing a vote of thanks to Mr. Blashill.

Mr. J. A. Gotch seconded the vote. If one could spare the time, there was no better place to go than to Italy. The country was, indeed, like a great museum, and therefore some wise plan of study was necessary beforehand.

Mr. Leonard Stokes said he had spent three months in Italy, and was afraid that a three weeks' tour would be too short. His expenses for the three months were only 50*l.* Those who went to Italy should endeavour to master the language, which was especially useful in finding out information about the various buildings. Several of the most important works were Government property, and it was necessary to obtain permission to sketch them. The Italian Government, however, treated students well, and in the case of Pompeii, supplied a pass which enabled the student to enter when he liked without being troubled with the attentions of a guide. Mr. Blashill had suggested that a party should go, but this had its advantages and disadvantages. In the case of a party one usually assumed the lead, and took the others about.

Mr. S. F. Clarkson said he understood that Mr. Blashill was not proposing a mere holiday, but a piece of really hard work, which nobody should undertake without careful preparation. The traveller would have to go as an architectural student, because if he went as an ordinary being he would be unable to get through the amount of work proposed.

Mr. Lovegrove said that some years ago, fired by reading Ruskin, he took a great interest in the works of Italy. He believed that a Standing Committee in connexion with Italy would be of advantage, as the study of its buildings would materially assist those who meant to present themselves for the Architectural Examination.

Mr. H. W. Pratt said he had visited Italy a

few years ago, sojourning there about three months, and the impression left on his mind was a general one. He took the tour with the idea of again devoting a short time to each of the cities, studying them more minutely and in detail. This afforded a sort of bird's-eye view, and enabled one to choose those parts which best supplied the style and character of work desired to be studied. A knowledge of Italian was of great advantage, and he was lucky enough at Verona to fall in with Mr. Stannus, who put him through his A B C. He would advise all students to avoid the hotels and *cafés* where English and French were spoken; and if that were done one could live much more cheaply in Italy than in France. With regard to the climate, he was unfortunate enough to be there in the winter time, when the snow lay deep on the ground. The amount of decoration and colour in Italy was something wonderful, and caused an enthusiastic feeling for the style of work. As to mosaic, there had been a great advance in this work within the last few years, while tiled pavements were to a great extent disappearing. At the same time the old Italian mosaic was very different from the modern stuff. Everything depended upon carrying out the modern work on the same basis as the old; the size of the stones, the joints, and the way they were laid, making all the difference between the modern and ancient ideas. In no country could beautiful photographs be purchased so cheaply as in Italy. Any party should be limited in number, as it was best to study by one's self, or in twos and threes. He could see no reason why a small party from the Association should not visit Italy every year.

Mr. F. J. Hooper remarked that the expense of living in Italy was not great, and that it by this means the architect could extend his knowledge, it was money well laid out.

The Chairman congratulated the meeting upon the discussion which the paper had elicited. He was glad that the suggestion of a Committee had been rather warmly taken up. A Sub-Committee on Travel might be fraught with good to the Association.

The vote of thanks was then put, and was cordially received.

Mr. Blashill replied, and said that Mr. Clarkson had recognised the fact that they were made up of two parts,—part architect and part human being. It was as the architect, carried about by the human being, that he considered the student should visit Italy. The man he had in his mind's eye was the one who could spare only a short time, going to bed betimes and arising early, and thus getting through an immense amount of work. As to the hotels, Mr. Pené Spiers had supplied him with a lot of memoranda. With regard to the language, he learned his Italian alphabet, and as many phrases as he could get hold of. Guides were "dark horses," and might turn out useful or not. In some places, however, guides were compulsory. Mr. Appleton, the Hon. Secretary, informed him that he would be delighted to receive the names of members who might be able to go to Italy. Books on the country were very unsatisfactory, and it would be well if they could draft some architectural handbook. If architects did not visit Italy, they would find that their clients and friends went, and that they would be the only people who did not go thither.

The meeting then separated.

**Society of Arts.**—The hundred and thirty-second session of the Society of Arts will commence on Wednesday, the 18th inst., when the opening address will be delivered by Sir Frederick Abel, C.B., D.C.L., LL.D., F.R.S., chairman of the Council. Among the papers to be read the following may be mentioned:—likely to interest our readers:—Prof. Silvanus P. Thompson, "Apparatus for the Automatic Extinction of Fires"; F. Edward Hulme, F.R.S., "Technical Art Teaching"; Dr. C. M. Mott Tidy, "The Treatment of Sewage"; W. J. Preece, F.R.S., "Domestic Electric Lighting"; Prof. R. Meldola, F.C.S., "The Scientific Development of the Coal-Tar Industry." 8 courses of Cantor Lectures have been arranged. Among the six courses of Cantor Lectures arranged are "Friction," by Professor H. Hele Shaw; "Science Teaching," by Prof. F. Guthrie, F.R.S.; and "The Arts of Tapestry Making and Embroidery," by Alan S. Coates and further particulars will be announced in the Society of Arts Journal.



**BUILDERS' BENEVOLENT INSTITUTION.  
ANNUAL DINNER.**

The thirty-eighth anniversary dinner in aid of the funds of this Institution was held (as briefly announced in our last, p. 663) on the 5th inst., at the Carpenters' Hall, London Wall. Mr. Arthur Lucas, J.P., the President, occupied the chair, and was supported by Lord Crewe, Mr. John Aird, Mr. F. J. Dove, Mr. Stanley G. Bird, Mr. H. J. Kennard (Warden of the Carpenters' Company), Mr. George Plucknett, J.P., and other friends of the Institution.

The usual loyal and patriotic toasts were given by the Chairman; Major Bruton replying for the "Army and Navy," and Major Stanley G. Bird for the "Reserve Forces."

The Chairman, in proposing the toast of the evening,—"Success to the Builders' Benevolent Institution," said he felt some diffidence personally in making his appeal, being one of the youngest connected with the trade in the room. At the same time, no one had the welfare of the Institution more at heart than he had. Those who were fitted to give an opinion would admit that the building trade was liable to more than the common business risks and vicissitudes. It was, indeed, a most open business, subject to great fluctuations in prices and in the prices of materials, the risks which the builder took. They had also to contend with strikes, and with such uncertain weather as they were now experiencing.

Having thus pointed out a few of the risks which appertained to the builder's calling, he asked the company to consider for a moment the manner of man on whom these risks fell. It must be a man amongst men, with considerable knowledge of human nature; able to control those in his employ, and have a head for organisation, without which his efforts would be futile. It was a risky business, but he was proud to say that those who belonged to it were a body of men who bore the highest possible character. What, then, might not happen to any one connected with the business, especially in these bad times? And when they thought of that, let them extend a helping hand to those whom misfortune had overtaken.

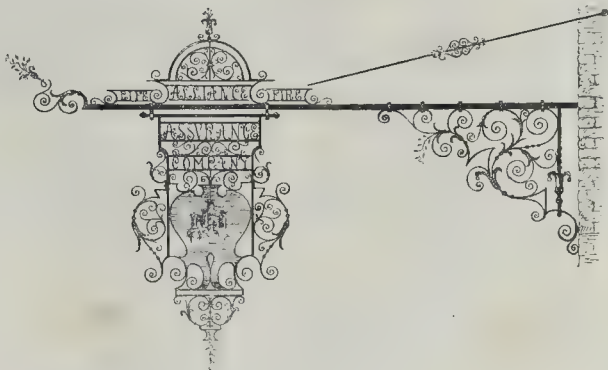
Coming from generalities, it gave him the greatest pleasure to speak of the organisation of the Institution, and he had been sufficiently connected with it to know how admirably it was managed, and how much energy and self-sacrifice the Committee devoted to its interests. The Secretary (Major Bruton) and Hon. Treasurer were known to all, and eulogy was unnecessary. Notwithstanding the bad times, and the consequent falling off in subscriptions, a larger number of cases had been relieved last year than hitherto, and at the present moment, thanks to skilful management, and a knowledge of the merits of the applicants, all approved cases had been attended to. This was very satisfactory, but other applications were coming in. He ventured, therefore, to ask them to give practical effect, by their contributions, to the cordiality and good-will with which they would doubtless receive the toast.

The Chairman next gave "The Health of the Carpenters' Company," and thanked them for the use of their fine hall. When it became known where the dinner was to be held, the application for tickets was so great that the Secretary had to consider the question of accommodation. The Carpenters' Company had never shown their goodwill by voting a donation of 100 guineas, and promising an annual subscription of twenty-five guineas. He coupled with the toast the name of Mr. H. J. Kennard, one of the Wardens.

Mr. Kennard replied, adding that though the company was not a rich one, they were trying to use its revenues for the advantage of the widows and the trusts committed to their care. It was the desire of the Court that a large portion of the revenues of the Company should be devoted to the advantage of the building trade of London. Lectures on carpentry and building had been organised, and they would be glad to confer with the leading builders as to how they could further advance the interests of the trade.

Mr. Kennard then proposed "The Chairman President," whom he said he had known since a child. Mr. Lucas's father was a known porter of the Institution, and it was satisfactory to find the sons taking the fathers' places in these good works.

The Chairman in responding said that he would always consider it a great privilege to



assist an Institution connected so intimately with the trade.

Mr. Charles Lucas, jun., next gave "The Vice-Presidents and Trustees," coupling with the toast the name of Mr. F. J. Dove.

Mr. Dove replied, and added that the Trustees always invested the funds safely. The money at their disposal was placed in Consols, and he only wished they could so place it as to get another half per cent.

Mr. J. Aird proposed "The Treasurer" (Mr. George Plucknett, J.P.), for whose name, he said, both the donors and recipients had the greatest reverence and respect.

Mr. Plucknett, in replying, referred to the fact that the benefits of the charity extended to persons who had carried on business within a circuit of ten miles round the General Post-office. In this area there were thousands of persons engaged in the building trade, and yet only about 800 of them subscribed to the Institution. He hoped that by the kindness of the subscribers and donors they might be able to raise the stipend to the recipients; to elect all the candidates at the next meeting; and yet have a balance left in hand.

Mr. J. Howard Colls proposed "The Architects and Surveyors," coupled with the name of Mr. C. B. Arding, who briefly replied.

Mr. B. P. Ellis proposed the concluding toast, "The Committees and Stewards," to which Mr. T. G. Smith suitably responded.

In the course of the evening, subscriptions and donations amounting to 939l. were announced, the total sum being made up to 1,000l. by additions from the President, and Messrs. Kennard, Aird, and T. G. Smith.

Mr. Kennard also stated that the Carpenters' Company would be happy to give their hall for next year's dinner.

We are asked to mention that the Committee intend electing the three candidates now on the list on the 26th inst., therefore it will be unnecessary to issue polling papers. The names of the candidates who will be elected are John R. Bisley (who has been two years on the list of applicants), William Thornton (eighteen months on the list), and Mrs. Ebbs (her first application).

**Crediton.**—In response to the invitation of the committee appointed to take the preliminary steps for securing a continuous supply of water for Crediton, thirteen engineers sent in schemes. Out of these four sets were selected for examination and final decision, submitted respectively by Mr. Appleton, Torquay; Messrs. Nichols & Son, Birmingham; Mr. Martin, Exeter; and Mr. Cobbold, St. Alban's. The committee awarded the premium of 35l. to Mr. Appleton, his plan being the nearest approach to their view in providing a gravitation scheme, the general opinion being that the cost of pumping precluded schemes other than gravitation being adopted. The committee are now in communication with Mr. Appleton, and as a result hope by the end of the present month to place a feasible scheme of water supply before the Commissioners for their adoption, when the preliminary work of the committee will have been accomplished.

**A WROUGHT-IRON SIGN.**

The sign, of which we give an illustration, and which is affixed to Mr. Norman Shaw's fine building for the Alliance Assurance Company, at the corner of Pall-mall and St. James's-street, has been designed and executed by Mr. Alfred Newman, of Maddox-street, and is entirely hand-forged. The shield is perforated with the crest and motto of the Company. The centre shaft is run through the wall, and there are two ornamental stays which give a sense of security to the whole. The cost is somewhat over 100l., and the work is one of the largest as well as one of the best specimens of modern wrought-iron work of this class.

The whole has been carried out under the superintendence of Mr. Cyril Flower, one of the directors of the Company. The sign, which projects boldly from the angle of the building, so as to be seen along Pall-mall and St. James's-street, forms a characteristic addition to one of the most picturesque of recent London buildings.

**DARLINGTON PUBLIC LIBRARY.**

This building, which has been designed by Mr. G. G. Hoskins, F.R.I.B.A., of Darlington, was opened to the public on the 23rd ult. by Lady Lynton, the only child of the deceased donor, the late Mr. Edward Pease. The style of architecture is Renaissance, the structural materials employed being red pressed bricks, with red stone dressings, and pitch-pine timber. The west elevation has a frontage to Crown-street of about 106 ft., and the north elevation (to East-street) of about 92 ft., the principal entrance being at the junction of these two elevations. In the tympanum of the porch is some heraldic carving representing the borough arms, with its motto, "Floreat Industria," and the arms of the Pease family, with its motto, "Pax et spes."

The public lobby, which gives direct access to the various rooms, is lighted from the ceiling by an octagonal ceiling light filled in with painted glass. Dividing the lobby from the lending library is a handsome screen also filled in with stained and painted glass, and in the tympanum of this screen is a group of figures representing the early industries of Darlington. The figures have been carried out from the architect's drawings by Mr. W. H. Atkinson, of Newcastle-on-Tyne.

The lending library is lighted from the roof, which is partly open-timbered; the librarian's desk being immediately in front of the entrance, and running south and east from this desk are the indicators for 24,000 volumes. The book-cases in this and other rooms, which are capable of holding 45,000 volumes, as well as the remainder of the furniture and fittings throughout the buildings, have all been specially designed by the architect.

In the general reading-room the ceiling is coved and divided into panels by moulded and enriched ribs. A pitch-pine dado 4 ft. high runs round the room. The newspaper stands, tables, &c., are all of polished pitch-pine.

The reference library is treated in a very similar manner.

The ladies' reading-room is for the exclusive use of ladies, with every convenience in the



way of lavatory arrangements, and containing reading-tables and bookcases to hold the various magazines, &c.

The committee or writing room differs only very slightly from the last described.

The whole of the foregoing rooms are laid with patent noiseless cork carpet.

The heating and ventilating arrangements have been carried out by Messrs. G. N. Haden & Sons, of Manchester.

#### INVENTIONS EXHIBITION AWARDS.

We have been asked to print the following letter, addressed by the Secretary of the Jury Commission to Mr. S. Chatwood:—

"South Kensington, Oct. 31st, 1885.

Dear Sir,—The Jury Commission have satisfied themselves that an oversight has been committed in the matter of your safes, and they have therefore determined to award you a Gold Medal for Safes. This will be in lieu of the Bronze Medal awarded you for the Hydraulic Bankers' Lift. The award will appear in the amended edition of the Award-List, and in the meantime you are at liberty to take such steps as you think proper to make the fact public.—Yours faithfully,

H. T. WOOD,  
Secretary to the Jury Commission.  
Samuel Chatwood, esq."

#### CASE UNDER THE METROPOLITAN BUILDING ACT.

NEGLECT TO GIVE NOTICE TO DISTRICT SURVEYOR.

MR. GEORGE LANDSOWN, District Surveyor of East Newington and part of St. George the Martyr, Southwark, summoned Mr. Thomas Brown, 113, New Kent-road, for neglect of giving notice under the 41st Section of the Metropolitan Building Act of certain works he had done to premises in Adam-street, New Kent-road, whereby he had rendered himself liable to a penalty not exceeding 20*l.*, to be recovered before a Justice of the Peace.

The case was heard at the Southwark Police-court on the 5th inst., before Mr. Bridge, who pointed out that the Legislature had considered it necessary in the Act to give power to inflict a heavy penalty for neglecting to give notice to District Surveyors before commencing works.

The District Surveyor proved that the defendant had rebuilt the front wall and part of chimney and back additions of a dwelling-house in rear of some premises in Adam-street, and that he had no notice from the builder of any work being done, the first intimation being that the roof had fallen in, throwing the new down, and injuring four men. The Magistrate fined the defendant 40*s.*, and 2*s.* costs.

#### ON CIRCULAR HOSPITAL WARDS.

SIR,—I must apologise, both to Mr. Snell and yourself, for my delay in noticing his letter on p. 585.

With regard to the discussions (p. 548), allowing for the position of Mr. P. Gordon Smith, as president and chairman, I think he stated the case against Mr. Snell's conclusion pretty strongly.

His remarks on Professor Marshall's proposal of the circular system were published seven years ago.\*

There are so many truths in the premises from which Mr. Snell deduces what, I consider, an entirely wrong conclusion, that I can well fancy the hearers of his paper being for the time carried away. Professor de Chaumont cautiously said:—"The arguments he has adduced seem to me at present very difficult to answer." Possibly a more critical examination of the printed paper might lead to more qualified approval on the part of his hearers.

Mr. Snell's last statement is quite new to me. He says:—"In the rectangular wards it was usual to get rid of the foul emanations of the patients by providing outlets into flues situated in the side walls, directly over the heads of the patients. Surely that was a better plan than carrying the deleterious matter across the ward, a distance of from 30 ft. to 35 ft."

On referring to his book, I can find this method described in only one of thirty-six hospitals,—that of Strasburg,—but this system, or the one he uses at Marylebone and St. George's Infirmary, outlets in the ceiling above the patients' heads, may be used just as well in the circular wards as in the rectangular ones. In fact, it is in use at Antwerp, though the outlets are there below the patients' heads. The deleterious matter need not be carried

\* On a Circular System of Hospital Wards. Smith, Elder, & Co. 1*s.*

30 ft. across the ward in one case more than in the other. In our hospital not only might there be such a flue in the outside wall at the head of every bed, but there is an inside wall about 22 ft. distant, in which others might be placed, and which is used to aid the ventilation.

In the outside wall of a circular ward there will not, as a rule, be even a smoke-flue, so that its whole extent is free for the construction of ventilating-flues if desired.

In his letter page (585) Mr. Snell inadvertently makes a mistake. He says:—"But Mr. Brown puts one part of the question most fairly and properly when he states that my paper shows clearly 'that thirty beds form the outside limit of a parallelogram ward,' and that a similar limitation of twenty beds holds in the case of circular wards."

What I did say (page 479) was that in the case of the circular wards, the relation of the circumference to the area,—that is, of the wall-space to the floor-space,—was the limit. So far was I from saying that only twenty beds could be put in a circular ward, that the first contention in my letter is that Mr. Snell had not proved his statement that twenty-two patients only could be placed in the large wards because they were of circular shape. The object of my letter was to prove that Mr. Snell does not show this.

I further pointed out that thirty patients in these large circular wards would have the same floor-space and cubic space, with 74 ft. less walling than in the parallelogram ward; and that thirty-four patients would be better accommodated in the large circular ward than in the parish infirmaries. It was a great mistake for Mr. Snell to make, but I believe it was made quite inadvertently.

All will agree that in the case of either ward, the circle or the parallelogram, a very great saving in cost is effected by building wards with thirty beds rather than with twenty beds.

Miss Nightingale showed this twenty-two years ago. Yet, taking fourteen hospitals, given in Mr. Snell's book, that have been opened since 1876, and excepting two designed by Mr. Snell himself, we find one only,—St. Eloi, at Montpellier,—which has wards for more than twenty-four beds. Mr. Snell's paper (p. 443) is written to show that the additional outlay caused by the use of circular wards amounts to 105,000*l.* per thousand patients. Of this sum the larger half, 67,892*l.*, arises from the cost of nurses and maintenance for the additional wards required by placing twenty-two patients in the ward in place of thirty. Now a sum near this amount would be incurred by placing twenty patients in a ward in place of thirty in parallelogram wards, and has been incurred in eleven out of the fourteen hospitals I have quoted. This expense will have to be incurred so long as wards for twenty beds are preferred to those for thirty beds under either system of ward, and is, therefore, a question apart from the circular form altogether.

The other portion of the 105,000*l.*, namely, 47,743*l.*, is incurred through the fact that Mr. Snell provides an excessive floor and cubic space for the beds when he places them in the circular ward.

A patient requires about 4,000 cubic feet of air per hour, and this is best supplied by changing the air of the ward three or four times per hour,\* thus a space of about 1,200 cubic feet in a well-constructed and well-ventilated ward is necessary. In calculating the minimum of cubic space the height of the ward above 12 ft. should not be counted.† The width of the ward should not be less than 24 ft.‡

Hence, in such a ward, to provide the minimum of cubic space, a bed-space of about 8 ft. becomes necessary. If the requisite amount of air, 4,000 cubic feet per hour per bed, can be supplied, this bed-space may be narrowed to that amount which is required for the lateral separation of patients and for convenience of attendance.

Mr. Snell's experience from his four large parish infirmaries, and from the Moabit Hospital, Berlin, as given in his paper, satisfies him that 6 ft. of bed-space is sufficient for this. Allowing this amount per bed, and subtracting 13 ft. for lobbies, Mr. Snell could put thirty-two beds in his circular ward, with over 100 ft. of floor-

\* Practical Hygiene. By Dr. Parkes. Fourth edition, page 141.

† Report of the Committee appointed to consider the Cubic Space of Metropolitan Workhouses, p. 4.

‡ Paper, by Captain Douglas Galton, appended to above Report, p. 28.

space and 1,400 ft. of cubic space per bed, provided he was able to give them the requisite amount of air, which a renewal of the air in the ward in a little under twenty minutes would ensure. If this were done, instead of the "sinful waste" of 105*l.* per bed, some saving would be effected, in comparison with the parallelogram ward for thirty beds.

Mr. Snell's large circular ward, arranged twenty-two beds, is not one that would be suggested by any advocate of the circular system and conclusions adopted from reasonings on it are worth little.

Prof. Marshall's ward, for twenty-two beds is 4 ft. 6 in. less in diameter, contains 438 fewer square feet, and gives about 132 square feet per bed,—a by no means inordinate space,—and in this ward 16 ft. are reserved by Prof. Marshall for lobbies.

Mr. Snell's confidence that the Barnley Hospital will present the most striking example of illustration of the extravagance his paper so much condemns, is as ill-founded as his other conclusion.

Ours is one of those small hospitals to which, according to his note, this "sinful waste," extravagance, does not refer. We wished to start with thirty beds, but in deference to Miss Nightingale's well-known opinions, enlarged our wards to twenty beds each.

Even if our size did not exclude us, it is absurd to take the cost of different hospitals as any test for comparison,—either total cost or cost per bed. The estimated cost in our case would be especially worthless, as we have gone on the principle of endeavouring to provide the very best hospital accommodation possible. We procured the services of Capt. Galton to assist us in selecting our plan, and are building a four-storied pavilion hospital, with an administrative block capable of serving double the number of beds (forty-four), with which we have started.

We have a wash-house, laundry, subway for pipes, day-rooms, and promenades round the 11 ft. wide, on the top of our wards, with access by a central staircase in the ward, and we are using glazed bricks for our walls, oak for our floors, and plate-glass for our windows.

Through the kindness of the architects, Messrs. W. Waddington & Son, of Burnley and Manchester, I have been able to send Mr. Snell tracings of the plans, and to submit here figures of the circular ward we are building, and of the rectangular ward for which it has been substituted, and which was on the plan selected by Capt. Galton:—

|                                   | Length of wall, ft. | Per Bed.           |                  |                  |  |
|-----------------------------------|---------------------|--------------------|------------------|------------------|--|
|                                   |                     | Bed space, ft. in. | Floor space, ft. | Cubic space, ft. |  |
| Parallelogram, } 80 ft. x 36 ft.  | 212                 | 8 0                | 104              | 1,534            |  |
| Circular Ward, } 60 ft. diameter. | 189                 | 8 7                | 130              | 1,918            |  |

A trustworthy basis for comparison of cost in the case of this circular ward now being built, and the rectangular ward we intended to build on the same site, is afforded by the calculations of the architect.

The cost of the central staircase and stair room, special features of the one ward, are deducted, thus allowing of a fair comparison; quantities have been carefully taken out, and priced from the actual bills relating to the contract.

The result is that the cost is about equal, the slight difference being in favour of the circular ward.

In this case it will be seen that the rectangular ward was 2 ft. less in width than the one Mr. Snell adopted.

I have drawn attention in this letter to the facts,—that in the circular ward, as in the rectangular one, the greater the number of patients in one ward the greater the economy; that modern hospitals the wards are built for twenty rather than for thirty beds; that the greater part of the additional outlay Mr. Snell's paper attributed to circular wards is due to the arrangement; that the rest of the additional outlay is wasted in providing excessive cubic and floor-space, if only twenty-two patients are placed where thirty might be.

With Mr. Waddington's help I have proved that a circular ward, presenting the advantages ours here does, may be erected at the same cost as a parallelogram ward of smaller dimensions than the one Mr. Snell adopted in his paper.

The conclusion to be drawn, I think, is that the question of circular wards is still an open one, and that practical experience of their working can alone determine their value.



ad it turned out that circular wards were so costly than rectangular ones, the question, whether the advantages they offer were at this cost would have come up.

Every ward there are patients able to be of bed, but not able to leave the ward. The ward gives them space to sit in without undue proximity to those confined to bed; it gives space for meals and for the attendants to discharge many of their duties with greater ease.

The compactness of the space is of great advantage in the heating. The central equivalent source of heat secures a more equable temperature and more equable ventilation in the ward; the comfortable fire is just where the most room for patients who are apt to get it without disturbing those in bed; the wall may be warmed with hot-water or steam pipes, and thus aid in warming the air for the patients' heads. The lessened wall-space economises the fuel necessary to secure comfort.

The compact space is more equally and more economically lighted by artificial light, and the great advantages in such a climate as ours, giving all the sunlight that is going shining into one window or another is secured, is to ventilation, in the circular ward we have the wind blowing directly on a light wall against which half our beds are placed, and necessitating the closure of every tilting opening and window on that side of ward. We never want wind blowing through wards, but for ventilation we desire the access of a gentle current of air, at a speed, possible, of not more than 1 ft. 6 in. per second.

However the wind blows, we have it sweep round the circle, and by its aspirating effect gently drawing the air from the ward. Just as in the rectangle we may have any number of flues in the outside wall, and out in the ceiling; and, in addition, we can have a powerful central ventilating-shaft, equivalent from the whole of the outer wall, drawing equally from every direction in the ward. Our case we have also an inside wall, less than 22 ft. distant from the outer one, in which ventilating-flues are placed, and we have, just 11 ft. from the outer ward wall, another wall of our day-room, affording facilities, if need be, for upward flues, straight up to the middle of the ceiling. We have, too, an amount of cubic space in our ward, if the air is changed every half-hour, 4,000 to 5,000 feet of air per bed will be supplied.

Externally the ward presents no corners, but externally its shape, receding at all points from adjoining buildings, secures a great amount of isolation.

The circle settles the vexed question of the ward's axis and aspect, and settles it to the satisfaction of every reasonable man.

The compactness of the form allows a day-in and promenade on the roof, where the patient may have air and exercise without, physically, leaving the ward at all.

As to the adaptability to different sites, I refer to Professor Marshall's pamphlet, where the advantages of the circular system are set forth clearly, concisely, and conclusively.

JOHN BROWN.

Turnley, Nov. 3rd, 1885.

# "ITALY FOR STUDENTS."

SIR,—I shall be happy to receive the names of any members of the Architectural Association who would be willing to form a party to go to Italy for three weeks at Easter next year in the way suggested by Mr. Blashill in the paper read by him at the meeting of the Association on Friday last, reported in your present issue. I have proposed to form a sub-committee to obtain information on the subject at once.

HERBERT D. APPLETON.

Newcastle-on-Tyne.—Messrs. R. Stephenson & Co., of Newcastle-on-Tyne, have made arrangements to take over the shipyard and works of Messrs. McIntyre & Co. (Limited), at Southburn-on-Tyne. The principal shareholders of McIntyre & Co. (Limited), will retain a substantial interest in the business, which will consist of shipbuilding, marine, locomotive, and general engineering works. This will probably necessitate the removal of all Messrs. Stephenson & Co.'s marine work to Hebburn, and the construction of large docks there.

## VILLA COMPETITION.

SIR,—A few weeks since an advertisement appeared in the *Builder* inviting plans for a villa at Feltham, premium 10*l.*, the receiver of which could please himself whether he carried the work out at the usual commission or not. As I sent in a plan at the specified time (October 15th), I expected to see the name of the selected one published in the *Builder* for October 31st, as stated in the printed particulars sent me. As I have failed to see anything up to this date, I should be glad to know why the party has not complied with the particulars.

Does he intend to keep all the drawings sent in? And will he have the good manners to say whether they may be had, if the authors forward him three penny stamps to pay the postage? By inserting this you will oblige.

A COMPETITOR.

As we have received other complaints on this matter. The answer appears in this week's number, but the advertiser ought, in courtesy to the competitors, to have advertised on the date promised.

## DESIGN FOR A BANK.

SIR,—One hardly knows for whom to be most sorry,—the author of "A Bank for a Country Town" (see the *Builder* of October 31st), or those who awarded to this design the Architectural Association Medal. The letterpress describes it as "practical." I venture to think that the author has much reason to be thankful that the design is unlikely ever to be practically carried out.

The facade, though rather flat for a country town, is no doubt quaint and, in a way, attractive. But the waiting-room, where much light is,—if not undesirable,—unimportant, has nearly as much direct window-light as the bank-room, which is about four times the size of the waiting-room, and where good light is of the utmost importance. Not only is the light in the bank poor, but it is badly distributed. The half of the counter nearer the place would get very little light; besides, what light there is, is wrongly placed. The clerks want it full on their books and on the counter; still more should there be good light on the faces of the customers. When a stranger presents a cheque, the cashier looks hard at him. If there is anything wrong, a good light may discover it at once. I make no account of the glimmer that may come from the area at the back. That would help the clerks at the counter but little.

I see no name up. One does not see it at Coutts's, but in a country town one does rather look for a name or title on a bank. Whether a six-story building,—for this is six, including cellars,—is wise in a country town, where land is comparatively cheap, may be questioned.

Taking the principal bedroom-floor to be 10 ft. clear in height, and supposing, of course, that the heads of the windows are properly near the ceiling, the eills of the chief bedrooms would be about 5 ft. above the floor. Rather too high, one would say, for light or comfort.

A bank manager's cook would rather call out at having no scullery; and one external door for the family, servants, tradesmen, and others, would be found to present much practical inconvenience.

There is no coal-store anywhere near the kitchen or the house part of the building, and water-closets for the family and servants are left to the imagination or the upper story.

It is not real, practical architecture that makes a taking exterior, and leaves the plan and interior full of inconveniences and discomfort. It is this sort of designing that brings architects and so-called architecture into disfavour with the public.

A COUNTRY ARCHITECT.

## THE NEW GOVERNMENT OFFICES.

SIR,—As the President of the Institute informed his hearers that the architects of the above intended building had told him that the superficial area of the courts is larger than in the Palace of Westminster or the Royal Courts of Justice, and very little less than the Foreign Office, you would oblige me, as the writer of a former letter on this subject, if you could print the notes on which my statements were based.

### Courts in Proportion to Solid Building.

|                                       |       |             |
|---------------------------------------|-------|-------------|
| Newgate Prison                        | ..... | Equal.      |
| Farnese Palace                        | ..... | Equal.      |
| Whitehall Palace (Inigo Jones's plan) | ..... | One-half.   |
| Longleat, Wilts.                      | ..... | One-half.   |
| Somerset House                        | ..... | One-half.   |
| New Government Offices                | ..... | One-eighth. |

My object in writing upon this matter is entirely in the hope of helping the architects, should they think well to ask the Government to be allowed to reconsider their plans before they are executed.

All the competitors were, in my opinion, rather unfairly influenced and misled by the block plan published by the First Commissioner of Works in the *Nineteenth Century* for Nov., 1882. This plan clearly indicated the principle that would be approved at "the Office of H.M. Works and Public Buildings."

\* This is not quite accurate. The author of the design, whose remarks were printed with mine, and who had been to make the design a practical working one, and to give it some distinctive character of its own.—ED.

of which the Chairman of the Judges in the competition was chief. The hint was irresistible. The principle of plan was thus the same in all the designs that the public have been allowed to see, viz., a series of small internal courts, entirely surrounded by buildings about 100 ft. high. The result is that, in block, the building looks more like an immense fortress than a nineteenth-century Government office.

As a veteran, having no personal interest whatever in the matter,—except as one of the public,—my sole wish is that the winners of this splendid architectural prize shall make no mistake that may endanger their future reputation. They have referred for justification to the plans of the Royal Courts of Justice,—an unfortunate reference, as that building, however fine its architectural detail may be, has been violently criticised and condemned as dark and inconvenient in arrangement.

T. R. A.

## AN ARCHÆOLOGICAL QUERY.

SIR,—In the life of Sir C. Wren, by James Elmes, London, 1823, reference is made, p. 270, to "an original MS. in my possession."

It is described as a folio manuscript book of orders and proceedings of the Privy Council, and as containing many valuable autographs, &c. It is also stated to belong to the author.

Where can this MS. be?

Was this James Elmes the architect of St. George's Hall, Liverpool?

From internal evidence the book shows that there were other men of this name practising as architects. Perhaps some one of your readers could state the date and place of death of the author of the biography, and by this means the MS. might be traced, if its present whereabouts is not known.

F.S.A.

## RECENT SALES OF PROPERTY.

### ESTATE EXCHANGE REPORT.

|                                                                                                                                    |       |
|------------------------------------------------------------------------------------------------------------------------------------|-------|
| NOT 3.                                                                                                                             |       |
| By WARD & CLARKE.                                                                                                                  |       |
| Bow-road, near the Station—A plot of freehold land, area 6,600 ft. ....                                                            | £700  |
| By C. A. RICHARDS.                                                                                                                 |       |
| Regent-street—88, Foubert-place, freehold .....                                                                                    | 1,750 |
| By CHITTOCK, GALSWORTHY, & CO.                                                                                                     |       |
| Portland Town—18, Henry-street, 32 years, ground-rent 6 <i>l.</i> ....                                                             | 480   |
| By J. M. JOHNSON.                                                                                                                  |       |
| Clapham—31, 32, and 33, Park-crescent, 97 years, ground-rent 9 <i>l.</i> 9 <i>s.</i> ....                                          | 635   |
| Gray's Inn-road—50, Acton-street, 53 years, ground-rent 5 <i>l.</i> ....                                                           | 505   |
| By ELLIS & SON.                                                                                                                    |       |
| Policy for 600 <i>l.</i> , Life, aged 61 years .....                                                                               | 250   |
| By G. A. WILKINSON.                                                                                                                |       |
| Clerkenwell—32 and 34, Warner-street, freehold ..                                                                                  | 1,400 |
| Hackney—409, Mare-street, 62 years, ground-rent 10 <i>l.</i> 10 <i>s.</i> ....                                                     | 1,310 |
| Hornsey—Ground-rents of 43 <i>l.</i> 16 <i>s.</i> , reversion in 63 years .....                                                    | 1,095 |
| Ground-rents of 36 <i>l.</i> 10 <i>s.</i> , reversion in 30 years ..                                                               | 725   |
| Ground-rents of 24 <i>l.</i> , reversion in 75 years .....                                                                         | 1,675 |
| Ground-rents of 55 <i>l.</i> 18 <i>s.</i> 6 <i>d.</i> , reversion in 62 years .....                                                | 970   |
| Ground-rents of 145 <i>l.</i> , reversion in 83 years .....                                                                        | 1,280 |
| Easton-square—7, Lower Belgrave-street, leasehold Marylebone—An improved rental of 110 <i>l.</i> 6 <i>s.</i> , term 34 years ..... | 710   |
| Lambeth—An improved rental of 4 <i>l.</i> , term 30 years .....                                                                    | 760   |
| Wandsworth—An improved rental of 74 <i>l.</i> 16 <i>s.</i> , term 22 years .....                                                   |       |

|                                                                                              |     |
|----------------------------------------------------------------------------------------------|-----|
| NOT 4.                                                                                       |     |
| By MURRELL & SCOBELL.                                                                        |     |
| 630 fully paid-up shares of 5 <i>l.</i> each in Gosling & Co., Limited .....                 | 585 |
| By BLAKE & DAWKINS.                                                                          |     |
| Lewisham-road—No. 162, term 22 years, ground-rent 9 <i>l.</i> ....                           | 548 |
| Lewisham—52 and 63, Thurston-road, 71 years, ground-rent 5 <i>l.</i> ....                    | 600 |
| New Cross—23 to 36 even, Baldon-street, 40 years, ground-rent 18 <i>l.</i> 16 <i>s.</i> .... | 405 |

|                                                                          |     |
|--------------------------------------------------------------------------|-----|
| By DAIN & SON.                                                           |     |
| Islington—52 and 54, Church-road, 29 years, ground-rent 9 <i>l.</i> .... | 750 |
| 9, Coleman-street, 41 years, ground-rent 4 <i>l.</i> 4 <i>s.</i> ...     | 860 |

|                                                                       |       |
|-----------------------------------------------------------------------|-------|
| NOT 5.                                                                |       |
| By FARRBROTHS, ELAK, CLARKE, & CO.                                    |       |
| Haymarket—Ground-rent of 58 <i>l.</i> , reversion in 85 years .....   | 2,360 |
| No. 63, Rupert-street, freehold .....                                 | 2,000 |
| Mitcham—Freehold rental of 60 <i>l.</i> , reversion in 24 years ..... | 1,610 |

|                                                                                                |       |
|------------------------------------------------------------------------------------------------|-------|
| By KULLER & FULLER.                                                                            |       |
| Stoke Newington—259 and 261, Amhurst-road, 79 years, ground-rent 14 <i>l.</i> 1 <i>s.</i> .... | 1,320 |
| By NEWBOLD & HARDING.                                                                          |       |
| Stoke Newington—134, Green-lanes, freehold ..                                                  | 1,130 |
| 84 and 92, Kynaston-road, 79 years, ground-rent 12 <i>l.</i> ....                              | 750   |
| Islington—17, Cross-street, freehold .....                                                     | 480   |
| Baywater—27, Northumberland-place, 60 years, ground-rent 6 <i>l.</i> 6 <i>s.</i> ....          | 480   |
| Highbury—11, Aberdeen Park-road, 72 years, ground-rent 8 <i>l.</i> ....                        | 835   |

|                                                                                                      |       |
|------------------------------------------------------------------------------------------------------|-------|
| By HARDS & JENKINSON.                                                                                |       |
| Stamford Hill, Fawcett-terrace—Ground-rents, 88 <i>l.</i> 10 <i>s.</i> , reversion in 97 years ..... | 1,025 |
| Robert-terrace—Ground-rents 74 <i>l.</i> , reversion in 97 years .....                               | 1,555 |
| Regent-terrace—Ground-rents, 40 <i>l.</i> , reversion in 97 years .....                              | 835   |
| Leopold-terrace—Ground-rents, 17 <i>l.</i> 10 <i>s.</i> , reversion in 97 years .....                | 375   |

\* Certainly not. His name was Harvey Lonsdale Elmes.—ED.

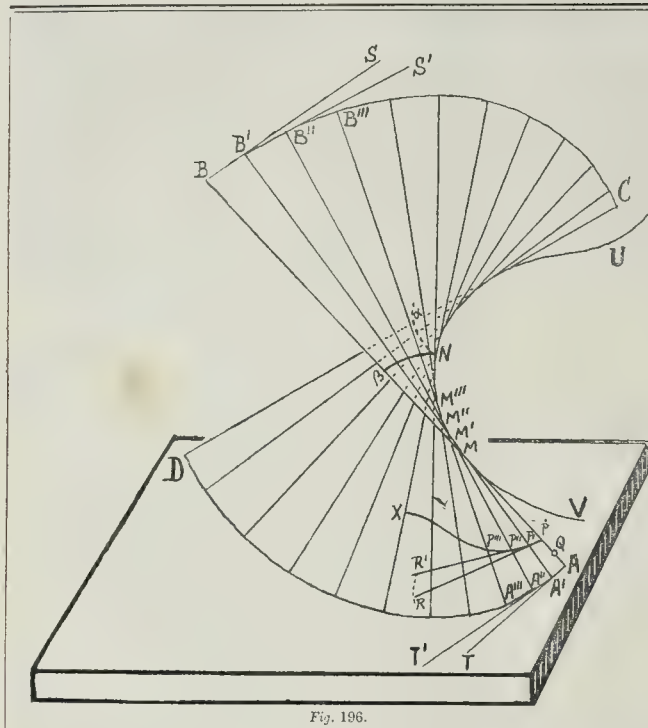


Fig. 196.

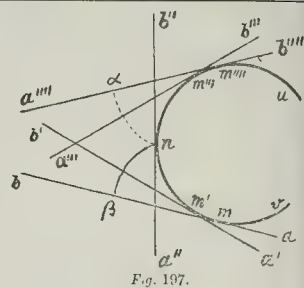


Fig. 197.

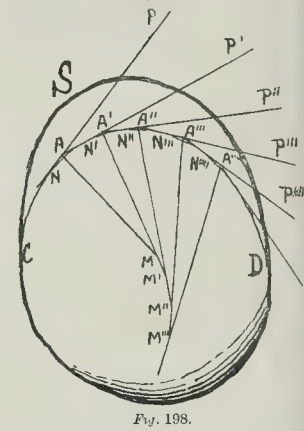


Fig. 198.

### The Student's Column.

#### DESCRIPTIVE GEOMETRY.—PART II. XXIV.

**N**OW, to continue the subject of last week, let us examine (fig. 196) a developable surface in general. We suppose a surface engendered by a straight line which moves through space in such a way that two consecutive positions of that line are contained in a plane. For instance, in our figure (which the reader must not consider as a plane surface, but as a perspective view of a spider's web) the lines  $A^1 B^1$  and  $A^2 B^2$  meet in a point  $M^1$ , the lines  $A^2 B^2$  and  $A^3 B^3$  meet in a point  $M^2$ , and so on for every successive generator of the surface. The successive intersections of the generators would form in space (not in a plane) a polygon  $M^1 M^2 M^3 M^4 M^5$ ; but, when we suppose that the generators are infinitely close to one another, the polygon becomes a skew curve, such as  $V M M^1 M^2 M^3 M^4 M^5 U$ , to which all the generators are tangent. This curve is called an *arris of retrogression*; we shall see why hereafter.

The surface so formed is developable on a plane, for it is formed of plane elements, and we can turn round the generator  $A^1 B^1$  as a hinge, the plane contained between the generators  $A^1 B^1$  and  $A^2 B^2$ , bringing thereby that element in the same plane as its neighbour, the plane which contains the generators  $A^2 B^2$  and  $A^3 B^3$ . Continuing the same operation on the next element and on the next . . . we can develop the whole surface on a plane without any rent whatever.

The system of generation we have described is that of all developable surfaces, of which cones and cylinders are only special cases. We can therefore come to the following conclusions:—

A plane tangent to a developable surface in any one point is tangent to the surface all along a generator, for the point is situated on the infinitely narrow strip of a plane which contains two neighbouring generators of the surface. Therefore, the plane, tangent to the surface in the point  $Q$ , is the plane which contains the generator  $A B$  and the tangent  $A T$  to any curve on the surface passing through a point of the generator  $A B$ . This shows that the method we used to find the tangent planes to cones and cylinders is applicable to all developable sur-

faces. We shall soon study other surfaces which are also generated by straight lines, but the tangent planes to which have not the above property, for they are skew surfaces.

We observe also that the plane of the superficial element  $A M^1 A'$ , or, what is the same thing, the tangent plane  $B A T$  coincides exactly with the osculating plane of the aris of retrogression  $V M U$ , for it contains the lines  $A M^1$  and  $A' M^1$ , which are both tangent to this curve.

In fig. 196 we called the curve  $V M U$  an *arris of retrogression*, because the surface forms two sheets, with the curve  $V M U$  as a sharp aris between the two sheets. This is a characteristic feature of all developable surfaces. The reader will perhaps be able to conceive how this takes place by examining the fig. 197. The curve  $V M U$  (fig. 196), being a curve in space, can be considered as delineated on the surface of a cylinder, we suppose (fig. 197), the curve  $v, m, n, u$  to be the base of that cylinder. As the generators of the surface are tangent to the curve  $V M U$  (fig. 196), they will be tangent to the cylinder  $v, m, n, u$  (fig. 197), and we can conceive the surface formed by a straight line  $a b$  in rolling on a cylinder without sliding. If we examine a point  $\beta$  of the line  $a b$  we shall see that, as the generator  $a b$  rolls on, the point  $\beta$  moves towards the cylinder by a curve  $\beta n$ , then moves away from the cylinder by a curve  $n a$ , forming a sharp angle in the point  $n$ . This point  $n$  is a point of the line  $V M U$ , and therefore this line must form a sharp aris of the surface. (The curve  $\beta n a$  is shown also in fig. 196.)

In a cone the aris of retrogression is reduced to a point, and in a cylinder it may be considered as infinitely distant.

We now know what are the conditions which the generators of developable surfaces must fulfil, but, how are we to produce such a surface?

After having taken in space two curves (fig. 196) such as  $A D$  and  $B C$ , if we were to connect any point  $A$  of the first curve with any point  $B$  of the other, we could not possibly say that the neighbouring generators would be in the same plane. We select a point  $A$  on the lower curve: draw a tangent  $A T$  to that curve; then, draw a tangent  $B S$  to the upper curve parallel to the former tangent  $A T$ . Now, we can say that the line  $A B$  is a generator of a developable surface; for, the elements  $A A'$

and  $B B'$  of the curves (being infinitely small) are part of the tangents; the tangents being parallel are in the same plane, and, therefore, the two generators  $A B$  and  $A' B'$  are in the same plane. By repeating this operation for a number of points of the directing curves  $A D$  and  $B C$  we could produce a series of generators of the surface.

There is also another method of producing the surface. We adopt the aris of retrogression  $V M U$  as the sole directing curve, and make a straight line as generator to move in space, remaining always tangent to the directing curve. In such a surface the neighbouring generators will be contained in the same plane for, as the generator  $A B$  (fig. 196) touches the curve  $V M U$  along the element  $M M^1$  and the generator  $A' B'$  touches the same along the element  $M^1 M^2$ , these generators intersect one another in the point  $M^1$ , and are, therefore, in the same plane. Such is the mode of generation of the developable helicoid, for instance.

The surface can also be engendered in the following way:—

If on a given surface (fig. 198), which we shall simply designate as the surface  $S$  (in the drawing consider the surface  $S$  as made of glass), we delineate a curve  $C N \dots D$ ; then, through points infinitely close  $N, N^1, N^2, \dots$  taken on that line we produce tangent planes  $P, P^1, P^2, \dots$  to the surface (we have figured these planes by the lines  $N P, N^1 P^1, N^2 P^2, \dots$  only); these planes will cut one another consecutively along straight lines such as  $A M, A^1 M^1, A^2 M^2, \dots$ , lines which will be two by two in the same plane. The lines  $A M, A^1 M^1, A^2 M^2, \dots$  will be, therefore, the generators of a developable surface, and as they are touched by the tangent planes  $P, P^1, P^2, \dots$ , we can consider the developable surface as produced by a plane rolling over a curved surface,  $S$ , and in continuous contact with a curve,  $C N \dots D$ , delineated thereon. In other words, a developable surface is the enveloping surface of the various positions taken by a movable plane moving through space according to some given law. For instance:—

The plane may roll, as in our example, in contact with a line of a given surface. As an example of this generation, a plane rolling along the parallel of a sphere will engender a cone, and rolling along the equator of a sphere it will engender a cylinder.

The plane may roll on two curved surfaces



ultaneously. Neither of the surfaces must be developable, as otherwise the plane would be one generator of that surface and a point on the other, and, therefore, could not move. The plane may be bound to osculate a given curve. In that case, the curve will be the surface of retrogression to the surface produced. The plane may in moving remain always normal to a given curve, for, in that case, the successive positions of the plane will cut one another along straight lines contained two by two in the same planes.

We shall now examine (fig. 196) what conditions a curve  $P P^1 \dots X$ , delineated on a developable surface must fulfil to be the shortest line between two points  $P$  and  $X$ .

The curve must, of course, be transformed into a straight line when the surface is developed. We have seen that a curve is transformed into a straight line when each two neighbouring elements of the curve make equal angles with an intermediary generator; we must have, in fact, in each point of the curve the angle  $P^1 R = M^1 P^1 P^1$ . This is, therefore, the condition the curve must fulfil to be the shortest distance between two points. This leads us to another important property of that curve.

The shortest curve from the point  $P$  to the point  $X$  has all its osculating planes normal to the developable surface.

From what we have said above, the two tangents  $P^1 R$  and  $M^1 P^1 R^1$  form equal angles with the generator  $A^1 M^1$ ; these tangents belong, therefore, to the generators of a cone of revolution the axis of which is the line  $A^1 M^1$ ; the plane  $R^1 P^1 R^1$ , which contains the two infinitely small generators of the cone  $P^1 R$  and  $P^1 R^1$ , is, of course, tangent to the said cone along its generator  $P^1 R$ . But in every surface of revolution the tangent plane is perpendicular to the meridian line which passes through the point of contact; the plane  $R^1 P^1 R^1$  is, therefore, perpendicular to the plane  $A^1 M^1 A^1$ , which is a meridian line of the cone as it contains the axis  $A^1 M^1$  and the generator  $P^1 R$ . Now, the plane  $R^1 P^1 R^1$  is the osculating plane (it contains two tangents) to the shortest curve, and the plane  $A^1 M^1 A^1$  is the plane tangent to the developable surface.

The above property of the shortest line is not limited to developable surfaces, but extends to surfaces whatever. Let (fig. 198) the curve  $N \dots D$  be the shortest line between the points  $C$  and  $D$  of the surface  $S$ . If we roll a plane along the line  $C N \dots D$ , we shall generate, as we have seen, a developable surface, which we will call  $S^1$ . If the curve  $C N \dots D$  is the shortest line on the first surface  $S$ , it will be also the shortest on the second surface  $S^1$ ; but in that case the osculating planes of the curve will be perpendicular to the planes tangent to the surface  $S^1$ , and as these tangent planes are common to both surfaces, we can conclude that on any surface the shortest line between two points has all its osculating planes normal to the surface. This property is of the highest importance for the jointing of masonry.

# RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

12,368, Builder's Hoist. J. Tottenham.

An endless band runs over rollers, one on the drum and the other forming the barrel of a windlass mounted on the scaffolding. The band is made of sections, which are united by links, having cross-ribs upon which are hung double hooks. Basket or other articles are hung from these hooks, and are lowered as required.

13,588, Purifying Drainage Waters and sewage. E. Capitaine.

Silicic acid hydrate is added to the water for the purpose of forming a dense and compact sediment. In cases where the water to be treated does not contain free lime it is only necessary to add the same in very small quantity, and then to saturate the lime again by the silicic acid hydrate. The separation of organic, that is, nitrogenous and putrefying and fermenting bodies, silicic acid hydrate with lime in conjunction with soluble mineral salts is employed.

14,010, Portland Cement. H. J. Cooper.

Lime, chalk, limestone, or other suitable calcareous material is added to molten iron slag not containing large proportions of iron oxides or sulphur. As the slag flows from the furnace 100 parts of the powdered calcareous material are added to out 35-50 parts of slag. The materials are thoroughly mixed by rollers or other apparatus, and, if necessary, furnace to complete the formation of the clinker, which is cooled, granulated, and ground.

9,685, Burglar and Fire Alarms. G. Pearson.

Electrical contacts are arranged on the doors and windows, so that on any attempt to open them an electrical circuit is completed, and a current from a battery flows through the coils of a magnet. An armature is thereby attracted, and releases a weighted lever carried by a gas tap. By this means a red lamp outside the house previously just alight is turned up, and at the same time a bell is rung in any room as desired. When the apparatus is required to act as a fire-alarm, a thermometer with contact wires is placed in the circuit, the latter being completed by the rise of the mercury.

13,472, Fireplaces. H. Thompson.

The bottom and back of the grate are formed of hollow bars open at their lower ends, and closed at the upper, with perforations in the back to allow air passing through them to enter a chamber. The ash-pit is closed, and has a flue at each side near the front. The smoke from the fire passes between the bars into the chamber, and mixes with the heated air coming through the bars; the products then pass through the ash-pit and flue, round the ovens and boilers, and return through the flue, under the ash-pit, to the chimney.

13,129, Adjusting Windows, &c. M. Rowcliffe.

A strip of metal or other hard material is fixed on the edge of the sliding part; a tapered cavity, widest at the top, is made in the fixed frame. A roller or ball works in the cavity and jams the window, &c., at the required height. The window is released and made free to move up or down by pressing a thumb-piece on a bell crank lever; this raises the ball or cylinder, and the window is free to move until the pressure is taken off the lever, when the ball falls, and the window is immediately re-jammed.

## NEW APPLICATIONS FOR PATENTS.

Oct. 30.—13,057, S. Wright, Emptying Water from Cisterns, Reservoirs, &c.—13,066, J. Hopkinson and C. Gibson, Retaining Windows in any position.—13,078, C. Hunt, Combined Reflecting and Ventilating Apparatus.—13,079, J. Tucker, Weather Bar for Doors and Windows.—13,086, E. Morris, Improvements in Sanitary Pans.—13,097, B. Finch, Ejector Cows.—13,098, J. Eborer, Parquet and other Floorings.—13,110, W. Lake, Apparatus for Facilitating the Nailing of Laths.—13,115, J. Hayler and Others.—Apparatus for the Manufacture of White Lead.

Oct. 31.—13,130, J. D-eley, Water-closet and Urinal Pans or Basins.—13,140, J. Pierret, Waterproof Cloth, Felt, Board, Paper for Roofing, &c.—13,142, J. and C. Christie, Waste-preventing Flushing Apparatus for Water-closets, &c.—13,143, F. Chambers, Construction of Shop-fronts.—13,159, J. Pointon, Anti-fouling and Anti-corrosive Paints or Compositions.—13,173, W. Brewer, Devices for Fastening Windows.

Nov. 2.—13,198, F. Caws, Ventilating.—13,219, F. Moir, Improvements in Window Sashes for Ventilation.—13,220, J. Buzzard, Fastenings for Trap Doors, &c.

Nov. 3.—13,233, T. Woods, Stone-cutters' Tools.—13,247, H. Headland, Smoke-preventing Chimney Pot.—13,256, P. Jahn, Planing Machines.—13,271, S. Sutcliffe, Tile Grate Fronts and Tile Grates and Chimney-pieces Combined.—13,292, H. Denne, Window Fastener.

Nov. 4.—13,303, T. Gibson, Invalid's Electric Call Bell.—13,308, J. Donald, Paving Streets and Roads.—13,321, J. Simmons, Window Fastenings.—13,325, H. Davidson and H. Hart, Improved Socket Pipes.—13,327, J. Green, Improvements in Dry Closets, &c.—13,328, T. Smith, Manufacture of Cements.—13,329, J. Beresford and W. Restall, Improvements in Water-closets.—13,332, C. Lawrence, Ventilating Apparatus.—13,336, H. Hadden, Ventilating Tunnels, &c.—13,352, E. Aldous, Chimney Top or Ventilator.

Nov. 5.—13,371, J. and W. Smith, Hanging and Supporting Sliding Window Sashes.—13,373, W. and H. Sutcliffe, Improvements in Ball Taps.—13,395, H. Sporton, Water Meters, &c.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

11,098, R. Stone, Manufacture of Cement.—11,309, C. Sullivan, Machine for Dredging and Excavating.—11,534, F. Cox, Fastening for Sashes, Casements, &c.—11,552, C. Lea, Construction of Door Knobs.—11,695, H. Thompson, Improvements in Kitchens, Open Grates, and Stoves.—11,939, G. Chandler and Others, Chimney Top or Ventilator.—12,590, J. Armstrong, Improved Forms of Building Materials.—12,403, J. Deesley, Flushing Cisterns.—12,468, J. Cushing, Improved Water-closet Basin.—12,471, S. Johnson, Apparatus for Flushing Closets, Drains, &c.—11,734, G. Brodie and J. Prior, Safety Catches for Window-sash Fastening.—11,810, J. Nield, Portable Extension Ladder.—12,045, J. Gilmore and W. Clark, Ventilating Apparatus.—12,056, T. Normanton, Ventilating Apparatus.—12,156, J. Bedford, Ventilator, and Fixing same.—12,309, J. Kent, Machine for Joining, Grooving, &c.—12,507, H. Long, Bolt with Plate or Plates for Lavatories or Water-closets.—12,525, W. Sorymgor, Construction of Floorings, Roofs, &c.—12,550, S. Smith, Automatically Flushing Closets and Drains.

## COMPLETE SPECIFICATIONS ACCEPTED.

### Open to opposition for two months.

16,057, J. Rhodes, Cupboard-door Turns.—10,005, J. Moore and H. Salomon, Combined Table and Writing-desk.—11,202, E. Smith, Folding Chair.—11,698, J. Rae, Simplifying Repairs to Water-Fittings by an Improved Water-tap.—16,882, W. Hassall, Fireplaces or Furnaces for Bricks or other Kilns.—101, T. Greenwood, Improved Hinge.—573, H. Lake, Excavators.—654, T. Ward, Hoisting Apparatus.—841, C. Shields, Improved Means for Joining Lead Pipes.—1,340, W. Gedgo, Machine for Cutting, Planing, and Shaping Wood.—2,691, C. Billington and J. Newton, Fastening Knobs to Spindles.—4,568, J. Barwick, Ceiling Ventilator.

## MEETINGS.

SATURDAY, NOVEMBER 14.

British Museum (Archaeo. Room).—Miss J. E. Harrison on "The Parthenon Marbles." (II.) 11 a.m.

MONDAY, NOVEMBER 16.

Royal Institute of British Architects.—Mr. William Woodward on "London as it is and as it might be." 8 p.m.  
Architectural Section, Philosophical Society of Glasgow, Presidential Address by Mr. William Landless.

TUESDAY, NOVEMBER 17.

Institution of Civil Engineers.—Further discussion on the papers by Professor Osborne Reynolds and Mr. Brightmore on Steam Engine Indicators." 8 p.m.  
Statistical Society.—Sir Rawson W. Rawson on "International Statistics, illustrated by Vital Statistics of Europe and of some of the United States of America." 7-45 p.m.

WEDNESDAY, NOVEMBER 18.

British Archaeological Association.—(1) Mr. W. De Gray Birch on "The Art of the Roman Pavements at Bignor." (2) Mr. C. H. Compton on "The Church of St. Nicholas, Colnsey, Norwich." (3) Mr. John. Harris on "The Saxon Fort in South Haying Church." 8 p.m.  
Society of Arts.—Opening Address of the Session, by Sir Frederick Abel, F.R.S. 8 p.m.  
South Kensington Museum (Lecture Theatre).—Miss J. E. Harrison on "The Mythology of the Iliad as illustrated by Greek Vase Paintings." (III.) 6-15 p.m.  
Builders' Foremen and Clerks of Works Institution.—Ordinary Meeting. 8-30 p.m.  
Royal Meteorological Society.—Three papers to be read. 7 p.m.

THURSDAY, NOVEMBER 19.

York Architectural Association.—Mr. S. Harrison on "Medieval Stained Glass." 7-30 p.m.  
Dundee Institute of Architecture.—Mr. John Young on "Architects: their Work, and how viewed by the Public." 7 p.m.

FRIDAY, NOVEMBER 20.

Architectural Association.—Mr. L. Harvey on "The Connexion between Dress and the Art of Composing, illustrated by various Examples taken from the late Professor Semper's 'Lessons on Style.'" 7-30 p.m.  
University College.—Professor C. T. Newton, C.B., on "Greek Myths illustrated by Fictile Vases and other Monuments." 4 p.m.  
Institution of Civil Engineers (Students' Meeting).—Mr. John Goodman on "Recent Researches in Friction." 7-30 p.m.

SATURDAY, NOVEMBER 21.

British Museum (Archaeo. Room).—Miss J. E. Harrison on "The Parthenon Marbles." (III.) 11 a.m.

## Miscellaneous.

Royal School of Mines.—On Monday, the 9th inst., Professor Warrington Smyth, M.A., F.R.S., commenced a course of lectures on mining, in the theatre of the Geological Museum, Jermyn-street. After referring to the enormous capital which the mining interest represents, he dwelt at length upon the conditions which have contributed to render the working of minerals in this country one of the most important branches of our industry. The student ought fully to realise that the main object of lectures and study in a question of the nature of mining, is emphatically this,—to enable him more quickly to understand problems presenting themselves in actual operations, and not to supplant the all-important necessity of experience itself. The different systems which obtain in different countries regarding the right of working minerals, has affected very materially the internal development of mining as an art. In every country in Europe except Britain, the Government reserves to itself the right to minerals below the surface of the ground. The freedom which exists at home in this respect has afforded opportunities for enterprise and activity which the Continental system of Government supervision is always calculated to more or less discourage.

City and Guilds of London Institute for the Advancement of Technical Education.—Alderman Sir R. N. Fowler, bart., M.P., has consented to present the Institute's scholarships, prizes, and certificates, at a meeting to be held on Wednesday evening, December 9th, at the Salter's Hall, St. Swinburn's-lane, E.C. The Lord Mayor will preside.



**Association of Public Sanitary Inspectors.**—On Saturday evening last, the opening meeting of the third annual session of the above important body took place at 1, Adam-street, Adelphi, the inaugural address being delivered by the Chairman of the Council, Mr. G. B. Jerram, A.M.I.C.E. After referring to the loss of that eminent sanitary reformer, Lord Shaftesbury, an honorary member of the Association, and to the increase of public interest in sanitary questions, as evinced by the Health Exhibition, the paper chiefly addressed itself to the recommendations contained in the first report of the Royal Commission on the Housing of the Poor, and the Public Health (Metropolis) Bill introduced last Session by Lord Salisbury, and read once in the House of Lords. Mr. Jerram remarked that while the evidence taken by the Commission had revealed, not only in the Metropolis but in other large towns, and in the cottages of the rural districts, incredible defects in house-drainage, the condition of ashpits and dustbins, and the collection of refuse, far more of such defects would have been revealed had the evidence of Medical Officers of Health, Surveyors, and Inspectors of Nuisances been called for. The most useful proposal of Lord Salisbury's Bill was that which provided for the consolidation of the fourteen Sanitary Acts affecting the Metropolis, assimilating them to those in force for the rest of the United Kingdom under the Public Health Act of 1875. A discussion followed the reading of the paper.

**Bolton Art Club.**—At the monthly meeting, held last week, at the club-rooms, Mr. John B. Gass, A.R.I.B.A., holder of the Godwin Bursary, 1885, delivered a lecture on "Art Reproducing Processes." The lecture was well illustrated by examples of the different processes referred to, which were classified into two groups, intaglio or incised work, and relief or projected work. In the first group the lecturer described the history and methods of engraving, photogravure, etching, and aquatint, each process being clearly and concisely explained. In the second group wood-cutting and the production of electrotypes were described at length, as also were lithography and chromo-lithography, and reference was made to the new French process by which a coloured print is obtained at one impression. Typographic etching and graphotype were mentioned, and the application of photography in photo-lithography, ink photos, &c., and zincography, was well illustrated, printing blocks being handed round for inspection. Photo-etching was referred to, and the different methods of printing illustrations direct from photographs, and without the intervention of engraver or draughtsman, were described, and plates and prints were shown of the luxotype, Macbeth's, the Meissenbach, and other processes.

**St. Patrick's Cathedral, New York.**—Preparations are being made for the erection of two white marble spires on the front of St. Patrick's Cathedral, New York. The total height of the spires will be 180 ft., and they will be of Gothic design. The lower portion, or tower, is to be octagonal in shape, with a height of 67 ft. A marble cross will be placed on the extremity of each spire. The cost is estimated by the architect, Mr. James Renwick, at 180,000 dols., or 47,500l. sterling. The cathedral, which has taken such a length of time to construct, will be practically completed as soon as the spires are erected.

**Edinburgh Architectural Association.**—On the 5th inst. the opening meeting of this Association was held in the Professional Hall, 20, George-street. There was a large attendance. Mr. George Washington Browne, the President, gave an inaugural address on the "Monastic Orders and Buildings in Scotland." At the close, a hearty vote of thanks was accorded Mr. Browne for his address. A collection of photographs and drawings, lent by members of the Association, was exhibited in the hall.

**Proposed Naphtha Pipe from Bakou to Batoum.**—A project has been submitted to the Russian Minister of Public Works for the construction of a conduit for the conveying of naphtha from Bakou to Batoum, a distance of 800 versts, or about 530 miles. A private company has already undertaken to construct it.

**Utilisation of Salt Water for Towns.**—The Kirkcaldy Local Board of Health, Coat-ham, Redcar, have instructed their Surveyor (Mr. James Howcroft) to carry out a salt-water scheme for street-watering and private purposes, in accordance with plans prepared by him.

**Largs Free Church.**—We received the following details in regard to this church, illustrated in our last number, too late for publication at the time. The church, as erected in 1843, was a plain rectangular building, 69 ft. by 41 ft., without any attempt at ornament. It is now being altered from plans prepared (as already mentioned) by the late Mr. A. J. Grahame, architect, London. The illustration in our last shows the principal frontage, which stands "directly" fronting the Firth of Clyde. The tower stands in the north-west corner, and rises to the height of 90 ft. It contains the staircase leading to the new end gallery. The new vestibule is 7 ft. 6 in. wide, giving access to the area of the church by one wide central doorway: connecting with the vestibule there is a session-house. At present there are galleries at both sides and end of the building; these are to be removed and a new gallery at a lower level constructed at the end of the church. A transept, 24 ft. by 14 ft., with a gallery, is to be built out from the south side of the church, and an apse, 20 ft. wide, broken out in the east gable. The vestry will be in a low building immediately behind the apse. The present deep narrow pews are to be removed and the whole church to be re-seated; there are in all 600 sittings. The whole of the outside walls are faced with Giffnock freestone, the rubble being rough-hammer dressed, in broken courses. The estimated cost of the alterations is 2,700l.

**Manuscripts of Leonardo da Vinci.**—The Royal Academy of the Lincolni, following the initiative given by France relative to the publication of the Manuscripts of Leonardo da Vinci, has undertaken the publication of the *Codice Atlantico*, of the Ambrosian Library at Milan. The enterprise will require eight years, with an annual outlay of 1,200 lire, which expense is already covered by a subscription fund of 36,000 lire, the principal contributors to which are the Grand Mastership of the Order of Saints Maurice and Lazarus, for the sum of 10,000 lire, King Humbert, the entire Cabinet, and the Academy of the Lincolni. This *Codice Atlantico* is a manuscript, 65 centimetres by 44; containing 399 leaves and 1,750 designs, and comprising several volumes, the pages whereof have been separated and pasted upon drawing-paper. It formed part of the thirteen Manuscripts of Leonardo da Vinci sent to Paris from the Ambrosian Library of Milan in 1796, by Tinot, who was appointed by Bonaparte as Art Commissioner to superintend the official plundering. The manuscript in question was bestowed upon the National Library of Paris, but reclaimed in 1815 for the Ambrosian Library by Prince Schwarzenberg, the representative of Austria. The *Codice Atlantico*, together with other eleven Manuscripts of Leonardo da Vinci, were a donation to the Library by Arconati, in 1837. It is said that Charles I. of England in 1630 offered Arconati for one alone of these manuscripts one thousand Spanish doubloons, or about 2,400l.—*Tablet*.

**Presentation.**—A very enjoyable evening was spent at the "Foresters" at Tonbridge last Saturday, when a large number of the employees of the firm of Messrs. G. Punnett & Sons assembled under the presidency of Mr. James Trill, sen., to present to their late and much-respected foreman, Mr. John Fagg, a handsome testimonial in the form of a massive oak silver-mounted inkstand, bearing a suitable inscription, together with an illuminated list of subscribers. The meeting was a most hearty and enthusiastic one, Mr. Fagg having held the post for a period of upwards of thirty years, during which period he has been connected with many large and important works, both in Kent and Sussex. The esteem in which he is held by those with whom he has worked was manifestly evinced, and good wishes for his future welfare expressed, with a hope that in his retirement from the more active pursuits of business he may be spared in this the autumn of his life to spend his remaining years in health, quiet, and happiness. Mr. Fagg has for many years been connected with the affairs of the town of Tonbridge, and at the present time has the honour of occupying the chair of the Local Board.

**Robert Boyle & Son (Limited).**—We may remind our readers that the list of applications for shares in the company of Robert Boyle & Son (Limited) closes for London and country on Tuesday next, the 17th inst., as mentioned at the head of the prospectus to be found on our back page.

**Accident Fund at Elswick Ironworks.**—Among nearly 10,000 men hardly a day passes without some one having his arm crushed, his hand nipped, or his leg broken, and though everything is done that can be done for the prevention of accidents, carelessness will assert itself, and claim its average of victims. To provide against these accidents an "accident compensation fund" exists, whose latest report shows that the injuries only reach 7.4 per cent. The income of this fund exceeds 2,000l., and is derived from the workmen, who subscribe every week in proportion to their wages, and from the masters, who each week add to the fund double the amount subscribed by those they employ. In connexion with the fund ambulance classes have been established, and of the seventy-eight who last presented themselves for examination, seventy-two passed successfully, thus giving a percentage of ninety-two against the All England rate of sixty-six. No statement would convey an idea of the importance of the injuries for which compensation is granted, for there is only one injury whose gravity is not left to the imagination, and that is death; but the lowest amount paid seems to have been 2s. 3d. for a bruised knee, while the highest was 150l., the total of the allowances amounting to 1,500l.—*Leisure Hour*.

**Leather v. Canvas.**—The respective merits of leather and canvas hose have of late led to considerable controversy in various quarters, and much dissatisfaction has been expressed with regard to the canvas hose at present used by the Metropolitan Fire Brigade. The success of a brigade in extinguishing fires so largely depends upon the quality of the hose that it becomes a matter of first importance to ensure the durability and efficiency of this appliance. The substitution of canvas hose in lieu of leather in the Metropolitan Fire Brigade can hardly be justified by reference to past experience. The rubber-lined canvas hose at present so largely in use does not compare favourably with leather hose, either on the score of economy or practical efficiency. Its chief recommendation is lightness, which for brigade work is undoubtedly a consideration, for besides being more readily manipulated by the firemen, it can also be made in longer continuous lengths than leather hose, and so requires fewer joints. It is also cleaner and less troublesome to keep in order than leather, and these qualities no doubt recommend it to the firemen. Canvas hose can be manufactured to bear a pressure of from 500 lb. to 600 lb. per square inch, but its capacity for enduring rough work and wear is vastly less than leather.—*Commercial World*.

**St. Bride's Working Men's Club.**—At the Hall of the above Club on Saturday evening last a lecture was given by Mr. Henry J. Fare on "Church Clocks, Ancient and Modern."

#### PRICES CURRENT OF MATERIALS.

| TIMBER.                                              | £. s. d. | £. s. d. |
|------------------------------------------------------|----------|----------|
| Greenheart, B.G. .... ton                            | 6 10 0   | 7 10 0   |
| Teak, E.I. .... do                                   | 12 10 0  | 15 10 0  |
| Sequoia, U.S. .... cube                              | 0 2 6    | 0 2 6    |
| Ash, Canada .... load                                | 3 0 0    | 4 10 0   |
| Birch " .... do                                      | 3 0 0    | 4 10 0   |
| Elm " .... do                                        | 3 10 0   | 5 0 0    |
| Fir, Dantsic, &c. .... do                            | 1 10 0   | 4 10 0   |
| Oak " .... do                                        | 3 0 0    | 5 0 0    |
| Canada " .... do                                     | 8 0 0    | 7 0 0    |
| Pine " red " .... do                                 | 3 0 0    | 4 0 0    |
| " yellow " .... do                                   | 3 10 0   | 5 0 0    |
| Lath, Dantsic " .... fathom                          | 5 0 0    | 6 0 0    |
| St. Petersburg " .... do                             | 5 0 0    | 7 0 0    |
| Waincot, Riga " .... log                             | 2 10 0   | 4 10 0   |
| Doals, Finland, 2nd and 1st. .... std. 100           | 8 0 0    | 9 0 0    |
| " 4th and 3rd " .... do                              | 6 10 0   | 7 10 0   |
| Riga " .... do                                       | 6 0 0    | 8 0 0    |
| St. Petersburg, 1st yd. .... do                      | 9 0 0    | 15 0 0   |
| " 2nd " .... do                                      | 7 0 0    | 8 10 0   |
| " white " .... do                                    | 8 0 0    | 10 10 0  |
| Sweden " .... do                                     | 6 0 0    | 10 0 0   |
| Canada, Pine 1st " .... do                           | 18 0 0   | 32 10 0  |
| " 2nd " .... do                                      | 12 0 0   | 18 10 0  |
| " 3rd, &c. " .... do                                 | 7 0 0    | 10 10 0  |
| " Spruce 1st " .... do                               | 9 0 0    | 12 0 0   |
| " 3rd and 2nd " .... do                              | 8 0 0    | 8 0 0    |
| New Brunswick, &c. .... do                           | 5 0 0    | 7 10 0   |
| Battens, all kinds " .... do                         | 4 0 0    | 13 0 0   |
| Flooring Boards, sq. 1 in.—Prepared, first " .... do | 0 7 0    | 0 13 0   |
| Second " .... do                                     | 0 7 0    | 0 8 0    |
| Other qualities " .... do                            | 0 7 0    | 0 8 0    |
| Cedar, Cuba, " .... foot                             | 0 0 3    | 0 0 4    |
| Honduras, &c. .... do                                | 0 0 3    | 0 0 4    |
| Australia " .... do                                  | 0 0 3    | 0 0 4    |
| Mahogany, Cuba " .... do                             | 0 0 5    | 0 0 7    |
| St. Domingo cargo av. .... do                        | 0 0 5    | 0 0 7    |
| Mexican " .... do                                    | 0 0 4    | 0 0 5    |
| Tobacco cargo av. .... do                            | 0 0 5    | 0 0 7    |
| Honduras cargo av. .... do                           | 0 0 4    | 0 0 5    |
| Rose, Rio " .... ton                                 | 7 0 0    | 16 0 0   |
| Bahia " .... do                                      | 8 0 0    | 14 0 0   |
| Satin, St. Domingo " .... do                         | 0 0 0    | 0 0 0    |
| Porto Rico " .... do                                 | 0 0 0    | 0 0 0    |
| Walnut, Italian " .... do                            | 0 0 4    | 0 0 5    |



| METALS.                         |    |    |    | METALS (continued). |    |    |    |
|---------------------------------|----|----|----|---------------------|----|----|----|
|                                 | £. | s. | d. |                     | £. | s. | d. |
| Iron—Pig in Scotland .....      | 2  | 2  | 0  | Tinplate—           |    |    |    |
| Bar, Welsh, in London .....     | 4  | 15 | 0  | IX coke .....       | 0  | 15 | 6  |
| „ „ in Wales .....              | 4  | 7  | 6  | IX ditto .....      | 1  | 1  | 6  |
| „ „ Staffordshire, London ..... | 6  | 0  | 0  | IX charcoal .....   | 0  | 17 | 6  |
| Sheets, single, in London ..... | 7  | 10 | 0  | IX ditto .....      | 1  | 4  | 0  |
| Hoops .....                     | 6  | 5  | 0  |                     |    |    |    |
| Nail-roads .....                | 6  | 0  | 0  |                     |    |    |    |
| COPPER—                         |    |    |    |                     |    |    |    |
| British, cke. and ingt. ....    | 43 | 0  | 0  |                     |    |    |    |
| Best selected .....             | 44 | 0  | 0  |                     |    |    |    |
| Sheets, strong .....            | 52 | 0  | 0  |                     |    |    |    |
| „ „ India .....                 | 48 | 0  | 0  |                     |    |    |    |
| Australian, fine cash .....     | 0  | 0  | 0  |                     |    |    |    |
| Chili, bare .....               | 38 | 15 | 0  |                     |    |    |    |
| YELLOW METAL .....              | 0  | 0  | 4  |                     |    |    |    |
| LEAD—Pig, Spanish .....         | 11 | 5  | 0  |                     |    |    |    |
| English, com. brands .....      | 11 | 10 | 0  |                     |    |    |    |
| SPRINKLER—                      |    |    |    |                     |    |    |    |
| Silesian, special .....         | 14 | 5  | 0  |                     |    |    |    |
| Ordinary brands .....           | 14 | 0  | 0  |                     |    |    |    |
| TIN—                            |    |    |    |                     |    |    |    |
| Straits .....                   | 90 | 15 | 0  |                     |    |    |    |
| Australian .....                | 91 | 2  | 6  |                     |    |    |    |
| English ingots .....            | 84 | 0  | 0  |                     |    |    |    |

## COMPETITIONS, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITIONS.

| Nature of Work.      | By whom required.   | Premium.   | Designs to be delivered. | Page. |
|----------------------|---------------------|------------|--------------------------|-------|
| New Law Courts ..... | Birmingham Corporn. | Not stated | Not stated               | ii.   |

## CONTRACTS.

| Nature of Work, or Materials.                       | By whom required.                              | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page.  |
|-----------------------------------------------------|------------------------------------------------|-----------------------------------|--------------------------|--------|
| Dispensary, Woodbridge .....                        | Govan, Seckford Hospital, & Co., Schools ..... | Official .....                    | Nov. 14th                | ii.    |
| Guernsey Granite .....                              | Croydon Union .....                            | do. .....                         | Nov. 16th                | ii.    |
| Kerbing, Tar-Paving, and Channelling .....          | Levensham Bnd. of Wks. .....                   | do. .....                         | Nov. 17th                | ii.    |
| Aqueduct, Thirlmere .....                           | G. H. H. .....                                 | do. .....                         | Nov. 20th                | xviii. |
| Re-making Roads (with New Gullies, &c.) .....       | Epping N. S. A. .....                          | do. .....                         | Nov. 21st                | ii.    |
| Curbing, Roadmaking, Cesspools, &c. .....           | Kent & Essex Lnd. C. Lm. .....                 | do. .....                         | Nov. 21st                | ii.    |
| Shutes-Coke Air-Valves, &c. .....                   | Northwich Local Board .....                    | H. Bancroft .....                 | do. .....                | ii.    |
| Altering and Adding to existing Copper Plates ..... | Liverpool Corporation .....                    | Official .....                    | do. .....                | ii.    |
| Wrought-Iron Girders, &c. .....                     | do. .....                                      | do. .....                         | Nov. 23rd                | ii.    |
| Fire Brigade Station .....                          | Met. Board of Works .....                      | do. .....                         | Nov. 24th                | ii.    |
| Pipe Sowers, &c. .....                              | Wandsworth Bd. of Wks. .....                   | do. .....                         | Nov. 25th                | ii.    |
| Erection of Bakehouse and Mortuary .....            | Epsom Union .....                              | H. D. Appleton .....              | Nov. 27th                | ii.    |
| Drainage and Sanitary Works, Ashford .....          | Mangrs. W. L. Sch. Dist. .....                 | Keith D. Young .....              | Nov. 28th                | xviii. |
| Broken Guernsey Granite .....                       | Finchley Local Board .....                     | G. W. Brunell .....               | Nov. 28th                | xviii. |
| Surface Drains, &c. .....                           | Rumford U. R. S. A. .....                      | Brundell, Simmons, & Co. .....    | Dec. 1st                 | ii.    |
| Iron Pier, Lee-on-the-Solent .....                  | Tottenham Local Board .....                    | De Pape .....                     | Dec. 5th                 | ii.    |
| Erection of Farm Buildings .....                    | Glamorganshire Lun. Asy. .....                 | E. A. Robinson .....              | Dec. 8th                 | ii.    |
| Pipe-Sewer, &c., Fenge .....                        | do. .....                                      | W. A. Murphy .....                | Not stated               | ii.    |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised.       | Salary.    | Applications to be in. | Page. |
|------------------------|---------------------------|------------|------------------------|-------|
| Engineer .....         | Dawlish Local Board ..... | Not stated | Not stated             | xvi.  |

## TENDERS.

|                                                                                                                                                                                                                                                                                |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| BERMONDSEY.—For rebuilding Glue and Size Works, Spu-road, Bermondsey, for Messrs. B. Young & Co., Messrs. Wheeler & Hollands, architects. Quantities by Messrs. Evans & Deacon:—                                                                                               |            |
| Althorpe & Latta .....                                                                                                                                                                                                                                                         | £2,650 0 0 |
| Renard .....                                                                                                                                                                                                                                                                   | 6,875 0 0  |
| H. & D. Leed .....                                                                                                                                                                                                                                                             | 6,685 0 0  |
| Hill Bros. .....                                                                                                                                                                                                                                                               | 6,677 0 0  |
| Castle .....                                                                                                                                                                                                                                                                   | 6,670 0 0  |
| Colls & Sons .....                                                                                                                                                                                                                                                             | 6,680 0 0  |
| Wells .....                                                                                                                                                                                                                                                                    | 6,650 0 0  |
| Deacon & Son .....                                                                                                                                                                                                                                                             | 6,646 0 0  |
| Smith & Son .....                                                                                                                                                                                                                                                              | 6,375 0 0  |
| Jerrard .....                                                                                                                                                                                                                                                                  | 6,298 0 0  |
| Jervis Smith .....                                                                                                                                                                                                                                                             | 6,249 0 0  |
| J. & J. Greenwood .....                                                                                                                                                                                                                                                        | 6,224 0 0  |
| Chaten .....                                                                                                                                                                                                                                                                   | 6,148 0 0  |
| Kilby & Gayford .....                                                                                                                                                                                                                                                          | 6,064 0 0  |
| Martin Wells & Co. .....                                                                                                                                                                                                                                                       | 5,823 0 0  |
| BETHNAL GREEN.—For building new mission hall, Gibraltar-walk, Bethnal Green:—                                                                                                                                                                                                  |            |
| Gaisford .....                                                                                                                                                                                                                                                                 | £488 14 0  |
| Howard .....                                                                                                                                                                                                                                                                   | 439 0 0    |
| Thomerson & Son .....                                                                                                                                                                                                                                                          | 435 0 0    |
| Jarvis & Sons .....                                                                                                                                                                                                                                                            | 412 0 0    |
| Foppet .....                                                                                                                                                                                                                                                                   | 369 0 0    |
| BRENTFORD.—For making-up Albany-road and Bangor-road, for the Brentford Local Board. Mr. F. W. Lacey, A.-M.I.C.E., surveyor:—                                                                                                                                                  |            |
| Nowell & Robson, Kensington .....                                                                                                                                                                                                                                              | £232 0 0   |
| S. Atkins, Twickenham .....                                                                                                                                                                                                                                                    | 280 0 0    |
| H. R. Trehearne & Co., Battersea .....                                                                                                                                                                                                                                         | 262 0 0    |
| J. Mowlen & Co., Westminster .....                                                                                                                                                                                                                                             | 261 0 0    |
| T. Brunsden & Co., Brentford .....                                                                                                                                                                                                                                             | 239 0 0    |
| H. Spicer, Brentford (accepted) .....                                                                                                                                                                                                                                          | 215 0 0    |
| Bangor-road.                                                                                                                                                                                                                                                                   |            |
| Nowell & Robson, Kensington .....                                                                                                                                                                                                                                              | £233 10 0  |
| H. R. Trehearne & Co., Battersea .....                                                                                                                                                                                                                                         | 220 0 0    |
| T. Brunsden & Co., Brentford .....                                                                                                                                                                                                                                             | 215 0 0    |
| H. Spicer, Brentford .....                                                                                                                                                                                                                                                     | 203 0 0    |
| J. Mowlen & Co., Westminster .....                                                                                                                                                                                                                                             | 197 0 0    |
| S. Atkins, Twickenham (accepted) .....                                                                                                                                                                                                                                         | 190 0 0    |
| BRENTFORD.—For the erection of filar-presses and other machinery in connexion therewith, for the Brentford Local Board. Mr. F. W. Lacey, A.-M.I.C.E., engineer:—                                                                                                               |            |
| Manlove, Alliot, Fryer, & Co.,                                                                                                                                                                                                                                                 |            |
| Nottingham (accepted) .....                                                                                                                                                                                                                                                    | £1,320 0 0 |
| S. H. Johnson & Co., Stratford .....                                                                                                                                                                                                                                           | 1,200 0 0  |
| CARSHALTON (Surrey).—For the erection of house, New-road, for Mr. James Gibbs, Mr. Herbert D. Appleton, architect, Wool Exchange, E.C. Quantities by Messrs. Franklin & Andrews, Ludgate-hill, E.C.:—                                                                          |            |
| H. Clark .....                                                                                                                                                                                                                                                                 | £4,522 0 0 |
| S. Elliott .....                                                                                                                                                                                                                                                               | 4,483 0 0  |
| J. Longley .....                                                                                                                                                                                                                                                               | 4,285 0 0  |
| B. E. Nightingale .....                                                                                                                                                                                                                                                        | 4,222 0 0  |
| C. Jarrett .....                                                                                                                                                                                                                                                               | 4,135 0 0  |
| Prestige & Co. .....                                                                                                                                                                                                                                                           | 3,982 0 0  |
| How & White .....                                                                                                                                                                                                                                                              | 3,653 0 0  |
| D. Stewart .....                                                                                                                                                                                                                                                               | 3,586 0 0  |
| W. Robinson .....                                                                                                                                                                                                                                                              | 3,750 0 0  |
| E. J. Burnard .....                                                                                                                                                                                                                                                            | 3,568 0 0  |
| CLAPHAM.—For the erection of the Clapham School of Art, Clapham. Messrs. I'Anson & Son, architects. Quantities by Messrs. D. Campbell & Son:—                                                                                                                                  |            |
| McLauchlan & Son .....                                                                                                                                                                                                                                                         | £2,388 0 0 |
| Higgs & Hill .....                                                                                                                                                                                                                                                             | 2,190 0 0  |
| Ryder & Son .....                                                                                                                                                                                                                                                              | 2,018 0 0  |
| Kynoch & Co. .....                                                                                                                                                                                                                                                             | 2,025 0 0  |
| CLERKENWELL.—For new houses, stables, coach-house, &c., and repairs, alterations, and additions to premises on plot of land at the corner of Penton-street and Chapel-street, Clerkenwell, for Mr. D. Cooksey, Douglas Mathews, architect, Dowgate-hill. Quantities supplied:— |            |
| Goodman .....                                                                                                                                                                                                                                                                  | £3,985 0 0 |
| Siles .....                                                                                                                                                                                                                                                                    | 3,931 0 0  |
| Dove Bros. .....                                                                                                                                                                                                                                                               | 3,475 0 0  |
| Heale & Son .....                                                                                                                                                                                                                                                              | 3,265 0 0  |
| Williams & Son .....                                                                                                                                                                                                                                                           | 3,270 0 0  |
| Grover & Son .....                                                                                                                                                                                                                                                             | 3,188 0 0  |
| Spencer & Co. .....                                                                                                                                                                                                                                                            | 3,175 0 0  |
| Thos. Wentner Smith & Son .....                                                                                                                                                                                                                                                | 3,172 0 0  |
| Kilby & Gayford .....                                                                                                                                                                                                                                                          | 2,976 0 0  |

HORNSEY.—For making-up the carriageway of Cecil Road West, for the Hornsey Local Board. Mr. T. De Courcy Meade, engineer and surveyor:—

J. Jackson, Enfield ..... £720 0 0 |

Hearn, Horton ..... 657 0 0 |

Dunmore, Crouch End ..... 625 0 0 |

Ball, Tottenham ..... 587 0 0 |

Pizzey, Hornsey ..... 544 0 0 |

Nicholls, Wood Green ..... 543 0 0 |

D. A. Jackson & Son, Dimsbury Park ..... 516 0 0 |

W. T. Williamson, Green Lanes ..... 499 0 0 |

Mowlem & Co., Westminster ..... 438 0 0 |

Walker, Upper Holloway ..... 467 19 6 |

A. W. Howles, Acton (accepted) ..... 410 0 0 |

LONDON.—For building the superstructure, from the ground-floor level upwards, of block of buildings at the corner of Great College-street and Kentish Town-road, for Mr. M. MacSheehan, Mr. Frank J. Chambers, architect. Quantities by Mr. Mark W. King:—

|                         |            |
|-------------------------|------------|
| Dove Bros. ....         | £3,945 0 0 |
| Kerry & Son .....       | 3,429 0 0  |
| Asby & Horner .....     | 3,142 0 0  |
| Brass & Son .....       | 2,974 0 0  |
| J. & J. Greenwood ..... | 2,966 0 0  |
| Holland & Hansen .....  | 2,888 0 0  |
| E. Conder .....         | 2,880 0 0  |
| Matlock Bros. ....      | 2,723 0 0  |
| Nightingale .....       | 2,728 0 0  |
| Baylis .....            | 2,615 0 0  |
| Grover & Son .....      | 2,794 0 0  |
| Kilby & Gayford .....   | 2,736 0 0  |

LONDON.—For rebuilding the Duke of Argyll public-house, Mr. J. T. Wimperis, architect:—

|                       |            |
|-----------------------|------------|
| Farman & Sons .....   | £5,140 0 0 |
| Balaam Bros. ....     | 5,850 0 0  |
| Stanley G. Bird ..... | 4,690 0 0  |
| Herman & Sons .....   | 4,570 0 0  |
| Scrivenor & Co. ....  | 4,577 0 0  |
| Hatfield .....        | 4,640 0 0  |
| Bywaters .....        | 4,548 0 0  |
| H. & E. Lee .....     | 4,540 0 0  |
| Prestige & Co. ....   | 4,459 0 0  |
| Barker .....          | 4,419 0 0  |
| Bush .....            | 4,273 0 0  |
| Grover & Son .....    | 5,193 0 0  |

LONDON.—For erecting and completing new stables in the rear of No. 16, Fulham-road, S.W., for the London Road Car Company, Limited. Mr. Peter Dollar, architect, Great Marlborough-street, W.:—

|                        |            |           |
|------------------------|------------|-----------|
| Langdale & Co. ....    | £3,966 0 0 | Time.     |
| Foster & Dickson ..... | 3,497 0 0  | 4 months. |
| Stevens & Co. ....     | 3,420 0 0  | 4 "       |
| Scrivenor & Co. ....   | 3,323 0 0  | 4 "       |
| Prestige & Co. ....    | 3,184 0 0  | 2 "       |
| Gibbs & Frew .....     | 2,950 0 0  | 3 "       |
| Mark Manley .....      | 2,925 0 0  | 3 "       |
| Lorden & Son .....     | 2,739 0 0  | 4 "       |

LONDON.—For alterations, &c., at Ivy House, Edgware-road, for the United Christian Mission Society:—

Cowell ..... £198 0 0 |

Harris ..... 157 0 0 |

Smith ..... 129 0 0 |

Eighton ..... 116 0 0 |

Eagle & Co. (accepted) ..... 110 0 0 |

LONDON.—For alterations and repairs to stables and workshops in rear of Union-street, Oxford-street, for Mr. P. New, Mr. R. J. H. Stoneham, architect. Quantities by Mr. C. Cadney:—

|                             |          |
|-----------------------------|----------|
| P. & F. Wood .....          | £273 0 0 |
| E. Colley .....             | 543 0 0  |
| J. Morter .....             | 530 0 0  |
| Steel Bros. ....            | 497 0 0  |
| Jackson & Todd .....        | 459 0 0  |
| Shurman .....               | 486 0 0  |
| W. Johnson (accepted) ..... | 485 0 0  |
| Wall Bros. (too late) ..... | 484 0 0  |

LONDON.—For the completion of premises, Nos. 13 and 15, Gray's Inn-road, for Mr. A. J. Gillingham, Mr. Richard W. Crawley, architect:—

J. O. Richardson, Peckham ..... £735 0 0 |

LONDON.—For mortuary buildings for the St. Pancras Vestry. Quantities not supplied. Mr. F. Eggar, architect, Gower-street:—

|                      |                          |                            |
|----------------------|--------------------------|----------------------------|
| Harbrow & Co. ....   | Contract No. 1. £285 0 0 | Contract No. 2. £2,970 0 0 |
| Landfield .....      | 93 0 0                   | 2,277 0 0                  |
| Plummer .....        | 815 10 0                 | 2,283 0 0                  |
| Nicholls .....       | 632 0 0                  | 1,755 0 0                  |
| Leale & Knight ..... | 415 0 0                  | 1,531 0 0                  |
| A. & C. Braid .....  | 363 0 0                  | 1,579 0 0                  |
| Ridout .....         | 365 10 0                 | 1,345 0 0                  |

LONGBRIDGE.—For works in connexion with the erection of Longbridge Church. Mr. Evan Christian, architect. Quantities by Messrs. Vinsel & Kennedy, Guilford-street, Russell-square, W.C.:—

|                                       |            |
|---------------------------------------|------------|
| Excavator, Drains, Waller, and Mason. |            |
| W. H. Harrison, Preston .....         | £1,100 0 0 |
| Slater.                               |            |
| H. Wilkinson, Preston .....           | 128 10 0   |
| Carpenter, Joiner, and Ironmonger.    |            |
| T. Hacking, Clayton-le-Moors .....    | 933 0 0    |
| Smith, Plumber, Glazier, and Painter. |            |
| R. Crossdale, Preston .....           | 550 0 0    |
| Plasterer.                            |            |
| R. Arrowsmith, Preston .....          | 47 0 0     |

PECKHAM.—For the erection of residential chambers in South-grove, Peckham, for Mr. John Baker. Mr. G. Percival, architect. Quantities supplied:—

|                                   |          |
|-----------------------------------|----------|
| Manley .....                      | £298 0 0 |
| Stevens .....                     | 990 0 0  |
| Smith .....                       | 880 0 0  |
| J. O. Richardson (accepted) ..... | 870 0 0  |
| Allen .....                       | 818 0 0  |

PLAISTOW.—For making sundry alterations at the Lord Gough, Plaistow, for Mr. Dean:—

W. Buckle, Stratford (accepted) ..... £245 0 0 |

**PIMLICO.**—For erection of public mortuary at Ebury Bridge, Pimlico, S.W., for the Vestry of St. George, Hanover-square. Quantities supplied by the surveyor, Mr. G. Livingstone, C.E.:

|                          |            |
|--------------------------|------------|
| J. Dottenill             | £1,095 0 0 |
| Lyne & Smith             | 1,004 1 11 |
| W. H. Richardson         | 969 6 3    |
| T. Richards              | 845 0 0    |
| Infeld                   | 877 0 0    |
| Harbrow & Co.            | 843 0 0    |
| B. Walker                | 829 0 0    |
| Warr                     | 825 0 0    |
| J. E. Hunt               | 820 0 0    |
| H. B. Little             | 800 0 0    |
| J. Webb                  | 799 0 0    |
| J. Bullers               | 795 0 0    |
| J. Newton                | 790 0 0    |
| G. Howard                | 787 5 0    |
| A. Thompson              | 780 0 0    |
| Belham                   | 749 0 0    |
| G. T. Williams           | 747 0 0    |
| Wilkins & Kent           | 745 0 0    |
| T. Coulthard             | 725 0 0    |
| Griffiths & Co.          | 690 0 0    |
| Leslie & Knight          | 687 0 0    |
| Kirk Bros.               | 685 0 0    |
| G. Roberts               | 684 0 0    |
| A. & C. Braid (accepted) | 683 0 0    |
| J. Kidout                | 630 0 0    |
| C. H. J. Pawley          | 409 0 0    |

**RICHMOND (Surrey).**—For surface-water drainage-works. Mr. Walter Brooke, A.M.I.C.E., town surveyor:

|                                   | A.         | B.         |
|-----------------------------------|------------|------------|
| T. Rigby, Croydon                 | £5,713 0 0 | £3,969 0 0 |
| W. Langridge, Croydon             | 5,443 0 0  | 3,950 0 0  |
| Nowell & Robson, Kensington       | 5,465 0 0  | 3,675 0 0  |
| J. Harrison, Brighton             | 5,350 0 0  | 3,650 0 0  |
| W. Harris, Camberwell             | 5,040 0 0  | 3,205 0 0  |
| A. J. Catley, Lloyd-square        | 4,878 0 0  | 3,230 0 0  |
| W. G. Bottenill, Cannon-st.       | 4,384 0 0  | 3,113 0 0  |
| L. Bottom, Battersea              | 4,275 0 0  | 2,774 0 0  |
| R. & W. Isles, Wimbledon          | 4,167 0 0  | 2,779 0 0  |
| B. Cooke & Co., Battersea         | 4,141 0 0  | 2,782 0 0  |
| F. Sims, Richmond                 | 4,143 0 0  | 2,830 0 0  |
| G. Neale, Wandsworth              | 4,031 0 0  | 2,689 0 0  |
| F. B. Hayler, Landport            | 4,080 0 0  | 2,598 0 0  |
| J. S. Halliwell, Ealing           | 3,869 18 0 | 2,516 7 0  |
| G. Cowdery & Sons, Newnt          | 3,621 11 2 | 2,460 5 0  |
| J. G. B. Marshall, Brighton       | 3,700 0 0  | 2,500 0 0  |
| R. Mayo, Brighton                 | 3,600 0 0  | 2,459 0 0  |
| J. W. & J. Neave, Leytonston      | 3,680 0 0  | 2,460 0 0  |
| Peill & Sons, Bromley, Kent       | 3,653 0 0  | 2,353 0 0  |
| G. Bell, Tottenham                | 3,692 0 0  | 2,396 0 0  |
| W. Cordon, Nottingham (too late). |            |            |

[Engineer's estimate £4,447 7 2 and £3,063 18 10.]

A. Contract No. 1, Black Horse-lane outfall.  
B. Contract No. 2, Friar's-lane outfall.  
\* Accepted.

**SOUTHWARK.**—For erecting a warehouse in Blackman-street, Borough, S.E. Mr. G. B. Williams, architect:

|                | Net.       |
|----------------|------------|
| Corder         | £2,195 0 0 |
| Dove           | 2,195 0 0  |
| Little         | 2,148 0 0  |
| Rider          | 2,128 0 0  |
| Ashby & Horner | 2,086 0 0  |
| Higgs & Hill   | 2,064 0 0  |
| Canning & Co.  | 2,047 0 0  |
| Prestige & Co. | 1,989 0 0  |
| Hart           | 1,974 0 0  |
| Greenwood      | 1,955 0 0  |

**STAINES.**—For villa-residence at Staines, for Mr. Wm. Burge. Mr. C. Welch, architect. Quantities not supplied:

|               |          |
|---------------|----------|
| Oades & Son   | £265 0 0 |
| Harbrow & Co. | 683 0 0  |
| Reavell       | 659 0 0  |
| Belch         | 669 0 0  |
| B. Walker     | 691 0 0  |

**WANDSWORTH.**—For three dwelling-houses in flats, on site of Nos. 124 and 126, Wandsworth-road, S.W., for Mr. E. B. Graburn. Mr. J. William Stevens, architect, New Bridge-street. Quantities supplied:

|                          |            |
|--------------------------|------------|
| Green, Red Lion-street   | £2,675 0 0 |
| Levander & Son, Clapham  | 2,560 0 0  |
| White & Co., Rotherhithe | 2,331 0 0  |
| Smith & Son, Norwood     | 2,194 0 0  |
| Prestige & Co., Pimlico  | 2,162 0 0  |
| Bylton, Thames-street    | 2,100 0 0  |
| Creed, Brixton           | 2,099 0 0  |
| Pack, Brixton            | 1,928 0 0  |
| Richardson, Peckham      | 1,869 0 0  |

**WALTHAMSTOW.**—For corner shop, stable, and house, at Walthamstow, for Mr. Geo. Brown. Mr. J. H. Bethell, architect:

|                        |            |
|------------------------|------------|
| G. Hall                | £1,082 0 0 |
| Holland & Co.          | 1,043 10 0 |
| T. Baxter              | 930 0 0    |
| R. D. Boyd             | 888 0 0    |
| J. W. Wyles (accepted) | 646 5 0    |

[Architect's estimate, 620.]

**WESTMINSTER.**—For rebuilding Messrs. T. & W. Farmiloe's warehouse, Rochester-row. Messrs. Isaac & Florence, architects. Quantities by Mr. L. C. Riddett:

|                           |            |
|---------------------------|------------|
| Perry & Co.               | £5,665 0 0 |
| Mowlem & Co.              | 5,638 0 0  |
| Greenwood                 | 5,621 0 0  |
| Martin Wells & Co.        | 5,678 0 0  |
| Patman & Fotheringham     | 5,663 0 0  |
| Braid                     | 5,500 0 0  |
| Green                     | 5,467 0 0  |
| Wall Bros.                | 5,421 0 0  |
| Prestige & Co. (accepted) | 5,373 0 0  |

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# The Builder.

Vol. XLIX. No. 253

SATURDAY, NOVEMBER 21, 1885.

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### Books for Architectural Students.

**T**HE Royal Institute of Architects have issued, as most of our readers are aware, a list of books which students are advised to study in order to fit themselves to pass successfully an examination which is now the necessary preliminary to election to the Associateship of the Institute. As the list of books is a long and varied one, it may be of use if we take a rapid survey of the nature of their contents, to indicate what is the special kind of information to be looked for from them severally; from the principal ones, at all events.

The first division on the Institute list is headed "General History and Biography," and among the first books named are Mr. Fergusson's works,—that known in its earlier form as "Illustrated Hand-book of Architecture," and in its later form as "History of Architecture in All Countries" (both are named in the list), which is added the same writer's "History of the Modern Styles of Architecture," that from the Renaissance to the present day. These are books which stand more decidedly in modern architectural literature than the people are aware of. The illustrations in it, it is true, though most carefully selected and admirably engraved, are on too small a scale, and in the majority of cases too pictorial rather than architectural, for the purposes of a serious study of the architectonic character and details of a building. They were necessarily included in order to prevent so comprehensive a book from swelling to a size and costliness which would have put it practically out of the reach of the majority of the readers for whom it was intended. But it is in its comprehensiveness, in its logical and carefully-considered plan which it is carried out, that its great value lies.

In this respect we know of no other work on architecture to which it can be compared. Alone the student can take, in one book, a survey of the whole history of the known architectural styles of the world, with sufficient illustration to bring the salient features and characteristics of each before him, and their origin and artistic relations with each other; accompanied by a great body of thoughtful criticism and analysis, which, if we do not agree with all the conclusions arrived at, has at least the advantage of setting the student thinking on the meaning and purpose of architecture, and the influences under which its various types have been developed. It is to be added that in the illustrations the

student gets a good deal of what is to be found otherwise scattered through various works. A great many of them are collected from illustrations in various other works mentioned in the same list we are considering (their sources being always acknowledged); and though this will not stand instead of ultimate reference to these separate works, the student gets a first view here of what he would otherwise have to wait for till he had hunted up a number of separate publications. Let the beginner, then, who wishes to get a rational and comprehensive view of the great subject he is entering upon, study his "Fergusson" assiduously, and make notes from it, if he cannot possess himself of a copy (if he can he will find it always useful); he cannot make a better beginning.

There is another book in this first section of the Institute list which also stands alone in its way for comprehensiveness and excellence, and that is Gailhabaud's "Monumens Anciens et Modernes." The text is a minor matter in this case, the value of the book is in its illustrations. It is one of those costly and beautifully-got-up books of architectural illustration of which there are far more examples among French than among English publications. The illustrations are not all equally attractive in manner; for instance, those of Mediæval buildings will seem hard and tame in style to English eyes, accustomed to a different method of rendering this class of architecture. But the book contains a body of illustrations of architecture of all ages, on a scale and with a general beauty of execution not to be found in any other single book we know of, from such ancient remains as Mycenæ and Tiryns (so much of them as was known, that is to say, in the pre-Schliemannite period) down to the late Gothic period. Mr. Fergusson has drawn considerably on Gailhabaud for his own illustrations; and it is a good book to take in conjunction with the "Handbook of Architecture," for a general view of the subject.

Ramée's "Histoire Générale de l'Architecture" is a comprehensive philosophical treatise, very suggestive for its thoughtful and broad view of the subject, commencing with tracing the roots of architecture, as it were, in the history and migrations of the human race. It is not largely illustrated, but the illustrations are very much to the point and carefully executed. They deal rather with the logic than the picturesque of architecture. Gothic is viewed from a very French standpoint, but the development of vaulting is very clearly demonstrated and illustrated by diagrams.

Kugler's "Geschichte der Baukunst" ("History of Architecture") is a rather bald and uninteresting summary of the subject, with hard and ineffective illustrations; and,

considering that few English students read German, its value in the list is very problematical. There are two other books that, in our opinion, should have been in the suggestive list for general treatment of the subject of architecture:—Lesueur's "Histoire et Théorie de l'Architecture," which is a very suggestive book with many brilliant points in it, by one of the most eminent and accomplished French architects of the last generation; and Mr. Garbett's little treatise on Architecture, in Weale's series, which, with some eccentricities of view, contains more real thought on the meaning of architecture than any other book of the same size.

Battissier's "Histoire de l'Art Monumental" is not a book for students so much as for general readers; it is a philosophic treatise on architecture, giving a broad sketch of the history of the art, but with little illustration. The same may be said of Mr. Freeman's work; it is a suggestive history for general readers rather than an architectural student's book. De Quincy's "Dictionnaire Historique d'Architecture" contains a great deal of heterogeneous information, given in a dry style, and without illustrations: a useful book for looking up out-of-the-way information. His "Histoire de la Vie et des Ouvrages des plus célèbres Architectes" is what is called a "readable" book, containing pleasantly-written lives of Brunelleschi, Alberti, Bramante, San Gallo, Sansovino, Palladio, De Lorme, Scamozzi, Perrault, Mercier, Soufflot, Wren, Inigo Jones, and others. Milizia's "Lives of Celebrated Architects" (English translation) is a commonplace book, but gives general facts. There are hardly any good lives of architects. Vasari's "Lives of eminent Painters, Sculptors, and Architects," is one of the most delightful books ever written, but more pleasant than trustworthy, and architects do not occupy a very large proportion of it. The description of the building of the Florence cupola, in the Life of Brunelleschi, and the incidents connected with it, is as interesting as a novel; but Vasari's knowledge of architecture was very skin-deep, and he was a great partisan, and "wrote up" his own friends as conscientiously as any modern reviewer.

Under the head of "Classical," the first books to look at are those which give comprehensive and accurate illustrations of the various types of Classic architecture. The name of Vitruvius, of course, stands at the head of the list of Classic architectural literature,—a name always to be honoured as that of a high-minded man as well as a studious architect; but the young student who takes up his book in the expectation of getting much information from it on Classic architecture will probably be a good deal disappointed. The



real value of Vitruvius consists in the light which he throws on the manner in which architecture was regarded and practised in his day, and on the habits of building and living among his contemporaries; and even this is obscured a good deal by the difficulty, in the absence of any illustrations, of understanding the precise meaning of his terse and condensed descriptions.

Of the books which give accurate illustrations of the details of Greek and Roman architecture, Normand's "Parallel of the Orders of Architecture," translated and re-edited by Pugin, is one of the most useful. This gives pure Greek work as well as the "orders" as practised by the Romans and imitated by the Renaissance architects, who do not appear to have known anything of pure Greek work. It is a work in plain outline drawing, giving the facts of detail, not the picturesque appearance, of the various types. Mauch's "Neue Systematische Darstellung der Architectonischen Ordnungen" ("New systematic Representation of the Architectural Orders") is much the same thing, only that the illustrations are not so finely drawn or engraved. Stuart and Revett's great work on Athens, and Taylor and Cressy's on Rome, were admirable for the time in which they were produced, and for giving a comprehensive view of the antiquities of the two great seats of ancient Classic architecture; but photography has supplanted their "views," and increased facilities of travel also have made us in this generation much less dependent on works of this kind. They are fine books to turn over, but the student will learn more about the way the leading types of Classic architecture are designed and put together from the comparatively dry-looking geometrical drawings in Normand's "Parallel." For beautiful illustrations of ancient remains the volumes of the Society of Dilettanti, "Antiquities of Ionia" and "Unedited Antiquities of Attica," are well worth looking at, as well as for special information on special remains.

In Vignola's "Architecture" and Palladio's "Architecture" the student may see how Classic architecture was regarded by two distinguished architects of the Renaissance in Italy. Palladio is a great name, but his value to the modern student is but small. He represents the time when people were eaten up with the worship of everything Roman, and treats promiscuously "of their marriages," "of their divorces," "of their funeral rites," "of towers and steeples" (these are the titles of four consecutive chapters), and gives designs for applying their orders to modern buildings, with general expressions of contempt for all buildings constructed on other principles. Palladio has notions, however, which are worth attention, e.g.:-

"But of all abuses, in my opinion, the most intolerable is the making certain frontons\* of doors and windows or galleries, divided in the middle; because these frontons were contrived at first to defend those parts from rain, necessity having once taught our first architects to give to them the form of a roof; so that I know nothing more contrary to natural reason than to divide and open that part, which the ancients did make whole in order to defend the inhabitants of the house, and those that enter into the same, from rain, snow, hail, and other injuries of the air; and although variety and novelty should please all, yet we are not to go against the principles of art, and that which reason demonstrates."

So there is a little advice from Palladio for the gentlemen who rejoice in broken pediments.

Vignola's work, of which there is a good Paris edition of the date of 1815, gives orthodox examples for doorways, with pediments, cornices, architraves, and brackets, and a number of ornaments, candlesticks, &c., of a clumsy Renaissance pattern. The main value of the book consists in the full illustrations of his remarkable building, the Villa Caprarola, and of some other villas of fine, though less original type, including some rich, but formal, designs of ceilings. Canina's voluminous book, "L'Architettura Antica," in nine folios, has had its day, and is likely to mislead the student in regard to the "restorations" of some of the antique temples, &c., which are entirely overthrown by the fuller archaeological knowledge of the present day. It contains a number

of geometrical elevations in a hard, precise, mechanical style, but most things illustrated in it are to be found better illustrated elsewhere. The perspective views are singularly weak and poor; in fact, the work has acquired a reputation (perhaps from its size) quite beyond its merits.

From general works on Classic architecture we come to the class of works called Monographs, dealing with one particular building. Of these, Mr. Penrose's "Principles of Athenian Architecture," which is mainly an investigation of the corrections for optical illusions in the Parthenon, and of the practical construction of that unique building, is, for absolute thoroughness of execution, as well as the importance of the discoveries detailed in it, one of the most remarkable books in all architectural literature, and sheds a new light on the architectural methods of the Greeks. It is one of the most important books to master on Greek architecture, after the several treatises before alluded to, and is a fine example, too, of method and precision in architectural measurement and investigation. Inwood's "Erechtheion" is also a learned and carefully got-up book, with very fine and careful line drawings, and a beautiful restored view of the temple; but it has none of the special value of Mr. Penrose's work. Cockerell's "Egina and Bassæ" gives to students fine illustrations of another chapter in Greek architecture.

Nicholson's "Principles of Architecture" is a practical and geometrical work, commencing with geometrical problems and following with their application to measurement and design; it has not much special bearing on the study of Classic architecture in particular. Wood's "Palmyra" and "Baalbec" are large old-fashioned works, with rather coarsely-executed and very probably inaccurate engravings. We do not recommend the student to trouble himself with them. Wilkins' "Magna-Grecia" gives illustrations of the Early Doric of Italy and Sicily, but Hittorf's book on the temple at Selinonte (not in the list) is a better one.

The book at the head of the Institute list of Byzantine studies, Couchaud's "Eglises Byzantines en Grèce," little known, is an important one, as it gives Byzantine church architecture in some of its simplest and most primitive forms, illustrating buildings which, in works on Greece, have been overlooked beside the glory of the Classic remains. Hübsch's "Monuments de l'Architecture Chrétienne" is a splendidly-illustrated work, showing admirably, in the first instance, the transition from trabeated to arcuated construction in a series of examples, and giving numerous illustrations of San Vitale, Ravenna (with a great many fine chromo-lithographs of the coloured decorations), the church of Parenzo, &c. The book deals only with the Byzantine type of church, and concludes with some examples of modern work in this style. Salzenburg's book on the Byzantine buildings of Constantinople is in reality mainly a very fine monograph of the great Byzantine church of St. Sophia. In Texier and Pullan's work the student will follow the same class of architecture in its examples in Asia Minor, and in Vernet's work he will find the best illustrations of the very interesting churches on the Byzantine model which are found in the south of France. These books, studied in the order in which they occur in the Institute list, will give a very complete view of Byzantine architecture, than which no chapter in the history of architecture has been more finely, though some have been more profusely, illustrated in architectural publications.

The list of books on Mediæval architecture is headed by Bloxam's treatise on the "Principles of Gothic Ecclesiastical Architecture," (eleventh edition), and it is no small credit to the author of this little book, written at almost the commencement of the Gothic revival, that it still remains, perhaps, the best and most attractive work from which the young student may obtain his first ideas on Gothic architecture. The illustrations are well selected and admirably engraved, and the writing interesting and pervaded by a contagious spirit of enthusiasm. Rickman's "Attempt to Discriminate the Styles of Architecture in Eng-

land" should be read: much has been discovered since about Gothic architecture, but Rickman's still remains an admirable analysis of the English styles, for which he invented the nomenclature which has since been generally accepted. From these the student should pass to Scott's "Lectures," a book full of information and illustration, the more valuable as coming from one who had such exceptional opportunities of putting his knowledge into actual practice, and did so with such splendid success. Brandon's "Analysis of Gothic Architecture" is in reality a series of admirably selected and carefully-drawn examples, and is most useful book for study. Dollman and Jobbins's "Domestic Architecture" is a book of the same type, but with still better illustrations, and an abundance of carefully-drawn detail: a most useful book for the student. Gailhabaud's "Architecture du Vme au XVIIme Siècle" compiled from drawings and measurements by French and foreign architects before unpublished (date 1858), contains an immense number of finely-executed illustrations of various buildings and of Mediæval detail, but from the way in which it was got up it is rather heterogeneous, and not of so much value to students, who wish to get at the central and typical examples of the style. Caumont's "L'Architecture Religieuse" is a small work, profusely but not very finely illustrated, chiefly useful as classifying a great deal of the French Mediæval ornament, and giving suggestions as to the origin and meaning of typical ecclesiastical ornaments and symbols. "Architecture, Civile et Domestique," by Verdier and Cattois, is a beautifully-illustrated book, giving a great many French and Belgian Hôtels de Ville and smaller buildings, with numerous plans to a small scale, and a great deal of information arranged in a very systematic and lucid manner. King's "Study book of Mediæval Architecture and Art" is a work dealing mainly with Belgian and German Gothic. The author practised at Bruges (1888) the date of the book), and claims these special merits, that the examples are very numerous, they are drawn and measured under his own eye, and are all to the same scale. The illustrations are not very refined in execution, but they give a number of examples of Gothic work not of the finest order, but with a special interest as illustrating a certain school of Mediæval architecture. Pugin's architectural illustrations of Normandy it is only necessary to name. In the list are two splendid works, which, to our surprise, we have found are known to Gothic students of this generation than they ought to be: Bowman and Crowther's "Churches of the Middle Ages," and Sharpe's "Architectural Parallels." The first is a series of beautiful measured drawings of some of the finest churches of England, every detail, ornament, and moulding being religiously drawn from measurement, and finely-executed perspective view of each church added. Sharpe's book is a series of illustrations, executed with the same thoroughness, and with even greater beauty of the principal Cistercian abbeys of Yorkshire (mainly), giving careful perspective drawings of their actual restored elevations, and all existing details. This is one of the most sumptuous architectural publications in existence. Last, but not least, comes that wonderful monument of labour and genius, Viollet-le-Duc's "Dictionnaire," in which not only the facts but the very spirit of French Mediæval architecture are brought before us in every detail. No English translation of this work has appeared, and as the number of people who read French as a matter of course becomes every year greater, there is less and less chance of such an undertaking would pay; so that students who have not got up their French must do so, if they wish to get all the advantage of Viollet-le-Duc's wonderful book.

Under the head of "Renaissance," the largest works named in the list are Letaroussi's "Édifices de Rome Moderne," and Cicognani's "Le Fabbriche e i Monumenti di Venezia." Like Canina's, these are works which have gained a conventional reputation somewhat

\* I.e., pediments.



eyond their merits. Cicognara gives a number of plans of the Venetian palaces, and his large-scale drawings of mantel-pieces, &c., with sculpture accessories (very well drawn) are valuable. But the drawings of the buildings are hard, prosaic, and uninviting, and seem to rob them of half their poetry and expression. Letarouilly gives numerous elevations and plans of Renaissance villas, very full drawings of the Farnese Palace, of San Lorenzo, and other celebrated buildings, all in a hard, precise, and careful outline, the perspective views being executed in the same way. It is not a fascinating work, but it is a useful one for the study of very carefully-drawn detail. Berty's *Renaissance Monumentale en France* is a most beautifully-illustrated work on French châteaux, giving many of the finest examples. Duval's *Palais, Châteaux, Hôtels, et Maisons* is of the same class, but even more fully illustrated,—in fact, unsurpassable in this respect; it is accompanied by short and condensed descriptions of each building, with plans. Percier and Fontaine's *Palais, Maisons, &c., à Rome*, is like another but not so good a Letarouilly, equally hard and unexpressive in the style of its illustrations, and not so finished in execution.

Under the modest head of "Encyclopædias, Glossaries, &c.," comes one of the most remarkable of English architectural publications, Gwilt's *Encyclopædia of Architecture*. Mr. Parkworth's revised and enlarged edition. Gwilt is the English Vitruvius, and though the illustrations to the work are small and old-fashioned, the extent, variety, and accuracy of the information contained in it are most remarkable, especially in regard to the practical and scientific side of architecture. There is hardly any subject connected with this side of architecture on which Gwilt has not valuable information to give; and it is a book every architectural student should possess; he will instantly find its value. Parker's *Glossary of the Terms used in Architecture* is a well-known and useful book; and the *Dictionary of Architecture* will be an admirable one, if it is ever finished. It has got as far as Q, never, which at one time its best friends were expected.

Under the heading of "Mouldings and Ornaments" we have Chambers's treatise on the Decorative part of Civil Architecture, a book of rather mixed value. The modern small edition (1821) is the best, both as more handy and because the illustrations are much better. Gwilt's introductory essay on Greek architecture is interesting. Chambers vigorously regarded his book as a kind of modern Vitruvius, and he gives minute directions for the use and proportioning of the orders, based on Vitruvius. His sketches of the development of stone architecture out of wood are exceedingly imaginative, or imaginary, and are quite out of date in the light of more recent knowledge. Vulliamy's *Examples of Ornamental Sculpture in Architecture* is the very really good book of Classic ornament in its part of the list; it contains beautiful illustrations, to a large scale, not only of human and Renaissance, but of pure Greek ornament, which all the others almost ignore. Tatham's *Etchings* consist of a number of etchings of mostly very vulgar Renaissance ornament, the best things being series of antique tazzas and bowls. The book is not of much value, artistically. Bertolli's *Decorazioni di Nobili Sale* is chiefly notable for beautifully-executed woodgravings of Renaissance foliage ornament, many of them fine examples. There are a variety of ceiling and other designs, in a very mannered taste, but suggestive. A *Corso Elementare di Ornamenti* is a book of studies for drawing Classic foliage, progressing from the simple leaf to more ornate and difficult examples; old-fashioned, but containing fine studies for free-hand drawing. *Architectural Ornaments*, by Heidehoff and Engel (English text), contains much bad ornament, very well drawn; it may be studied as a warning. Mr. Colling's *Gothic Ornaments* contains much good ornament equally well drawn, and is a book to be recommended to the student.

Paley's *Manual of Gothic Mouldings* is another of the small books, like Bloxam's, produced in the earlier stage of the Gothic revival, which still keep their place; but Sharpe's *Mouldings of the Six Periods of Gothic Architecture* is much better, because more complete and systematic, and drawn to a large scale; it is the real book for the study of the subject. Altogether, the Gothic side of "mouldings and ornaments" is much better represented in the Institute list than the Classic side of the same subject.

In another article we will say something about the books recommended in connexion with Sanitary and Constructive subjects.

#### HYDRAULIC WORKS OF ENGLAND, CANADA, EGYPT, AND INDIA.\*

THE volume just issued by Messrs. Thacker is described by its author as a compilation of statistical information relating to hydraulic works which have been carried out in England, Canada, Egypt, and India, combining therewith certain particulars of the hydrology of those countries. Mr. D'Aguilar Jackson has published several treatises of a similar character, and his present work, he states, is to a certain extent an enlargement of Part II. of a previous publication, entitled "A Hydraulic Manual and Statistics." There is but little original matter in the book, the intention of the author being apparently to bring together in a compact and easily accessible form a mass of information which is for the most part at present either buried in official archives, or not readily attainable, even to professional men.

Objection may perhaps be taken to Mr. Jackson's assertion that in Great Britain hydraulic works have lately been confined to schemes of improved water supply and of sewage irrigation, but from subsequent remarks his intention is evidently to confine the term to works of navigation and storage; for no allusion is made to docks, harbours, drainage, river bridges, dredging, or estuary improvements, all of which come essentially within the category of hydraulic works. Though apparently compiled primarily for the benefit of the engineers of the Indian Public Works Department, the book contains much information which is not generally known in England, even amongst engineers, especially as regards the gigantic scale on which hydraulic works have been carried out in foreign countries. The statistics relating to the rivers of Great Britain, which have been compiled from various well-known writers, are conveniently arranged in divisions, showing the number of basins in each group, with the area, population, and geological formation, so that all such particulars with regard to any individual watershed are readily seen. Following this statement is a table of the various canals and navigations, compiled mainly from the statistics laid before the Parliamentary Committee in 1883. The particular feature in this table is the fact that out of the twenty-two "through" navigation routes, only four have not some link in their course not taken over by the railways, viz., two of the routes between London and the Severn, and two of those between Liverpool and Hull; or, according to the Board of Trade returns, out of 2,437 miles, 1,636 miles are under the control of the railway companies, by which means the traffic of the country is heavily weighted, and deprived of the cheap carriage which water transit alone can secure. Mr. Jackson thus pitifully contrasts the actual results that might have been effected by that Committee with the absolute total absence of results, "the treatment being parallel to that in the case of the water companies and many other cases of oppression under unjust free contract,—that is, in favour of the plutocrats and to the detriment of the public."

The statement of the principal storage works in Great Britain in 1881 is arranged so as to

show at a glance information which has not hitherto been so conveniently afforded, and is interesting in enabling one to arrive at the general cost of storing 1,000,000 cubic feet of water in large reservoirs. The two largest recorded, those supplying the towns of Liverpool and Manchester, and having a capacity of 649,000,000 and 727,000,000 cubic feet respectively, cost at the rate of 3,650*l.* and 3,950*l.* per million; but though not so stated, those sums probably include a portion of, if not all, the expenses of distribution, and also presumably the capacity is calculated upon only a single filling; for, as the reservoirs are said to contain a supply sufficient only for 220 and 142 days respectively, they must, in order to be effective, be replenished from time to time, and therefore the actual cost of storage per million cubic feet is probably much less than the above figures seem to indicate. Taking, however, the statement as it stands, out of fourteen large reservoirs, in nine the cost averaged 3,650*l.*; in three, 1,316*l.*; and in two, 650*l.* per million cubic feet. Similar works in Southern India, for the supply of the cities of Madras and Nagpore, apparently have cost at the rate of only 40*l.* and 135*l.* respectively per million cubic feet; while the Vehar Lake, for the supply of Bombay, on a much more costly scale, amounted, inclusive of distribution, to 1,200*l.* per million cubic feet.

The chapters on Sewage Irrigation consist, for the most part, of a series of statements, in which are tabulated several particulars of information derived principally from Parliamentary returns issued some ten years ago, together with an abstract from the judge's report on the sewage farm competition, issued in 1879. Though there may be more or less value in the particulars afforded, yet as the subject has been, and is receiving greater consideration, and more light is daily being thrown on sewage operations, the experience and results arrived at ten years ago have perhaps more value in showing what has to be avoided, rather than what has to be followed. The operations conducted at the various places where there are sewage farms are clearly described, while the details as to the number of waterings and weight of the various crops are valuable as records of actual results. Amongst others, the outturn obtained at Reading, in the case of mangolds, is especially noteworthy,—“The crop of long red mangolds, in 1874, having been marvellous.” It is said, “their yield per acre being 118 tons with tops, and 98 tons without them.” The conclusion arrived at by Mr. Jackson himself, as regards sewage disposal, is that “farming with effluent and suitable sewage remains the only sure and economic method.”

Passing on to Canada, the author describes in detail the operations carried out in the canals of the St. Lawrence series, which it is expected may be completed during the current year, with the result of securing a navigable depth of 14 ft. throughout the whole route from Montreal to Kingston. The expense will perhaps amount to two millions sterling, the returns for which are, however, considered as quite a subsidiary matter,—the light in which the State regards those works being, that on a comparison of its past with its present condition, “there can be no doubt of their having been of far greater benefit to Canada than the aggregate amount of their cost.” The magnificent scale of those works may be judged from the dimensions of the canals, which are 200 ft. wide, while the locks are 270 ft. long, and 45 ft. wide. Similar particulars are given of the Richelieu, Ottawa, Rideau, and Trent Navigations, as well as a detailed description of the operations on the Welland, the most important of the Canadian canals, which affords a navigable connexion between Lakes Erie and Ontario for vessels of 2,000 tons. It is to be regretted that no statistics have been added of the traffic that passes through the Welland and other canals, notwithstanding the disadvantage of being closed by frost for one-third of the year, and the competition of parallel railway lines, accommodate an enormous trade at rates far below what the railways charge.

Great interest attaches at present to this

\* Statistics of Hydraulic Works and Hydrology of England, Canada, Egypt, and India. Collected and reduced by Lewis D'A. Jackson, C.E., &c. London: W. Thacker & Co., 87, Newgate-street, 1885.



hydraulic works of the country next taken up in the book, viz., Egypt, and of which a very detailed account is given. Its irrigation works are similar to those in operation in the Indian Deltas, but from not having been as scientifically and carefully laid out they are of a rougher type and not so effective as they ought to be. Mr. Jackson likewise enters into a very full description of the hydrology of the basin of the Nile, including its levels and discharges at various points in the 3,000 miles of its course; and there is one fact of special interest to which a passing allusion is made, viz., the speed of the "flood wave."

From the table of discharges measured at Gondokoro, Khartoum, and Cairo, an approximate guess as to that phenomenon may be made. The highest level and discharge at Khartoum in the year 1849-50 as measured on 1st of September was 22-70 ft., the corresponding maximum measurement at Cairo was on the 1st of October 23-30 ft., the relative volumes being 419,637 and 319,550 cubic feet per second, from which it would appear that the flood wave took thirty days to travel from Khartoum to Cairo, a distance of 1,800 miles, thus giving a rate of sixty miles per day or 2-5 miles per hour. The author, however, deduces the speed of the flood wave at the first rising of the river to have been 1-68 miles, while at its highest stage it amounted to 3-11 miles. The decrease in the flood volume between Khartoum and Cairo is a curious phenomenon; the solution, as given by Lombardini,—to the effect that one large portion goes to fill up the river bed from low-water to flood, and another portion is lost in the infiltration from overflows that return to the river after high flood,—may doubtless to a great extent be correct; at all events, it is of considerable interest in tending towards an explanation of the law of flow of underground water. Had the data regarding the flood wave been studied previously to the despatch of the Soudan Expedition, a tolerably accurate forecast might have been made of the probable state of the river at given dates along the principal points of its course, as well as of the conditions at the site of the various rapids, and might, political vacillation apart, by showing the necessity for an earlier start from Cairo, have been instrumental in saving the expedition from some of the difficulties which were encountered, and, by avoiding the delays occurring at the Rapids, might have expedited its movements and enabled it to accomplish the object for which it was despatched. It is to be hoped that sufficient and accurate data have been collected during that expedition to determine this important phenomenon more exactly. According to Mr. Jackson's tables, the lowest state of the river at Khartoum occurs in the month of May and at Cairo in June, the relative discharges then being 31,044 and 26,841 cubic feet per second respectively. With so large a minimum discharge, improvements to render the Nile navigable throughout its entire length ought to be perfectly feasible. The different degree in which water carriage is appreciated and dealt with in the Eastern and Western hemispheres is very marked. While every effort has been made, regardless of cost, to surmount the difficulties occurring in the great Western Continent, the rivers in the Eastern Hemisphere have been entirely neglected, albeit the Nile presents on the whole less formidable obstacles than those overcome on the St. Lawrence, and has larger and equally important lakes at its source, destined, very probably, at some future date, to form the summit level of a grand chain of water communications from west to east of the great "Dark Continent."

Little faith has till lately been placed in agricultural or any other statistics relating to Egypt, but the chapter on the productive value of land, compiled from a memorandum prepared by Mr. Nicolson so lately as 1883, may presumably be accepted as containing reliable data. It is stated therein that the value of the average yield from maize, beans, wheat, and cotton amounts to 8-75% per acre, and from sugar-cane to 18-75%, while the net return yields about 9% per cent. on the capital outlay. The introduction of perennial irrigation is expected to enhance still further the value of the outturn, and if only the present able

Minister of Irrigation Works is allowed to carry out his plans, the agricultural prospects of Egypt, as well as the Public Treasury, will be greatly benefited.

The latter half of Mr. Jackson's book is devoted to the hydraulic works of India, the statistics of which are given in great detail. An idea of the scale on which operations have there to be carried on may be gathered from the extent of country to be dealt with, comprising an area of one million and a half square miles, inhabited by 253½ millions of people. The magnitude of the schemes, and the size of individual works, will be apparent from the tabulated enumeration of the dimensions and volumes of some of the principal rivers, the flood discharges of which range from 380,000 to 1,800,000 cubic feet per second, and the breadths of which vary between one and five miles, with surface velocities of from four to seven miles per hour. The great interest of India, however, is centred in its irrigation schemes, without which a large portion of the country would be unable to yield any produce or food at all. According to Mr. Jackson's figures, nearly 24 millions sterling have been expended on the canals throughout India, for which outlay six millions of acres are irrigated, yielding in 1882-83 a gross revenue of 1,932,200*l.*, or a net revenue of nearly one million. Out of the above capital outlay, 5,000,000*l.* have been expended on works which have either scarcely yet come into operation or do not as yet yield a surplus revenue. The return of navigable canals in Mr. Jackson's statement is incomplete; but from the statements handed in to the Parliamentary Committee there must be in India about 3,000 miles of navigable canals, independent of the rivers and tidal streams. Besides irrigation from canals, there is a very extensive system from reservoirs, or, as they are locally termed, tanks, in Southern India. In the Madras Presidency they are especially numerous, some of them being of immense size, and almost all of them are the works of the ancient rulers of India. It is said that in Madras alone there are 53,000 tanks, having probably 30,000 miles of embankment, and 300,000 separate masonry works in the shape of weirs, escapes, and sluices, irrigating about three millions and a quarter acres, which yield an annual revenue of 1,500,000*l.*

It is impossible to attempt to enter into the details of the great schemes of irrigation which have been carried out in the Deltas and Doabs, or interfluvial tracts of North and South India, and we must, therefore, refer those interested in the subject to Mr. Jackson's book, where they will find the particulars fully detailed; but a few words on the works carried out in a country which is just now attracting considerable attention, Burmah, will not be out of place. Traversed by a magnificent river, which is navigable for hundreds of miles, whose flood discharge is nearly 2,000,000 cubic feet per second, and its minimum summer flow 46,000 cubic feet, the Delta of the Irrawaddy is liable to be so submerged over vast tracts as to render agricultural operations nearly impossible. The attention of the local administration has been, therefore, directed to reclaim the country as far as possible from those floods, but, inasmuch as the population is sparse and the expense of the embankments considerable, averaging 840*l.* per mile, the works can only be carried out by degrees. In 1882-83 the capital outlay on the western embankments amounted to 305,000*l.*, the net revenue to 46,289*l.*, the working expenses to 8,733*l.*, a sufficiently encouraging result to justify the prosecution of the scheme for reclaiming by marginal embankments the whole of the upper part of the Delta.

Mr. Jackson's book concludes with a short account of the works carried out in Ceylon, which may be briefly described as comprising 24,700 square miles, of which 4,000 square miles are mountainous, at an elevation of 3,000 ft. to 7,000 ft. above the sea. There are several very fine reservoirs in the island, some of which were constructed by its kings before the Christian era. The information available, however, is very meagre.

Mr. Jackson would doubtless himself dis-

claim the idea of perfect accuracy for the statistics contained in his book, but probably they will prove sufficient for the purpose he has had in view. At all events, he has succeeded in bringing together within a compact and readable compass a vast mass of information which could not otherwise be reached except at great expenditure of time and labour.

#### NOTES.

**T**HE Report of the Council of the Institute on the draft of the new Charter, to be submitted to the general meeting on the 30th is now in the hands of members. The report briefly summarises the principal points in the new Charter: the minimum limit of age for Fellows (thirty), the proposal for powers to institute an examination in the election of Fellows as well as Associates, the vesting of the property in the Institute and not in the Fellows alone, the proposal to grant a certificate of membership to those who wish for it, &c. The Charter is printed in full. Professor Kerr announces a motion of formal opposition to the proposed new Charter in all its parts, in order to secure full and free discussion of the whole subject. The Journal of Proceedings also contains a memorial to the Council from members in Liverpool, in favour of vote by proxy for non-metropolitan Fellows and equal advantages in every way for country members with London members, with a suggestion for considering the question of amalgamating all provincial societies in one chartered body having its headquarters in London, as "until such amalgamation is carried out it will be impossible to obtain State recognition." The Manchester Society of Architects issue a memorial to non-metropolitan Fellows to attend the meeting and secure the advantages they wish for by a preponderance of votes. So on the whole we may take it that the 30th will be a bustling evening at No. 5 Conduit-street.

**A**FTER a good deal of delay and warm discussion, the Main Drainage Committee of the Richmond Vestry have resolved to recommend the adoption, out of a list of five schemes in the competition, of Mr. Melliss' Mortlake Drainage Scheme, as that which, of the whole, offers the best prospect of settling in a satisfactory manner "the extremely difficult question of disposing of the sewage of the parish." The Richmond Vestry, at a special meeting held last week, adopted this scheme by a majority of 19 against 6. It may be mentioned that this scheme is similar to the one which was promoted by the Thames Valley Sewage Board, prepared by Messrs. Melliss & Mansergh, and sanctioned by the Local Government Board, but thrown out in Parliament because of the opposition principally of the Vestry which now adopts it. The site for the precipitation and filtration operations is the same as that which was proposed in the larger scheme objected to. But it is now argued that in the case of the larger scheme it was proposed to drain twenty-one parishes. Here the object is to drain only one, and the necessary evils of any drainage system are materially diminished. It is a well-known fact that nine-tenths of the houses in Richmond drain directly into the Thames; but it will soon be a penal act to drain any more sewage into the river. When this scheme is completed, and in working order, it is not too much to say that a serious source of pollution for the river in the upper reaches, as well as the lower, will be removed. Mr. Melliss' scheme embraces the conveying of the sewage, either of the Richmond parish alone, or the district of the Richmond Rural Authority conjointly, by means of a collecting sewer along the river bank at Richmond; and by a main sewer thence to Mortlake. It is proposed to purchase a plot of land near the riverside at Mortlake, of about eleven acres (which it is stated Captain Fitzgerald offers to sell for 12,000*l.*); and there deal with the sewage by chemical precipitation and filtration; the effluent passing into



the Thames. The total cost of the scheme, is applicable to the parish and the District Council Authority, is estimated at 96,660l.

THE terrible conflagration which has swept away in a fiery wave upwards of 700 residences in Galveston is a fresh warning as to the need of readily available water supply, provided especially with a view to fire. In the great American cities water is usually supplied with a bounty that seems to us very wasteful. In the nine principal cities of the United States, each with a population exceeding 100,000 persons, the water delivered averages more than seventy gallons per head per day. This is double the London water supply, in the thirtieth time of the year. In Chicago, which was ravaged in 1871 by a fire that raged for four days, that swept an area of more than three square miles, and burned down 25,000 buildings, the present water supply, derived from the lake on the banks of which the city is built, is at the rate of 110 gallons per head per diem. This is a remarkable instance, not only of the burned child dreading the fire, but of the adoption of wise precautions against a recurrence of the evil. This magnificent supply is not only the most copious, but also the cheapest in the world. While the revenue derived from the Chicago water works is 10-26l. per million gallons, the actual cost of that supply is little more than a tenth of that price, viz., 1-11l. per million gallons. In these two terrible fires the buildings were chiefly of wood, and the conflagration once on foot was strong enough to mock all attempts at extinction. We ought not, however, to forget that in that quiet and easy pavement which is now spreading over London lies a source of possible danger in the case of a great fire. It is rather to constant watchfulness, to the regular testing of every source of water supply, as to its accessibility and working order, and to instant action when fire breaks out,—than to any other precaution, that we must look for the safety of London.

THE condition of the iron trade is not reassuring. The small-chainmakers in South Staffordshire and East Worcestershire resumed work, on the 13th current, after a nine weeks' strike, at the wages against which they struck. The present average price for all-mine pig-iron is 60s. per ton, while common or cinder iron is sold at from 40s. to 37s. 6d. per ton. But, at the same time, the Belgian prices have fallen to 39 francs, and the Luxembourg makers have reduced their price to 35 francs per ton. In face of this difference of price, it is perhaps intelligible why in Glasgow,—the very centre of one branch of the iron trade,—the new Municipal Buildings should be constructed with iron from Belgium. But it is none the less unpleasant as a fact, however it may be explained. In textile industry, the notice of Messrs. Marshall, of Leeds, the largest flax-spinners in England, that they are about to close their works, adds to the gloom of the winter outlook. It is idle to wait for better times, in presence of facts like these. It is incumbent on those who care for the future of the industry of the country to prove the causes of the existing depression. How far it is possible to obviate them is a question that cannot be rationally discussed till we know thoroughly what they are.

IN the action of Conway v. Clemence, heard in the Queen's Bench Division on Saturday last, before Mr. Justice Manisty and Mr. Justice A. L. Smith, the plaintiff, who was a bricklayer employed on a house being built by the defendant, and had been struck on the head by a brick which had fallen down the well of the staircase, had obtained a verdict of 50l. damages in the Westminster County-court under the Employers' Liability Act, on the grounds (1) that the well-hole on the ground-floor of the house had been of an unreasonable size, (2) that the large size of the well-hole had been the cause of the accident to the plaintiff, and (3) that its large size had constituted "a defect in the condition of the plant or works" of the defendant. The latter claimed that the verdict should be set aside, as the

mere size of the well-hole was not "a defect in the condition of the ways, works, machinery, or plant connected with or used in the business of the employer," and the brick was let fall by men in the employ of a sub-contractor to the defendant. The judges ruled that the word "plant" did not include the carcass of a house, nor width of the well a defect. Judgment was accordingly entered for the defendant. The case is a hard one for the unfortunate plaintiff, but it shows that in point of law he must have been wrongly advised from the first, and that it is very important for workmen in such cases to be sure of their legal ground before availing themselves of the provisions of the Act.

WE learn that an institution for instruction in "the European style of sculpture" has just been established at Ushigomi, Tôkyô, Japan, under the patronage of a number of high native officials. Students are admitted free of charge. This looks as if the Japanese were waking up to the fact that they cannot draw or model the figure in a serious sense, although they show such admirable faculties for humorous travesty. But it may be seriously doubted whether they are taking the right course in trying to follow European sculpture. If, without attempting imitation of Western art, they were to endeavour to develop their own unquestionable powers in grotesque modelling of the face and figure in a more serious line, they might in the end establish a new and original school of sculpture, instead of aiming at a second-hand edition of European art.

THE highway from Edinburgh to Queensferry is acknowledged to be one of the finest roads in the kingdom. This highway did not at once assume its present form, but is the result of various improvements which have been from time to time effected, the starting-point having been the erection of the Dean Bridge, which spans the gorge of the Water of Leith, and which forms one of the many picturesque points in the city. Before the erection of the Dean Bridge the exit from the city to the north-west was by a narrow, tortuous road, passing over the Water of Leith by a low-level bridge at Bell's Mills. This bridge has for some time been considered insecure, and the necessity for an exit in this direction from the newly-formed quarter at the west end has rendered it necessary to supersede it by a new bridge. This bridge is to form a continuation of the roadway of Palmerston-place, which has just been completed, and in order to attain the higher level, part of the old Queensferry-road will be raised by 24 ft., the total height of the new roadway above the stream being 52 ft. The design of the new bridge, which has been entrusted to Mr. Cunningham, C.E., shows a single arch with a span of 68 ft., with a breadth of 40 ft., including the parapets, which are to be constructed of granite and embattled. The rest of the structure is to be formed of ashlar in courses. At the abutments are to be broad projecting pilasters, above which are to be panels containing the city arms, and beneath the parapet there is a projecting denticulated string-course. The estimated cost of the work is about 15,000l.

WE regret very much to hear that the picturesque old gateway called the "Stone Bow," which may be said to be "The Temple Bar of Lincoln," is threatened with destruction by the town authorities. The reason given is, of course, the same as that which led to the unavoidable removal of Temple Bar, viz., that it blocks the traffic. In regard to Temple Bar this was a real and palpable evil which could not be overlooked, considering the immense traffic along Fleet-street, which was year by year increasing. But Lincoln, unless it be changed much since we last saw it, is no busy town of crowded traffic, where every one is in a hurry, but a quiet cathedral city of the antique type. The Stone Bow has only a single carriage way, it is true, but a resident writes that it is rarely that a carriage is delayed. It is surely better that there should be

a little occasional delay, if that is all (and of that we cannot speak from observation), than that a city like Lincoln should be denuded of so characteristic a monument.

WE published last week a letter from one of the competitors for a villa competition, premium 10l., complaining of the proprietor in advertising the result. From a letter we have received from another competitor, it appears that 200 designs were sent in (!), and that the unsuccessful competitors have not got their drawings back. We hope the person who advertised the competition is attending to his duty in this respect, and is not overwhelmed with surprise that so many fish should be attracted by so small a bait.

THE copy of the ancient city cross of Edinburgh, commissioned by Mr. Gladstone, is now completed, and, although it forms an additional object of interest in the city, we cannot say much in its favour as a work of art. The original structure was of great value as an ancient relic and on account of the associations connected with it, and had it been possible to restore it the time and labour might have been considered as profitably employed. The present structure, with a trifling exception, is new, and an admirable specimen of mason's work it is; but that is the best that can be said in its favour. Mr. Sydney Mitchell has done his part as superintending architect most efficiently, but had he been entrusted with the production of an entirely new design we have not the least doubt that the outcome would have been something worthy of admiration.

THE new church of St. Michael and All Angels, Walthamstow, was consecrated on Wednesday last by the Bishop of St. Alban's in the presence of a large congregation. The building has cost over ten thousand pounds, and is a large and lofty structure of rather original design and effective proportions. It consists of a nave of six bays, with rather narrow aisles, and a chancel with an organ-chamber and spacious vestries on the south side, the mourning chapel is in the east bay of the north aisle, and there is a baptistery at the west end. The walls are of stock bricks, with a considerable proportion of red brick and stone in the dressings, and a heavily-timbered open roof covered with tiles. Funds are still wanted to complete the north porch and to erect an isolated tower. The works have been carried out from the designs of Mr. J. M. Bignell, by Messrs. Adamsons, the contractors.

AN interesting work on decorative art is to be brought out shortly by Mr. Quaritch, consisting of a series of illustrations, drawn and coloured by Mr. Vacher, of designs taken from the dresses and stuffs shown in Italian paintings in the National Gallery collection. Mr. Vacher has made a number of careful coloured studies from these, a good many of which we have seen, and which are to be reproduced in chromolithography. The idea is a new and happy one.

THE Association of Diamond Merchants have just fitted up one of the shops under the Grand Hotel in a sumptuous and novel manner, for the purposes of their business. Messrs. Romaine Walker & Tanner, who designed and carried out the work with exceptionally good taste, have cleverly contrived to use every inch of the space at their command without cramping any part. The shop window is arranged with a recess in which people may stand to admire its contents out of the way of passers-by on the footpath. Inside there is a gallery at the back where purchasers may see their diamonds weighed in the delicate balance kept for the purpose, and in the basement is the workshop, where they may see them set. There is an office for the manager under the gallery, and a cosy ingle by the fireplace behind the stair to the gallery. All the detail is pretty, and the square-turned balusters are particularly effective.



WE understand that the Society of Lady Artists, with the addition of many new members, will hold its Annual Exhibition of Oil and Water-colour pictures this winter at the Egyptian Hall, Piccadilly. The Exhibition will be opened in February, 1886.

ONE of the architects who gave evidence before the Westminster Hall Restoration Committee in favour of Mr. Pearson's scheme has written to us in reference to our paragraph about Mr. Fergusson's article last week, about which our correspondent seems to have lost his temper, and insinuates that we are not representing the truth in saying that the scheme was "mainly prompted by superstitious reverence for a piece of Norman walling." The expression is a general one, not intended to be taken *au pied de lettre*, but it is borne out by the history of the whole affair, and even by detailed items in the published evidence, e.g., from Mr. Pearson's own evidence:—

"Question 326. I think your real motive for all this is to preserve the old Norman work!—Yes; all the evidences of the old Norman work are along that wall."

327. And that is the great motive of the design you have made!—That was the great object I had in view; and to turn the space within to the best account."

What does our correspondent say to that? The fact that the same view occurred to Mr. Fergusson and ourselves, who are quite independent in the matter, is in itself an indication that there is reasonable ground for it.

#### THE NEWLY-DISCOVERED SAXON CHURCH AT DEERHURST.

RECENT discoveries in the historic site of Deerhurst, in Gloucestershire, not far from Tewkesbury, have brought to light several antiquarian facts which render it imperative that the history of that archaic spot should be rewritten; for all existing accounts, when examined by the light of what has been lately explored, are untrustworthy and incorrect. Forty years ago Mr. Daniel D. Haigh described the church for the British Archaeological Association, and collected a quantity of useful notes relating to the history of the foundation and fortunes of that building. Later, the world of archaeology has become indebted to the veteran architect, Mr. J. C. Buckler, for a very valuable essay on the architecture of the church, which still remains unpublished, among the manuscripts preserved in the British Museum, although there are hopes that one of the County Archaeological Societies will before long publish a considerable part of it. Deerhurst Church has also contributed numerous details of architectural illustration to all the text-books of the architectural student. But until the summer of the present year no one had any other idea than that all that could be known of Deerhurst had been long investigated. Not far, however, from the church,—of which we do not propose to say more on this occasion than that it is one of the few specimens of the class of Early Anglo-Saxon churches, much disfigured by late alterations,—stands "Abbot's Court," which had belonged to the chapter of Westminster from a very early period, about 120 yards to the south, and somewhat nearer to the river Severn, which runs nearly north and south on the west. This, as it now stands, is a large irregular farmhouse, built at various times; its eastern portion is a fine-timbered erection of about the sixteenth century, and communicates with the centre part of the house, which is, in fact, an old church, which by the introduction of a flooring, has been converted into a series of apartments on the basement and the upper floor.

On the west side, communicating with this central portion, comes a third erection, more modern than the eastern part, but still of considerable age. This farmhouse happens to be untenanted at present, and it is owing to this that the discovery has been made. From the information conveyed to the British Archaeological Association last Wednesday (18th inst.) by the Rev. G. Butterworth, vicar of Deerhurst, it appears that the Ecclesiastical Commissioners are converting two farms into one, and the tenant farmer will not, in future, inhabit Abbot's Court. This edifice was handed over to a local builder (whose careful desire to pre-

serve the old work deserves great praise) for the purposes of repair, with a view, it is thought, of converting the "Court" into one or more cottages. All that was known about the building until about three months ago was that a portion of it was very old because of the unusual thickness of the walls. The discovery of the true character of the place arose in the following manner:—Mr. Butterworth, who had often inspected the old walls, fancied that the plaster with which the walls are covered in one place showed very faintly the appearance of a semicircle. One day the workmen employed on the alterations cut down a fruit-tree close to a large chimney-stack belonging to the sixteenth-century portion, and the vicar immediately discovered an inscribed stone which the tree had, until then, concealed, built into the wall. Unfortunately, the stone has been seriously mutilated, and the centre is completely cut away, as if the stone had been used for the head of a lancet window, but the portion remaining leaves sufficient to prove its real nature and import. The remaining letters are:—

|           |      |
|-----------|------|
| I         | HONO |
| .....     | ETRI |
| .....     | HOC  |
| .....     | REDE |
| DICATIVE: |      |

This, which is undoubtedly the dedication slab of the altar, has been explained by the vicar to read:—"In honorem Sancte Trinitatis hoc altare dedicatum est" ("This altar was dedicated to the honour of the Holy Trinity"). "Sancte" for "Sanctæ," we presume. It has been conjectured,—and, we think rightly so, if the forms of these letters on examination do not point to the earliest appearance of Christianity at Deerhurst (which, as we shall presently show, is not later than A.D. 804), rather than the second foundation some time before A.D. 980,—that this inscribed stone owes its existence to one of the Acts of the Council of Celchyth, presided over by Archbishop Wulfred, on the 27th of July, A.D. 816, viz., that bishops were to take care that the saints to whom the churches were dedicated were to be put up on the wall of the oratory or on a tablet, or also on the altars. The exact words are worthy of record, as found in an ancient manuscript in the Cotton Library of the British Museum, *Vespasian A. XIV.*, published by Haddan & Stubbs, *Councils*, vol. iii., p. 580, and others who have studied the history of the English Church. They are:—"Præcipimus unicuique episcopo ut sciat depictum in pariete oratorii aut in tabula, vel etiam in altari, quibus sanctis sint traque dedicata." This injunction was obeyed at first, and for some time more or less strictly, as at St. Martin's, Canterbury, and at Castor, in Northamptonshire; but from the dedication stone of the Abbey Church of St. Paul, Jarrow, which bears a date of the fifteenth year of King Egfrid, and the fourth year of Abbot Ceolfrid, i.e., A.D. 685, it is clear that the canon quoted above rather seeks to enforce an old rule than to inaugurate a new one.

One day the vicar called the attention of the builder, Mr. W. Collins, of Tewkesbury, to the appearance of the plaster about 12 ft. above the ground, and, on procuring a ladder, a circular-headed window was opened out, which had a splay both inwards and outwards, but no ashlar-work. Subsequent examination of the so-called pantry of the farmhouse showed two large stones, about 6 ft. or 7 ft. apart, and about the same height from the ground, which looked like impost. These simply stood out from the plaster, and close to one of them was and is a brick prop. Meanwhile plaster and whitewash, and features added at various and late times, concealed all besides. It was difficult to conceive an arch above these impost, and solid ashlar jambs below, and they thought that the old building ended with the chancel-arch, although they saw in the north-east angle of what proved to be the chancel an Early English bracket. At last they discovered that these two stones were massive impost, which will be described more in detail presently, and that beneath them were very solid ashlar jambs, with irregular long and short blocks disposed at the angles in alternate courses. Above the impost an arch was turned, somewhat inclining to the horse-shoe shape, so clearly indicative of the

oldest period of Anglo-Saxon architecture, unless the appearance be due, as it is known to be in some cases, to the settlement and inclination of the piers from which it springs. The centre of this arch, which turned out afterwards to be the chancel-arch of the church or chapel, is manifestly at a considerable distance above the line drawn from the upper edges of the impost. Unfortunately this line arch has been cut in half about 1 ft. above the impost on one side; that is, one side of the arch is lost from about the centre to 1 ft. above the impost. The arch, however, has been propped up. It was only by degrees that it became apparent that on one side of this arch was an ancient nave, on the other a chancel, of a small chapel; for at first it seemed to be an ancient dwelling-house, with an upper floor, and a huge fireplace at one end. The walls of the building have now been partially cleared, and the vicar does not expect to come upon many more ancient traces.

In plan this ancient edifice consists of but two portions, nave and chancel, divided by the very solid chancel arch above described, the width from jamb to jamb being 6 ft. 6 in. The extreme outside length of the work is 46 ft.; length of nave, 25 ft. 6 in.; length of chancel, 14 ft.; width of chancel, 11 ft. 2 in.; thickness of chancel walls, 2 ft. 3 in.; thickness of outside walls, 2 ft. 6 in. The south wall, and southern half of the eastern wall of the chancel, have been destroyed; the other walls are sound, and from their massive character they will with fair treatment remain practically indestructible. There are traces of the south door about one-third of the length of the south wall from the west. Opposite to this, on the north, is the north door, now blocked up. Its jamb consists of six ashlar blocks, of irregular size, capped by an impost of two members, each about 3 in. thick, the lower one only slightly projecting beyond the jamb; the upper one projects more boldly, and is ornamented with a semicircular moulding. Above this impost a low semicircular arch is turned, with segments of stone. The total height of opening from ground to top of arch inside is very nearly 8 ft. On the north wall, at about one-third from the eastern corner of the nave, and corresponding in position eastward to the blocked-up door westward, is an altered window. Exactly opposite to this, on the south wall, is the splayed window already referred to. The sill of this is about 10 ft. 6 in. from the ground. The opening is about 2 ft. 6 in. wide by 3 ft. 3 in. high. This arch is round-headed. But the most interesting feature of this part, and one which unmistakably points to a high antiquity for the original fabric, is the method of the construction of its voussoirs, which is not of ashlar-work, but of thin slabs or tiles arranged like the well-known fragment of the Roman building at Leicester; the Roman gate at Lincoln; the arches at Brixworth Church, Northamptonshire, and Porchester Castle, Hampshire; the windows and other parts of the old church in Dover Castle; and the work on the south side of Brytford Church, in Wiltshire. In the centre of the north wall of the chancel is a large, sixteenth-century window, which is not necessary to particularise here; and in the angle near it an Early English bracket of a simple character. There do not appear to be any indications of a window either at the chancel wall or at the west end, although it is not unlikely that at the chancel, at least, there was a window of small dimensions, which further investigations may reveal.

The chancel-arch, which now remains to be described, is exceedingly interesting, for many reasons. It possesses unique features for an arch of the Anglo-Saxon style, and is almost the only ornamental part (if we may use the term of a building almost entirely devoid of ornament) of the whole structure, which, from the severe simplicity of its ground-plan and the primitive character of its doors and window,—comparable, in some points, with the debased Roman work which entered so strongly into design of the oldest class of this style,—must be referred to a very remote period, for which we have, happily, documentary as well as lapidary and ecclesiastical evidence. The arch is composed of two massive jambs, 2 ft. 3 in. wide, about 5 ft. from the old floor-line, and 6 ft. from the foundation of the lowest course of stone. The large blocks used in this course support irregular long and short work of six courses, looking east towards the nave, and five courses more approaching the normal proportion



long and short angle work on the side looking west towards the chancel. Upon these are the impost, which consist of four members. The lowest, about 2½ in. thick, is chamfered or rifled along the whole face, at an angle of about 60 deg. The second and third members, taken together, are about 4½ in. thick, with hollow moulding, not quite semicircular in section, the upper one of the two slightly thicker, and each having a narrow strip of flat band to separate it from the next stone beneath it. The fourth tier or abacus is of larger dimensions, being fully 3 in. thick and having a bold circular moulding. The aspect of its capital or impost, 10 in. in thickness, is very pleasing, and is probably unlike any yet recorded or the period under observation. From it springs the arch which, as has been already pointed out, is of decidedly a horse-shoe form. The masonry on the side looking west towards the chancel is of somewhat irregular outline, but on the side looking towards the nave the tones are of regular proportion, and a narrow rib or strip of stone runs round them and dies into the abacus. The total height of arch from the old floor-line is about 10 ft. 3 in. inside opening. We may venture to assert that no masonry work on Anglo-Saxon ecclesiastical architecture will fail to point to the composition of its feature in the chapel as one of the highest interest. With regard to the plan, its simplicity is an unerring test of its age. Comparing the old church at Bradford-on-Avon (which, by the way, was also discovered quite accidentally by the late Rev. W. H. Jones), to which the late Mr. J. H. Parker, C.B., one of the best ecclesiastical antiquaries of his time, attributes the date of A.D. 705, we are struck with the general resemblance of proportion, the absence of east or west windows, and the north and south doors facing each other, but in the Bradford church in the middle of the wall length. But it must be admitted that the important and proportionally capacious porch at Bradford, contemporary in execution with the rest of the fabric, finds no corresponding structure at Deerhurst, and, therefore, it is fair to presume that the Deerhurst chapel points to a more remote antiquity.

We may say a word, before passing to the historical evidence which bears upon this ancient building, with regard to its future. To convert it into a cottage or cottages,—however picturesque and commodious they may be,—would be to outrage all ecclesiastical and antiquarian propriety. The buildings which have been set up against the original stone fabric may very appropriately be removed, but it will be hardly a suitable thing to house whole families of agricultural labourers within the undoubtedly consecrated walls of this church, newly rescued from an oblivious and degraded fate. One of the first steps taken by the Rev. Prebendary Jones after his discovery at Bradford-on-Avon, was to clear away the floors and tenements (which, strange to say, in that case also had choked up the Saxon church which now stands out prominently among the ancient ecclesiastical glories of a county already rich in other examples. It is manifestly the duty of those in whom the property is (for the present, shall we say?) vested to remove the flooring, clear and point the walls and masonry, repair the roof, and thus make an undivided space or hall, which could certainly in such a place as Deerhurst, contiguous to the populous town of Tewkesbury, be adapted to far more lofty uses than that into which it is most likely after all it will drift. The rescue of Steeley Church, Derbyshire, from roofless and utter ruin, and its successful application to the spiritual needs of the neighbouring mining population, is, not to mention other cases, a splendid example of what may be done by energetic exertions.

It remains to determine the age and uses of this edifice when examined by the light of ancient literary records and other antiquities. The historical notices of Deerhurst have, however, always been taken to point to the present parish church, no doubt the relic of a very ancient monastic establishment. Thus Dugdale and his editors, Haigh, in the treatise mentioned at the beginning of this notice, and others, have recorded that the original foundation, mentioned in a document of the early date of 804 (see Kemble, "Codex Diplomaticus," and Birch, "Cartularium Saxonicum" under that year), whereby Æthelric, son of Æthelmund, alderman of Worcestershire, granted to the monastery some valuable estates on condition of burial therein and commemorative

services by the monks, was destroyed by the Danes, who penetrated the neighbouring district, and devastated it towards the end of the ninth century. It was, however, rebuilt, and must have been in activity in A.D. 980, for Athelwold, bishop of Winchester, was, as we are told by William of Malmesbury, in his "Gesta Pontificum," or "History of the Bishops" (p. 109, Hamilton's edition), succeeded by Elphege, who had taken the habit at "Dirhest," at that time a small cell (*exiguum cenobium*), but at the time of the writer, A.D. 1125, an empty ruin (*antiquitatis vane simulacrum*). It is difficult to apply this latter description to the larger church at Deerhurst, which few will claim for it. It is clear that the monastery was in existence in 1066, and that Edward the Confessor, about the year 1056, had caused the monastery to be rebuilt, and given it, with its lands, to the Abbey of St. Denis at Paris. William the Conqueror confirmed this gift in A.D. 1069, and in A.D. 1250 it was sold by the monks of St. Denis to Richard Earl of Cornwall. But these words of William of Malmesbury would accurately designate the desolate condition of the "little cell," if we are right in conjecturing it to be this newly-discovered chapel. Close to it, in the year 1675, there was found in the adjacent orchard, a large stone, now preserved in the Ashmolean Museum, Oxford, bearing the following inscription in bold characters:—"Odda dux jussit hanc regiam aulam construi atque dedicari in honore S. Trinitatis pro anima germani sui Ælfrici qui de hoc loco assumta est. Aldredus vero episcopus qui eandem dedicavit idibus Aprilis xliii. autem anno regni Eadwardi regis Anglorum." The intent is that "Duke Odda ordered this royal hall [i.e., chapel] to be built and dedicated to the honour of the Holy Trinity for the soul of his brother Ælfric, which was taken up at this place. Bishop Aldred dedicated it on the 2nd of the Ides of April, in the fourteenth year [i.e., A.D. 1056] of King Edward [the Confessor]." A Tewkesbury Chronicle in the British Museum records that the two noble brothers Oddo and Dodo, who are buried at Pershore, had a brother Almaric (the Ælfric of the above inscription), who "was buried at Deerhurst, in a small chapel opposite the gate of the Priory, because that chapel was formerly the royal hall," and proceeds to quote an inscription which appears to be a variant form of the one given above. From the Anglo-Saxon Chronicle, the works of Florence of Worcester, Kemble's Collection of Charters, and other sources, the history of these three illustrious brothers may be gathered as follows:—Odda, or Odda, the thane or nobleman, first appears in A.D. 1015; Odda and Dodo, together, in A.D. 1031; Ælfric appears with them in A.D. 1042; Odda is made Earl of Devonshire, Somersetshire, Dorsetshire, and Wales in A.D. 1048; and commands the English fleet in A.D. 1052; Ælfric dies at Deerhurst, and is buried at Pershore in A.D. 1053, having first turned monk; on the 31st of August, A.D. 1056, Odda, having also become a monk, dies, and is buried at Pershore. The last notice of Dodo is A.D. 1062, when he is styled a Prince. Mr. Butterworth claims that this inscription, hitherto considered (even by Mr. Parker amongst others) to belong to the larger church, properly belongs to the newly-found chapel, and with much reason. The situation of the finding of the stone, the simple memorial character of the edifice, evidently adapted to commemorate rather than ceremonial services, and its contiguity to the larger church, which would render it useless for other purposes, all strengthen this idea. Future researches may, perhaps, tend to favour the former theory, and we trust nothing will be left undone to solve the obscure points of the history, and to protect this ancient relic from injury; but for the present we must be content to admit that the monastic history of Deerhurst has been seriously misunderstood, and must be re-arranged to agree with this recent and interesting discovery.

**The New West Ham Police-court.**—This Court was opened last week, the Stipendiary Magistrate, Mr. J. Roland Phillips, describing it as "one of the most handsome, suitable, and compact courts in the Metropolis." Mr. Lewis Angell, F.R.I.B.A., is the architect; and Messrs. Palmer & Sons the builders. The cost was 5,600.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE second meeting of the present session was held on Monday last, Mr. Ewan Christian (President) in the chair.

The decease was announced of Mr. George Smith, Associate, of Chester.

The President said,—I have an announcement to make in reference to the Charter. In the Report on the proposed application for the grant of a new Charter which was issued, together with a draft of the same, on the 31st of July last, a hope was expressed that members would make themselves familiar, during the recess, with the provisions of that draft, and they were asked to send in, before the 7th inst., any amendments to it which they might think desirable. This has been done, and some proposed amendments have been received, as was requested, which have been carefully considered by the Council, who, moreover, are much indebted to members for many valuable suggestions, some of which are none the less valuable on account of their informal character. This draft of the proposed Charter will be published in the Journal of Proceedings to be issued to members on Thursday, the 19th inst., together with a Report from the Council on the subject. A special general meeting will be summoned for this day fortnight (November 30th) at seven p.m., the specific purpose of which will be "to consider the draft of the proposed Charter with a view to an application to the Queen in Council for the grant of the same." I wish also to give notice that, it being absolutely essential for all amendments or motions (in respect to the draft of the proposed Charter) to be in the hands of members prior to the 30th inst., notices of such formal and specific amendments or motions should be sent to the office of the Institute, so that the same may reach the Secretary not later than four p.m. on Thursday, the 26th inst. Such notices, to be printed the same night, will be issued on the 27th inst., by letter post, to all Fellows, Associates, and Hon. Associates resident within the United Kingdom. Only such amendments or motions of which notice has thus been given and distributed will be considered at the special general meeting above-mentioned.

Mr. William Woodward then read his paper, entitled "London as it is, and as it might be." He began by saying that a considerable portion of his paper was taken up with complaints of matters as they now existed, but he asked his hearers to believe it was in no hostile spirit that he had ventured to bring forward so great a subject. His only desire was, if there was room for improvement, that the attention of the authorities should be directed to the matter. The person most concerned was the dweller in London, for it was clearly certain that what was adequate for a population of two millions was insufficient for the immense population of the present day. They had not now the advantage of a large area of bare land on which to design a grand city regardless of cost, vested interests, and opposition; but, on the other hand, there was a city so advantageously situated and so capable of lending itself to improvements, that what was wanted was some vast change in the administration of the laws. They might approach the subject, then, as one which, in part or in whole, must sooner or later be taken in hand by the Legislature. Considering the matter in this light, it would not be necessary to enlarge on the origin or foundation of the city. Dealing with London before the Fire, Mr. Woodward described its appearance and the endeavours made in the reign of Queen Elizabeth to stop the growth of building and population. It was easier, however, to check the growth of building, than the increase of population, so that the houses of the poor were crowded together, and when the Plague broke out the alarmed authorities enlarged the building area, and extension had been the word ever since. In the time of Charles II. the sanitary condition of London must have been a subject of anxiety, the plague carrying off no less than 100,000 souls. This was followed by the Great Fire, which consumed nearly six-sixths of the city within the walls. The ruins covered 436 acres, fifteen of the twenty-six wards were destroyed, and eight others partly burned down. The fire consumed 400 streets, 13,000 houses, 89 churches, besides chapels and many stately edifices, the amount of property destroyed being



computed at ten millions sterling. If ever a golden opportunity for rebuilding the city was lost, it was after the devastation of the Great Fire, the result being that London was now the inconvenient network of thoroughfares which the absence of a controlling authority had permitted it to become. Reference was next made to Sir Christopher Wren's plan for re-modelling London, which showed the conception and grasp of its accomplished author. In the reign of Queen Anne, party-walls were first directed to be made of brick or stone; in the time of George III., the general lighting of London by parish assessment was adopted, and paving commenced, and an Act passed to remove the enormous signs which hung across the streets. In using the term "London," he included the City and its liberties, Westminster, Southwark, &c. In 1801 the population numbered 959,000; in 1881 it had increased to 1,263,595; in 1871 it reached 3,883,092, while it was now over 4,000,000, and was increasing at the rate of 20 per cent. every ten years. The rateable value of property was now about twenty-eight millions sterling, having increased nearly five-fold in the last twenty-three years. Reference was next made to the municipality of the City, and its various duties, Mr. Woodward stating that though there was in many particulars room for improvement, with the exception of the thoroughfares, the other matters coming under the control of the Corporation were in a fair condition. The Holborn Hill improvement was a most important work. He next touched upon the constitution of the Metropolitan Board of Works, and its great achievements,—the Thames Embankment and the Main Drainage,—and dealt with the work of the vestries. It was interesting to note what had been done to preserve the health of the population of London, and the different Acts which had been passed showed the enormous pains the Legislature had taken to meet the necessities of the case. Many of the Acts relating to the sanitary government of London, however, appeared to be utterly unknown to the authorities, and reference was made to the paucity of medical officers, analysts, and sanitary inspectors in some of the great parishes of the metropolis. What education or special training, he asked, had the sanitary inspectors received? Such men should be compelled to pass an examination, and should receive a far higher salary. In the case of the Metropolitan Board of Works, he would ask whether the high anticipations which had been formed of that body had been anything like realised? It was no part of his business to inquire whether the staff of the Board was sufficient; but somehow, it seemed to him, at least, that they succeeded in doing that which was wrong. In the case of Northumberland-avenue an opportunity for a little architectural effect had been for ever lost, while the road levels were awkward, and the crossings dangerous and badly lighted. The result was that what should have been a strikingly grand avenue presented quite a different appearance, detrimental to the avenue itself, and to the buildings fronting upon it. Great hotels had been allowed to bury smaller buildings, and completely crush them out. He did not mean to say that the hotels should have been kept down to the height of the inferior buildings, but some proper average height might have been contended for, so that there might have been a comparatively uniform street. The Oxford-street and Gray's Inn-road improvements were next touched upon. In the latter case, Mr. Woodward dwelt upon the cruel manner in which he contended, the plots were set out, particularly in regard to St. Alban's Church, and reference was made to the plan of Mr. Isaacs, and that of the Board, which were displayed on the walls of the Institute. Had the plan submitted by Mr. Isaacs been followed, the west front of St. Alban's Church would have been opened up, and a good architectural effect gained, which now had been completely lost. Turning to the improvements in the neighbourhood of Piccadilly-circus, a new thoroughfare had been pitched into Oxford-street, at nearly right angles, the public-house and distillery remaining to utterly destroy the effect of the scheme. This new street, much to its surprise, found itself breaking into Piccadilly-circus, opening up in its tortuous windings some curious remnants of dilapidated architecture. Surely, said Mr. Woodward, the Metropolitan Board of Works was a subject for much wonder! The whole of these new thorough-

fares would doubtless prove excellent for cab routes, but they were not yet able to speak of the architecture which would eventually decorate them. The Board deserved some credit for preserving the open space at Tichborne-street; but he drew attention to several projections which had been permitted, although the Board had complete control over the line of frontage. The Metropolitan Buildings Amendment Act, 1878, had been broken in many of its provisions. It was quite lamentable to walk through many of the thoroughfares made by the Board, where plots were lying idle as receptacles for filth and rubbish, to the general deterioration of the character of the neighbourhood. This would continue while the Board held out for rentals which it was difficult to obtain, and offered no incitement to any one to become lessees or owners. In connexion with the new Government Offices, he compared the proposed plan with that by Mr. Robertson and himself, and hoped that the public would insist on the plan of the Office of Works not being carried out. Mr. Edis had referred the other night to the desirability of bringing the question before the public, and he might say that the whole subject had been discussed in the Press during last September, and that the greater part of the correspondence could now be obtained in pamphlet form. Turning to the question of the dealings of the Corporation in regard to frontages, he drew attention to the projection at Sion College, which was being brought out to the footway of the Embankment, entirely cutting off the view of the west end of the City of London School. What could be said in the case of the Freeholders allowing such a thing to be done? Censure should be given at once, and the offensive projection pulled down. Thus were the interests of the metropolis injured by the neglect of the constituted authorities. Mr. Woodward merely indicated the remainder of his paper, stating that it dealt with many subjects, such as drainage, water supply, dust removal, fire-escapes, subways, &c. In the matter of hoardings, he drew attention to a case in which hoardings had been heightened, and kept up, apparently for the display of advertisements. Open spaces, again, were all being covered by bricks and mortar, and this question had been all through regarded as everybody's business, with, of course, the usual result. Many open spaces which not long ago were close to central London, had been entirely built over; and, when they came to the outlying suburbs, what controlling power had attempted to stop the cruel occupation of open spaces? The Metropolitan Board and the Corporation had, no doubt, secured spaces of great value, but not before an outcry had been raised, and the outcry would have to be irresistible if Parliament Hill was to be secured as an addition to Hampstead Heath. Open spaces in front of buildings might have easily been secured, if the Metropolitan Board had kept their eyes open, but the condition of many of the thoroughfares showed how golden opportunities had been missed, and bricks and mortar allowed to encroach. Euston-road, for example, might have been made a splendid boulevard and fitting approach to the Metropolis, but, by reason of carelessness or worse, the parochial authorities had neglected their duty, and disgraceful encroachments had been made. The parks and open spaces of Greater London gave a rough total of 15,000 acres to a population of 5,093,995, or one acre to nearly every 330 persons; while the inner ring of London, with its 4,019,000 souls, had not more than 4,000 acres of open spaces, including squares, or only one acre to every thousand inhabitants. This compared badly with Paris, which had one acre to every thirteen people, or Vienna with one acre to every hundred. He then suggested a few points which might ensure a better observance of the Acts of Parliament. The whole of those which affected London should be repealed, and one new Act framed, embodying the present Acts, with additional clauses to make it complete. A copious index should accompany the volume, and a careful record be kept of all disputed cases. A plan of London might be made, showing merely the sub-divisions, marked for reference; each district having its own resident surveyors and other officials, so that one could see at a glance which officer was required for any particular place. A Department of Works should be created, with a permanent Minister at its head, with two permanent acting Under-Secretaries, and an adequate staff. There

should also be an efficient staff of architects, to whom all matters of rebuilding could be referred; while a body of well-qualified surveyors should be employed, at such salaries as would command good men. Power should be given to enforce the minor provisions of the Act, but the more important ones should only be enforced after consultation with the Under-Secretaries or the Minister. A staff of efficient sanitary inspectors should also be appointed, to act under the guidance of the surveyors. Yards should be provided at different points, containing the necessary materials and appliances, with workmen to carry out the regulations of the Department of Works in the event of persons served with notices failing to comply with them. Mr. Woodward exhibited a plan showing how the streets should be widened, so as to open up approaches to railway stations and public buildings, the formation of wide quays by the side of the Thames, the erection of new dwellings for the poorer classes, and for many other improvements. Then would London become what the richest city in the richest country in the world should become, a model of spacious suburb and commodious outlay, inhabited by a healthy and prosperous community. Then, in the language of Voltaire, "May Heaven send some man, some statesman, sufficiently zealous to undertake such projects, with a mind firm and enlightened to carry them out, and may he have trust enough reposed in him to make them a success. If in our immense city no one can be found to do this,—if we are contented to talk of it at table, to utter useless views, or, may be, impertinent pleasantries,—il faut pleurer sur les ruines de Jérusalem."

The President invited discussion on Mr. Woodward's paper, which he considered interesting and instructive, as well as amusing.

Mr. Taverner Perry remarked that no reference had been made to the landlords of this country, and particularly to those of London. One of the difficulties London had to contend with was that the great landlords,—such as the Crown, the Dukes of Bedford and Westminster, the Marquis of Salisbury,—had an opportunity of taking advantage of those who had created a valuable property, by refusing leases, or by granting them on such terms as to prevent the improvement of the metropolis, and any alteration of existing frontages.

Mr. Robert Walker said that while thanking Mr. Woodward for what he had done, he must, however, dissent from a great deal of what had been put forward. It should be remembered that in a city like London, which had risen up by a series of gradual growths,—a city which has been the home of liberty in regard to its buildings, as well as its social polity,—there must have been in its history a large amount of latitude displayed in the matter of building. In the present day there was a great deal of experiment in everything, but when the large mass of the population was suffering heavily in pocket, it was not a time for what might be termed architectural or building experimental legislation. Mr. Woodward had dealt severely with the Metropolitan Board of Works. It was a body made up from the various vestries of London, and had only certain powers under sundry Acts of Parliament. These powers might probably be extended in the future, and the Board be rendered more useful than at present. At the same time, Mr. Woodward was wrong in his reference to the state of Lisson Grove, as a great deal of misrepresentation had been used in connexion with the matter. According to the local government of London, the sanitary officials of the parishes were the supreme authorities in each district on sanitary questions, while the Metropolitan Board had no authority whatever, except in regard to the sewers. It was therefore manifestly unfair to be so severe on the Board when they were not deserving of censure. As to the last Act of Parliament, it compelled larger areas to be given at the backs of houses erected on building ground in the suburbs. He differed with Mr. Woodward as to the Act being of little use, as it had been of the greatest possible advantage to the whole metropolis. It should be borne in mind that in architectural matters two things must be kept in view which should guide them in carrying out works; the first was the question of finance, and, secondly, it was no use for the architect to try to outstrip public opinion. They might endeavour to educate the public, but they



ould always remember they could only build far as their clients would entrust them with means.

Professor Kerr proposed a vote of thanks to Mr. Woodward, whose paper, though sweeping in its character, was, he considered, one calculated to do a great deal of good. In these days there were so many things to attend to that the public mind could not be directed to any matter, even of considerable importance, without a good deal of that force which soon generated into exaggeration. He considered that Mr. Woodward was too hard upon the Metropolitan Board of Works. He (Professor Kerr) did not hold a brief for the Board, but it seemed to him that it had done the public good service. It should be borne in mind that the Metropolitan Board was not an imperial institution; it was entirely a local and parochial institution, bound to keep itself within strictly parochial limits. Parliament seemed to have forgotten that London was not merely a city, which was occupied by its own inhabitants, but the imperial capital. Therefore, Mr. Woodward was quite right in suggesting that sooner or later there must be a Minister of Public Works in this country, for the purpose of governing and controlling the administration of buildings in the metropolis as national property.\* It was true that they were not encouraged, in their aspirations in that direction, by what had taken place in what was present the substitute for such a ministry; but if the public, as might be the case in course of time, were a little better educated up to their duties, as regards the artistic and administrative regulation of London building, a better class of men would arise to hold office as members of the Government, with reference to that particular question. They would remember what Mr. Ayrton said with regard to his appointment as First Commissioner. He said that when the proposal was made to him that he should take office in the Government then being formed, Lord Palmerston as good as indicated that, as he knew absolutely nothing of building, that was the precise reason why he should be appointed to the office. This country had been, and probably would for a long time, be governed, not exactly by the country gentlemen, but by an uneducated class of men not immediately connected with business, and there was a good reason why it should be so. Out of that class it was easy to imagine that men might arise quite competent to administer artistic and scientific matters in regard to the building of London. If a Minister of Public Works were appointed, with some such staff as Mr. Woodward had suggested,—and that was a mere matter of detail,—the Metropolitan Board, or whatever authority might take its place, might do its work with perfect efficiency. At present what could the Board do? If it were to deal with artistic matters, not only would it be laughed at, but a disturbance would be created in every London vestry. At present there was no authority which could govern on behalf of the public, and the Institute might seriously consider whether some proposal might not be made,—as suggested by Mr. Edis on the last occasion,—in the interest of architecture, both artistic and scientific, and in the direction of the appointment of a high-class public officer.

Mr. William Westgarth seconded the motion, mentioning that he had been invited as a visitor to hear the paper. He referred to what he had done last year at the Society of Arts, in instituting prizes for the best papers on the reconstruction of Central London, and for the rehousing of the poorest classes. Mr. Woodward, he might say, sent in one of the best competitive essays, and secured one of the largest prizes. His (Mr. Westgarth's) idea was that, by means of the unearned increment, which he preferred to call the "natural increment," added to the increase of value due to improvements, the expenses of the whole reconstruction would be recouped, securing the fee-simple at a fair value for a sufficient number of years. His principle for reconstructing London was simply a business project, which should be self-remunerative. The reconstruction of central London seemed impossible on account of the immense values; that of Lombard-street alone, for expropriation purposes, being put as high as one hundred millions sterling. He had not given up his project, but the plan he now had in view

was a very much reduced one. It would consist in taking some of the worst parts of central London, such as Houndsditch, at a fair value, carrying out the plan of reconstruction by a company with adequate capital, and securing a certain term of years for the natural increment of value.

Mr. E. C. Robins, as one of the judges for the Society of Arts in connexion with Mr. Westgarth's prizes, considered the present paper deserving of all praise. The twenty-six papers then sent in formed very interesting and suggestive reading, though some of the ideas were rather crude.

Mr. Forster Hayward suggested that Mr. Woodward should give some sort of description of his plan, which he saw on the walls.

Mr. Hebb remarked that Mr. Woodward seemed to think the Metropolitan Board was answerable for the way in which Northumberland-avenue had been laid out. As a matter of fact, the street, as originally proposed, was more advantageously planned with regard to surroundings, and more particularly the monument, but it was altered at the last minute by the Committee of the House of Commons; therefore any shortcomings with regard to the laying out of the street should not be attributed to the Board, but to the Committee, who thought themselves more competent to deal with it. As to the frontage on the Embankment, the Board had no power to lay down particular lines. That power was vested in the hands of the Superintending Architect, as statutory officer, and could only be exercised when a building was being commenced, or when some complaint was made with regard to a building which might be commenced.\* The only power which the Superintending Architect possessed was that of determining the existing line of buildings in any particular block of thoroughfare. In the case of the Embankment there would not be a sufficient number of buildings to constitute a general line of frontage. With regard to Gray's Inn-road, the plan of Mr. Isaacs showed a much larger area than that which was included in the Parliamentary plan. It would no doubt have been desirable that an opening leading up to St. Alban's Church should have been laid out, but it should be borne in mind that the Metropolitan Board was answerable to its constituents, and had to make the best of the sites laid bare by improvements. The public desired economy in most matters, and if improvements were to be carried out from an Imperial point of view, they would have to be paid for.

Mr. Arthur Cates was very much surprised that Mr. Hebb should have put the functions of the Metropolitan Board at so low a standard. Its operations certainly should be conducted with economy, but the controlling organisation of this great metropolis should not be behind those of almost every small town of England and Europe. The great improvements effected in London had done much for the well-being of the people, and had attracted trade and population to it. Unfortunately the Board had occupied an unhappy position. It was spoken of as a "glorified vestry," created for the express purpose of carrying out the main drainage of the metropolis. Severe as Mr. Woodward's criticisms had been, he might have expressed some little commiseration for the position in which the Board had been placed. It was supposed that an opening leading up to St. Alban's Church should have been laid out, but it should be borne in mind that the Metropolitan Board was answerable to its constituents, and had to make the best of the sites laid bare by improvements. The public desired economy in most matters, and if improvements were to be carried out from an Imperial point of view, they would have to be paid for.

\* Mr. Hebb might have added that the Institute of Architects themselves were invested with a certain power in the approval (or at least the disapproval) of designs for the site referred to.—Ed.

for London than London, apart from the City, had done for itself. Some fifty years ago the Crown was found to have a considerable amount of property between Oxford-street and Piccadilly, and some to the north of Oxford-street. John Nash, in conjunction with the Prince Regent, laid out a scheme for the utilisation of this, and formed Regent's Park, Regent-street, the Quadrant, and Pall Mall East. The whole of these improvements were executed from the revenues of the Crown, as a wise landlord improving its property and expending a large portion of its capital in the acquisition of other properties to carry out the improvement. If the Crown had not done this, what would have been the condition of that part of London at the present day? Mr. Perry had also referred to the Duke of Westminster. It was no part of his (Mr. Cates's) functions to defend the Duke, or any other landlord, but he would like to draw attention to the magnificent improvement, carried out at the cost of the Duke, at the south end of Grosvenor-place. This had been done in a manner worthy the imitation of the Metropolitan or any other Board. Another point for consideration was the relation between the State and the Metropolis. It had been said that London must be dealt with differently to any other town in England, because it was the Imperial Metropolis. Unfortunately since the constitution of the Metropolitan Board of Works there had been a great deal of hostility between it and the State with regard to improvements. The State did not hesitate to erect a large building in a great thoroughfare, saying that it was the business of the Metropolitan Board to improve the thoroughfare or widen the street. A much wiser system was followed in Paris. Before Haussmann's great works were carried out, certain improvements in connexion with buildings were being carried on by the Municipality. These were adopted by the State, which derived the greatest benefit from them. He believed that a contribution of two-thirds of the net cost was made from the State to the City, and as the improvements became more remote the contribution diminished, until they ceased altogether when the State derived no advantage. In the matter of the extension of the Mall to Charing-cross, Mr. Woodward would not suggest that the entire cost of opening up the Mall should be borne by the State. He hoped the Institute would spare no exertions to secure this great improvement, which would do more for the adornment of London than any other work in that portion of the town, and that they would be able to impress on the public, the State, and the Metropolitan Board of Works, the necessity for considerations of the highest standard, more elevated, and more advantageous for the inhabitants, than those which Mr. Hebb had indicated as at present governing the operations of the Board.

The President said that Mr. Street, in the only paper he had given them, advocated very strongly the appointment of a Minister of Public Works, to control the public buildings of the metropolis. A great deal was said at that time as to the enormous difficulties and dangers attending such an office, and doubtless much could be said on both sides; but a Ministry such as was then described would be a great public benefit, if it were properly supported. As to Sion College, if they were to be confined to a straight line on such a great thoroughfare, it would be a misfortune. A break, such as was shown at Sion College, might be made of great architectural effect. None could be more jealous of open spaces than he was, but a little picturesque broken outline was valuable in a long frontage.

The vote of thanks was then put, and was carried by acclamation.

Mr. Woodward, in replying, said he had no desire to sweep away everything in regard to the Metropolitan Board of Works. His plan would form the subject of a paper at the Surveyors' Institution later on. Mr. Hebb had spoken of economy, but the way in which the Board laid out their building sites insured quite the reverse. As to St. Alban's Church, it was now too late to remedy what had been done, and the opportunity for having a little open place planted with trees there, had been lost for ever.

The President then adjourned the meeting to the 14th proximo, when Mr. William White, F.S.A., will read a paper entitled "A Week's Tour at Wisby, Sweden."

\* We need hardly observe that this suggestion has been made over and over again in the *Builder* for years back.—Ed.



## GREEK VASE PAINTINGS.

MISS JANE E. HARRISON is giving a course of six lectures, at the lecture theatre of the South Kensington Museum, on the Mythology of the Iliad in connexion with Greek Vase Paintings. In the first lecture, after some preliminary remarks on the shape, sizes, and provenance of vases, Miss Harrison warned her audience at the outset against the too common error of looking at these vase-paintings as mere illustrations, and the great interest of the parallel but absolutely independent development of myths in literature and in art. The myth of the "Judgment of Paris" was the subject of the first lecture. Special attention was drawn to a point which Miss Harrison is making prominent all through the lectures, namely, the necessity, in any scientific study of vases, of finding out the original type of the vase painting, by eliminating all unnecessary adjuncts, and observing how, when the type is arrived at, it originates often from some subject of every-day life, which being found to lend itself suitably to the expression of a particular legend was henceforward adopted for that purpose. A group of three figures, wrapped in one cloak, moving in procession, and headed by a fourth figure, from a vase in Signor Castellani's collection, was shown by Miss Harrison to be the forerunner of the three goddesses marshalled by Hermes to the judgment of Paris. In a series of very successful and copious illustrations, given by means of the oxy-hydrogen light, the lecturer showed how this simple conception of the three goddesses and Hermes had gradually received the addition of Paris, of love-gods, &c., till at last, in a vase from the Hermitage in St. Petersburg, the presentation of the myth receives its finishing touch by the presence of Themis, and Eris, and father Zeus himself. For this legend of Paris wax paintings are specially valuable, since neither the poem of the Cypria, which, with Aphrodite for its hero, was specially concerned with it, nor any of the tragedies which took it for its subject have come down to us. Following out this same method of analysis of the types, in her second lecture, Miss Harrison examined in detail the vases which represent the Rape of Helen, and showed that the original type was that of a warrior forcibly carrying off a maiden, his hand upon her wrist. This conception, it is interesting to notice, was utilised not only in the legend of Helen, but also in similar scenes, e.g., a representation of Agamemnon leading off Briseis, in another of Poluxena being led to sacrifice on the tomb of Achilles. Miss Harrison, in her third lecture, after touching on the legend of Iphigenia, of which we have but one vase-representation, dealt at length with those vases which throw light on the parentage and youth of Achilles, in order that, when she treads the real ground of the Iliad, the character of its great hero may be the more perfectly understood. The great scene of the wrestling of Peleus and Thetis, which it is easy to strip of the later accessory figures of Nereids, Nereus, and other sea divinities, and to reduce to its original elements of a man wrestling with a woman, was amply illustrated by vases, both of the archaic black-figured and later red-figured period, and the famous François vase from Florence, with its splendid marriage-feast, showed that the stormy wooing had had a peaceful ending at last. A charming vase from the British Museum illustrated the confiding of the child Achilles by his father to the old Centaur Chiron to be educated along with other young heroes.

Miss Harrison will continue to lecture on Wednesdays till December 9th, when she will close her subject with the myth of the destruction of Troy. An account of the three last lectures will appear in the *Builder* of that week. The course is being largely attended. Among the audience are the Greek Minister, Mr. Gennadius, Mr. C. T. Newton, C.B., Mr. Burno Jones, A.B.A., Mr. S. M. Thompson, and other distinguished Hellenic scholars and artists. After defraying the expenses connected with the lectures, Miss Harrison will generously devote the proceeds to the building fund for the proposed British School of Archaeology at Athens.

**Bartestree.**—A new wing, containing refectory, community-room, and nuns' cells, is about to be added to the Convent of Our Lady of Charity and Refuge, Bartestree, Hereford. The architects are Messrs. Pugin & Pugin.

## COMPETITIONS.

**New Presbyterian Church, Belfast.**—The managers of Linenhall-street Presbyterian Church having decided on erecting a new place of worship, recently invited competitive designs for the buildings. From those sent in, the design submitted by Mr. John B. Wilson, of Bath-street, Glasgow, was awarded the premium, and the committee have now instructed him to proceed with the work at once. The new church, which will occupy a fine site in University-road, will accommodate over 1,100 sitters, and has besides a school hall for 600 persons and lesser hall for 250, with other necessary buildings. The style is Early French Gothic, with simple and severe detail, and the principal feature will be a massive tower, about 140 ft. in height. It is proposed to have the buildings completed within next year.

**Ornamental Lodge, Shrewsbury.**—The Shrewsbury Horticultural Society, whose annual shows are held in the "Quarry Grounds," or public park belonging to the town, having decided to present the Corporation with a new Entrance Lodge to be erected adjoining the Park Gates, advertised for plans in the local and other journals. In response, they received thirty-three designs from various parts of the country, including several from London. The designs were sent in under mottoes: the one selected for execution, viz., "Straight Tip," being by Mr. G. B. Rawcliffe, of Burnley. The design is in the half-timbered style, with Ranbon brick walls and tiled roofs, and is estimated to cost 500l.

**Birkenhead Abattoirs Competition.**—Eleven sets of plans have been sent in for this competition. Nothing has been decided as yet.

**"Old Edinburgh Buildings."**—Six competitors sent in designs for this building for the International Exhibition of Industry, Science, and Art, to be held at Edinburgh next year, and the design of Mr. Sidney Mitchell, of Edinburgh, has been selected. We hope this will prove as attractive a feature as the Old London street at South Kensington.

## Illustrations.

LONDON AND WESTMINSTER BANK.  
SOUTH KENSINGTON BRANCH.

**THE** building stands at the south-west corner of Brompton-square, having a frontage of 55 ft. to the square, and of 65 ft. to Brompton-road. It was designed to accommodate the bank and strong-rooms on the ground-floor and basement, the bank entrance-door being at the south-east angle of the site; manager's residence, with entrance from Brompton-square; and, in the upper part, chiefly fronting Brompton-road, a separate residence, with entrance at the western extremity of the site.

The whole has been substantially erected with Portland stone to both frontages. The floors throughout are fireproof on Dennett & Inglis's principle. Messrs. Easton & Anderson fitted the hydraulic lift from the bank to the strong-rooms.

The building was erected by Mr. J. T. Chapell from the designs, and under the superintendence of Mr. F. W. Porter, architect. The carving and sculpture are by Mr. Kelsey.

## ST. DYFRIG'S CHURCH, CARDIFF.

The accompanying view of a design for a new church at Cardiff represents the architect's idea of a suitable edifice for the place. In consequence of the disapproval of those interested in the work, it has, however, been resolved to abandon the Renaissance type, and to substitute a Gothic design. A new design has been prepared therefore by the architect, and the necessary funds are being raised for the erection of the building. The church is to be erected upon a site near the Great Western Railway station. The architect is Mr. J. D. Sedding.

## TOWN HALL, FRANECKER, HOLLAND.

We give a view of this little-known building in the present number. It dates from about 1590. The position of the spire, if so it can be called, rising from behind the two stepped gables at the angle of the building, is very effective.

## HARBOUR GATE AT HOORN, HOLLAND.

The left-hand view of this picturesque gatehouse shows the view of the building approached from the water; the other side towards the town. It dates from 1513 except in regard to the gable and lantern on the town side, which were added in 1651.

## DUNBLANE CATHEDRAL.

On the banks of the river Allan, about 6 miles north-west from Stirling, lies the village of Dunblane, holding still, by courtesy, the title of a cathedral city. The name is derived from the patron saint of the Church of St. Blane, Irish descent.

Originally there appears to have been erected here a Norman cathedral, of which only the lower portion of the tower is now left. Probably it was founded in the time of David I., but the historical notes of this structure are fragmentary, and leave its history in great measure matter of conjecture.

Certain it is, however, that in its early days the Bishopric of Dunblane passed through various vicissitudes, and at one time remained vacant for more than a century.

Fordun records the death of a famous preceptor of the order of St. Dominic, Clement, Bishop of Dunblane, in 1256:—"A man great word and deed before God and man, who, finding his cathedral roofless, desolate, and no better served than a country chapel, raised it up distinguished sanctuary, endowed it with possessions, and extended to it the services of prebends and canons."

The nave and aisles are roofless, but the choir has been restored and is now used as the parish church. The nave has no transepts and the choir has no aisles, although on the north side of the choir a building is attached, supposed to be a chapter-house, which is entered from the choir.

The nave and aisles possess the chief interest for the architect, affording as they do a beautiful specimen of Early Pointed Gothic, of good proportions, fine moulded work, and almost devoid of carving. The nave consists of eight bays, and the triforium and clerestory are of one level with a passage between them. The space between the piers diminishes from 12 ft. 3 in. in the first bay at the west end to 10 ft. 3 in. in the eighth bay, by which piece of architectural trickery (for it is no better) an appearance of greater length is obtained when viewed from the west entrance.

The west gable is undoubtedly the most interesting feature in the building. It has a double window in three lights, with a slender mullion in each. A passage runs between the windows, from which the higher level of the triforium passage is reached by an angle stair. The outer window has plain splayed mullions and arches, and the inner one has moulded shafts and capitals and finely-moulded arches.

The sill of this window being only slightly higher than the springing of the nave arcade, a graceful effect is thus produced with the long slender mullions.

The small window in the top of the gable has long since received its due from the pen of Mr. Ruskin.

It will be seen that the lower portion of the tower is Norman. The two upper stages are of Early Gothic, while the finish of the top stage is baronial, of sixteenth-century character. It is also to be noted that this tower does not stand square with the rest of the building. Some conjecture that the axis of the original Norman cathedral did not lie due east and west, and that this error was rectified so far as the later structure was concerned.

The prebends' stalls in the choir are worthy of notice, being richly carved in dark oak, Late Gothic in style, and one of the very few specimens of Scottish ecclesiastical woodwork.

The cathedral, from its fine situation on the river bank, with a steep and sudden slope to the water's edge, must form a tempting subject to the artist, sufficiently proved also by the fact that Turner, on one of his northward journeys, halted here to note its dignified appearance.

From the architect and archaeologist alike Dunblane Cathedral is well deserving of careful study.

**Halifax.**—Mr. Richard Horsfall, of the firm of Messrs. Horsfall & Williams, architects and surveyors, Halifax, has been elected mayor of that borough.







Wyman & Sons Photo Litho



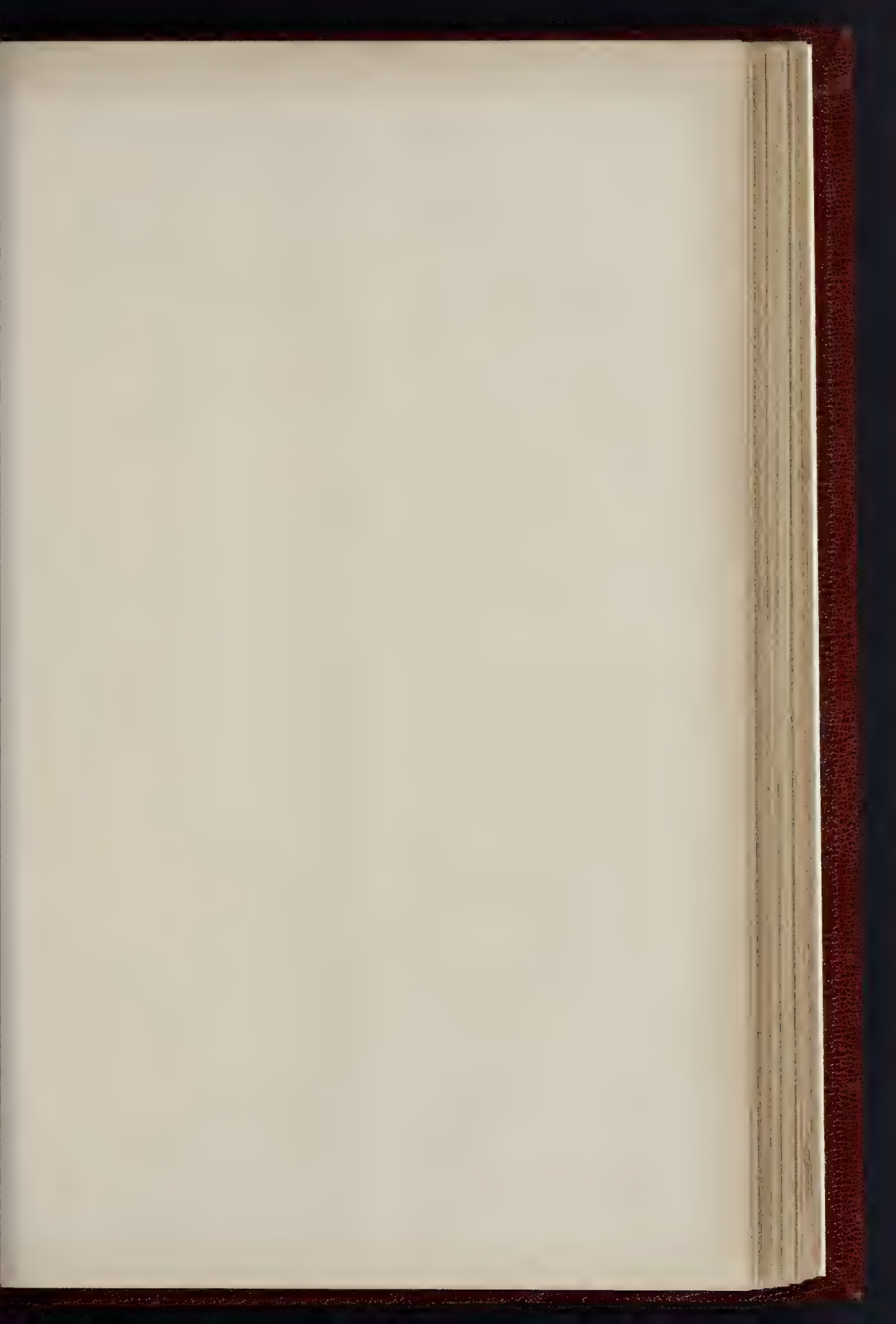


BRANCH.—MR. FRED. W. PORTER, ARCHITECT.

Queen St London, W.C.

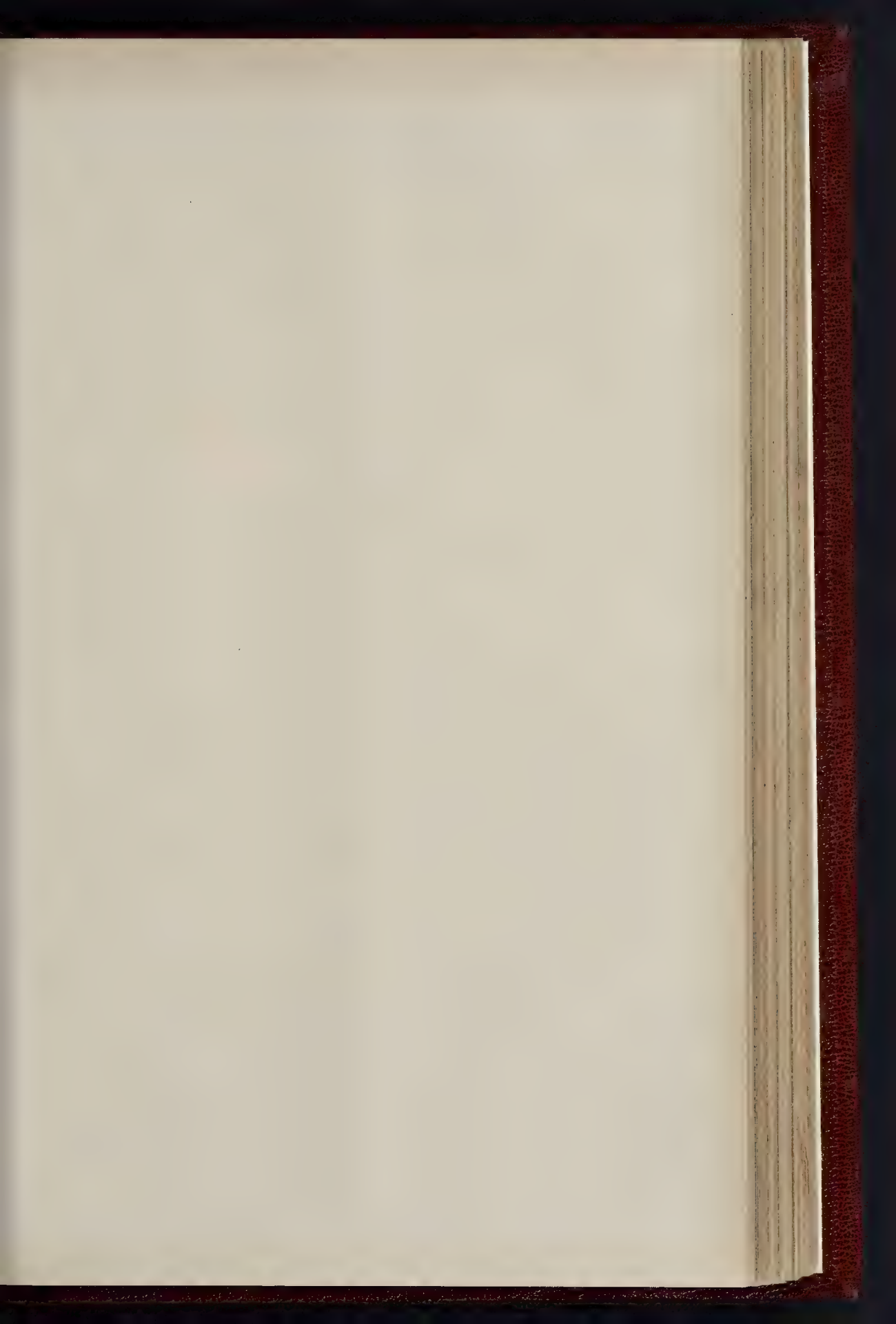










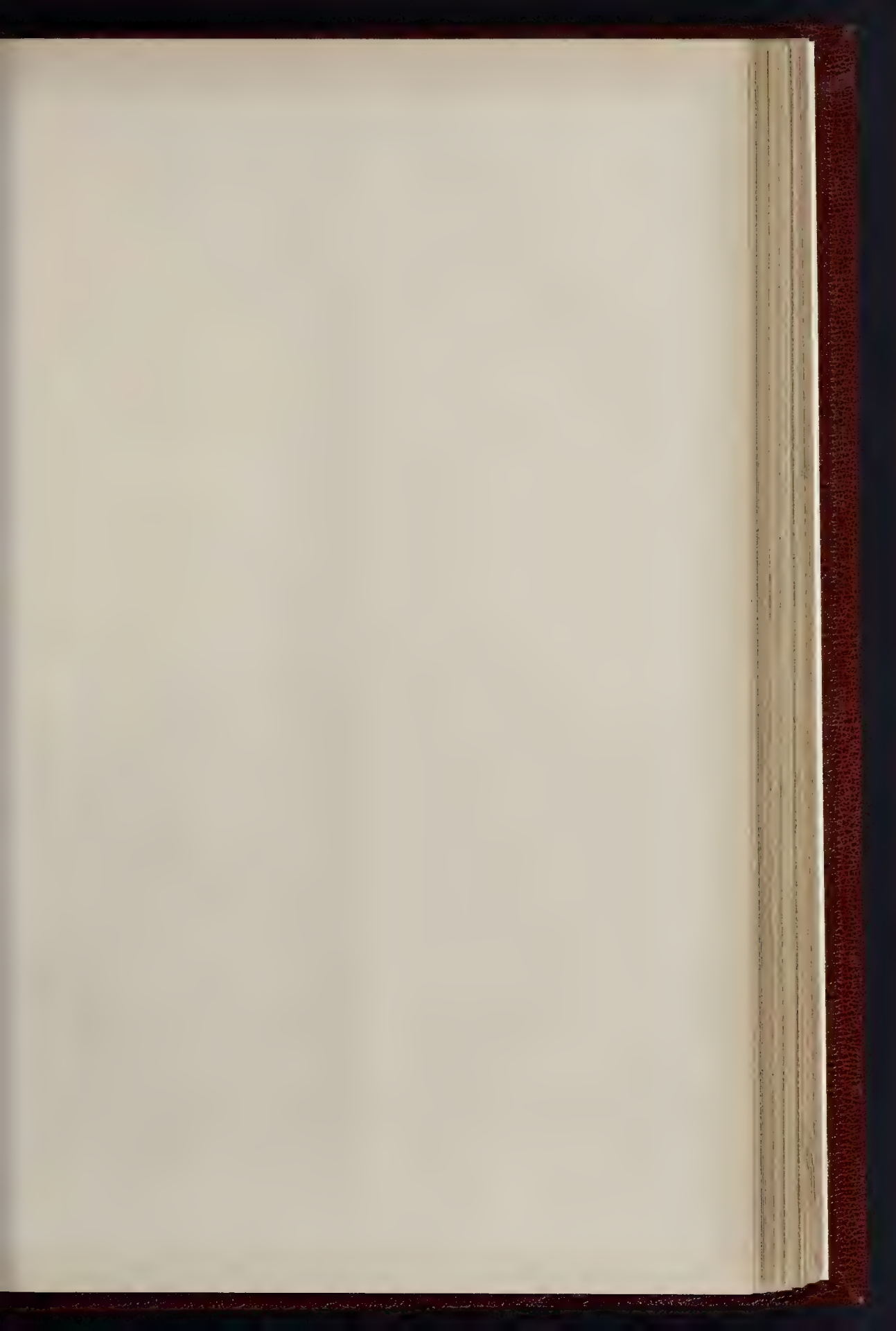


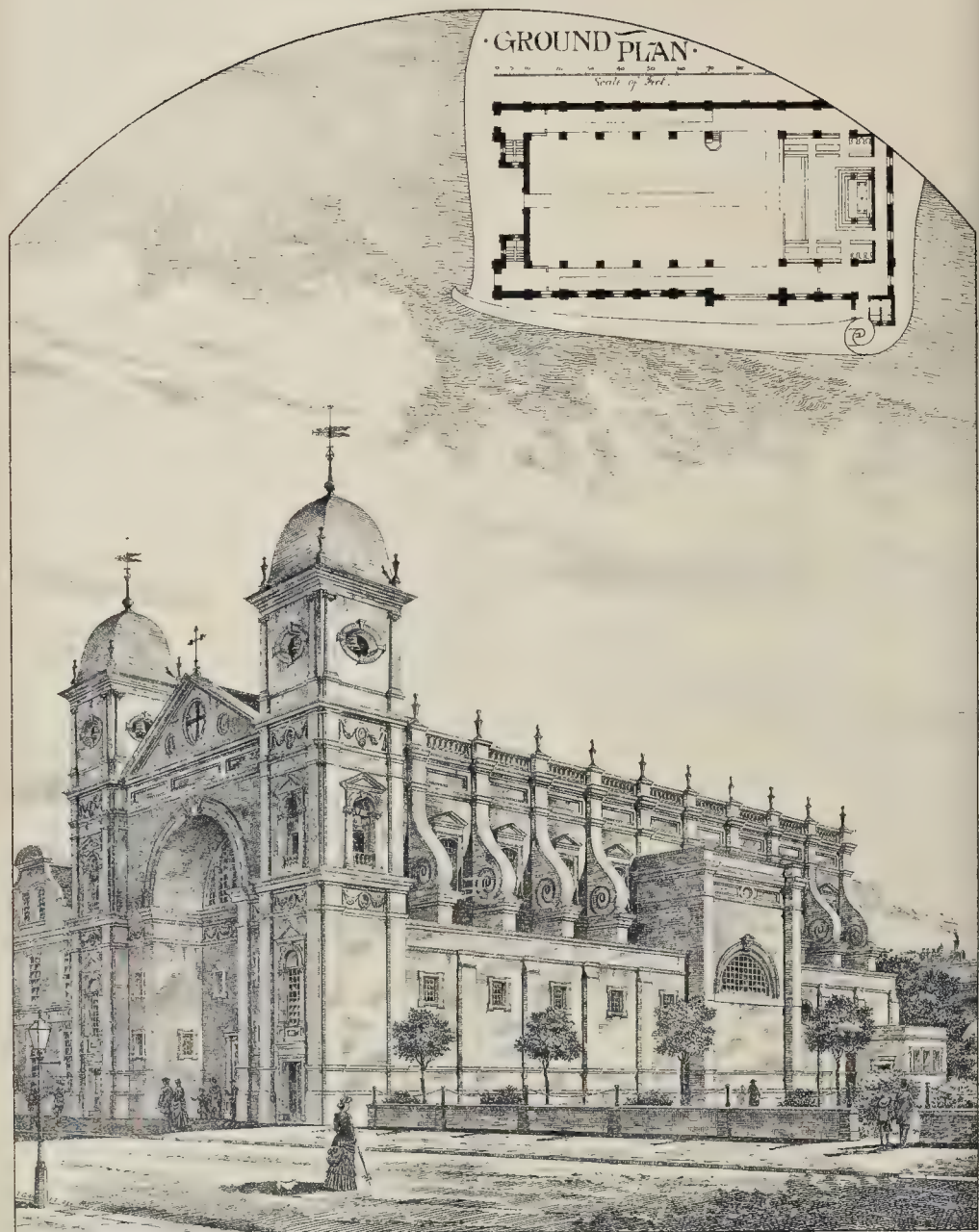


V. R. and Photo-Lith. & Engraving. A. G. van der Vliet, 10, 11 & 12, F.

TOWN HALL, FRANECKER, HOLLAND.







DESIGN FOR ST. DYFRIG'S CHURCH, CARDIFF. MR. J. D. SEDDING, ARCHITECT.

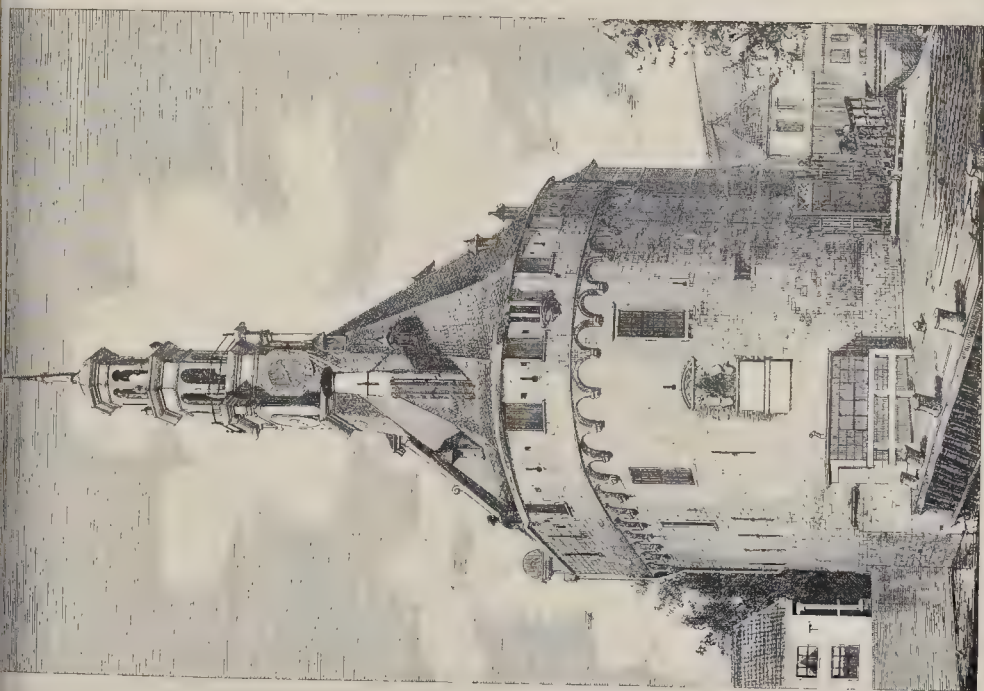




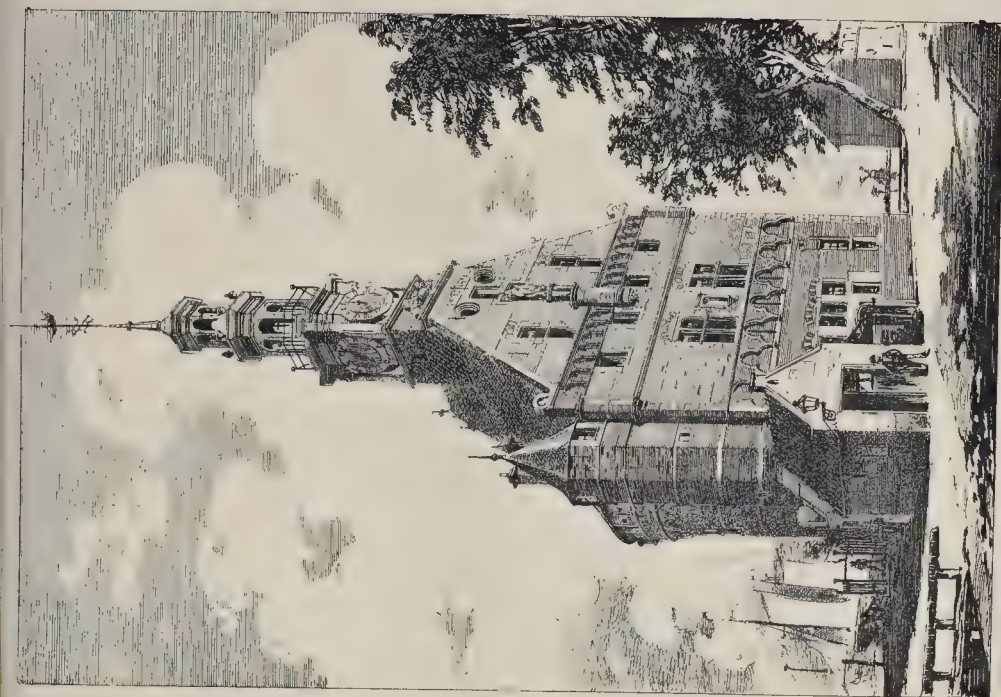
DESIGN FOR ST. DYFRIG'S CHURCH, CARDIFF. MR. J. D. SEDDING, ARCHT. & C.







THE HARBOUR GATE, HOORN, HOLLAND.—(OUTSIDE.)



THE HARBOUR GATE, HOORN, HOLLAND.—(INSIDE.)







PHOTO SPRAGUE & CO. LONDON

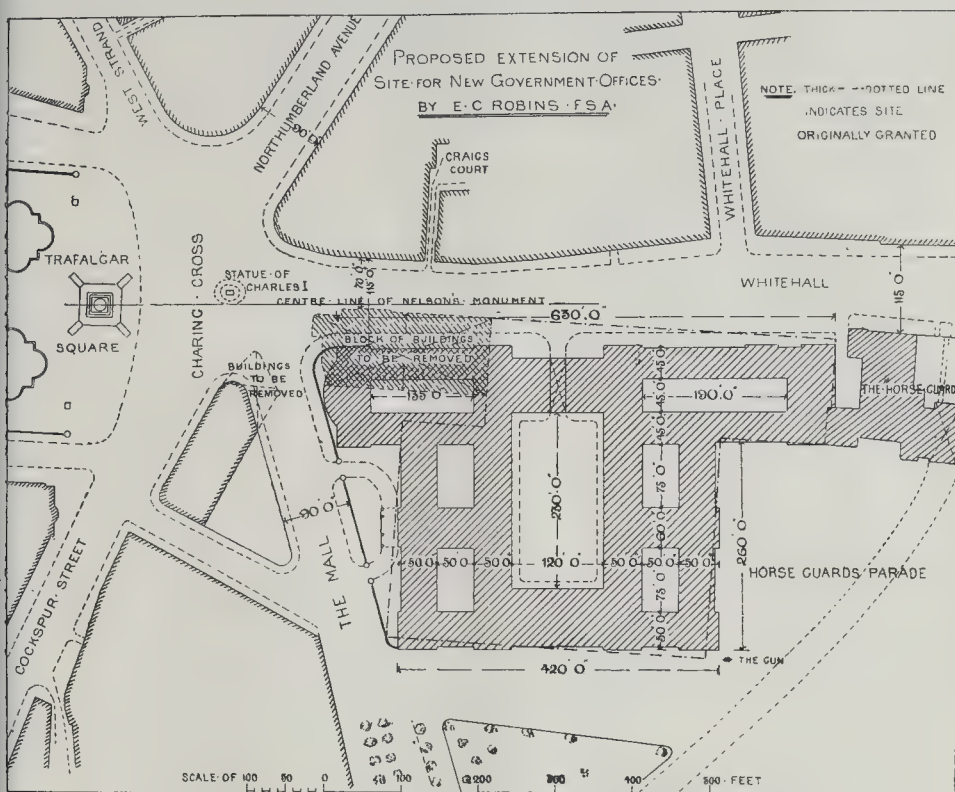
TRAVELLING STUDENTSHIP, 1885.  
MEDAL OF MERIT.

DUNBLANE CATHEDRAL.

DRAWN BY MR. T. MACLAREN







# PROPOSED EXTENSION OF THE SITE FOR THE NEW GOVERNMENT OFFICES.

SIR,—I beg to submit a scheme for improving the approaches and extending the site of the new Government Offices. There is no great novelty in the following suggestions, you having, over and over again, very forcibly drawn attention to the subject in your valuable journal, but they seem to have been overlooked.

Having moved the resolution which was carried at the Royal Institute of British Architects at its opening meeting on the 2nd inst., and as published in the *Builder* for Nov. 7 [p. 659, note], it seems appropriate that I should indicate the direction in which I personally think improvement may be made, and the extent to which I am anxious that the Council of the Institute should exercise its influence to overcome the impending evil, viz., the crowding together of a greater number of offices upon the selected site than is compatible with hygienic laws.

The appointed architects are no more responsible than the judges for the fact that the site now proved to be much too limited. Moreover, the official decision in favour of this particular site and its special limitations was settled long before the competition, and, therefore, before it had been conclusively proved by the designs sent in that, without unduly raising the buildings and contracting the internal courts from which light and air are obtained, the site was quite inadequate.

If any doubt on the point existed, it was set rest by the model, which made it clear to the simplest understanding that something should be done to extend the area to be devoted to the proposed range of buildings contemplated.

The necessity for a larger area having been demonstrated by the requirements of the building itself, aesthetic considerations may also be ascertained, and perhaps it may be considered best to all to make such suggestions as may lead to a fuller discussion of the whole question, that is to say, not only the building itself, but its surroundings also.

With this object I have prepared the accom-

panying plan to illustrate my views, and to show how the thing may be done on sound economical principles, and at the same time achieve a long-desired improvement, viz., the extension of the Mall of St. James's Park into Charing-cross, and the entire disengagement of the new public buildings from abutting structures of a meaner character, which now threaten to obscure the most important view.

To the accomplishment of this end it will be necessary to remove Drammond's Bank and the intervening buildings, and to extend the Whitehall façade to the Bank corner; at the same time, to set back the main front so as to widen the street at this, its narrowest part (about 70 ft.), to something like its width opposite the Horse Guards, viz., 115 ft.; and so that looking from Parliament-street Nelson's Column shall come in the centre of the widened roadway. In the same way, coming along West Strand, Buckingham Palace may be visible at the west end of the Mall, if it is continued into Charing-cross of a sufficient width, by the removal of the old houses south of Stanford's premises.

The result of these arrangements, as shown on the plan, is that the central court of the new buildings might be 230 ft. long by 130 ft. wide, and the remaining courts might be double their present width. Furthermore, the area of the land originally given upon which to plan the buildings was about 176,000 superficial feet, while the area herein proposed to be taken (exclusive of what is thrown into the roadway) is about 211,000 superficial feet. The portion of the original site area which was covered by buildings in Messrs. Leeming's first design (no plan having appeared of the amended design) was about 135,000 superficial feet; that is, the whole site except 41,000 superficial feet. The area occupied by buildings in the proposed plan will not be much in excess of that previously occupied, but there will be about 75,000 superficial feet given to courts and areas, besides the improvement of the approaches by the continuation of the Mall and the widening of Whitehall.

Those who have wandered over the Continent from Belgium to Vienna will not have failed to

observe the care with which the municipal authorities plan their public buildings with an eye to their national representative character, having regard not only to their internal palatial design, but to their general environment also. It is grievous to see so grand an opportunity as the present thrown away for the sake of a few thousands, which it would be far less economical to keep than to spend, when so large an outlay in any case is necessarily involved.

EDWARD C. ROBINS.

## PUBLIC WORKS AT TOTTENHAM.

WITH a view of meeting the growing requirements of the rapidly-developing parish of Tottenham, the Local Board are now spending large sums of money in the execution of permanent works. Operations which attract a considerable amount of attention amongst sanitary authorities are those in connexion with the treatment of the sewage of the extensive district within the jurisdiction of the Tottenham Board. It may be interesting to state that the approximate population (which has more than doubled within the last ten years) is now over 60,000; and it is obvious that any method designed for dealing with the sewage of a parish of 20,000 or 30,000 inhabitants would be inadequate to supply the want created by an addition of a hundred per cent. The Tottenham Board have been compelled to extend their works from time to time, and have lately been forced into special action by the attitude assumed towards them by the Lea Conservancy and the late Home Secretary. Mr. De Pape, the Board's engineer, was instructed to devise means for satisfying complaints preferred under the Lea Conservancy Act, 31 and 32 Vict. cap. 32 (Tottenham has a special saving clause, allowing it to discharge its sewage into the river, after treating it by the best known practicable means for deodorisation and purification), and he presented a comprehensive scheme, involving an outlay of something over 20,000. While no member of the Board



suggested that the adoption of the method proposed would not achieve the end desired, a section considered that, having regard to the extent of the proposed expenditure, it would be well to have independent testimony on the point. It was accordingly resolved to call in Sir John Hawkshaw, Son, & Hayter, and the report of that eminent firm having confirmed every detail of Mr. De Pape's scheme (which subsequently met with the entire approval of Mr. Arnold Taylor, who held an official inquiry as representative of the Local Government Board), the Local Board determined to have the first section of the new works put into operation. Tenders were invited, and that of Messrs. W. Brass & Co. (for 15,000*l.*) was accepted. The work is now fairly in hand. The Board have constructed important intercepting sewers, on the advice of their engineer; and Mr. Arnold Taylor has held a public inquiry in respect to the application of the Board for permission to borrow about 10,000*l.* to construct a larger sewer than that now in operation, through Lordship-lane to Wood-green. This has been devised by Mr. De Pape to take the high level and other drainage of the locality, including that of the Noel Park Estate, which at present consists of more than 2,000 houses. Mr. Arnold Taylor expressed full approval of the scheme, and the loan will be sanctioned. The Board have also expended large sums upon works of water supply, and have just accepted a tender for sinking a well 12 ft. in diameter, down to the chalk, and boring 450 ft., at one of their pumping stations. Under the contract this work has to be completed within thirteen months. The Board have likewise spent over 24,000*l.* on private roads, and have determined to have many others made up as early possible; and the Board intend promoting in the ensuing session of Parliament a Bill to confer upon the Board further powers with regard to streets, buildings, sewers, sewage works, infectious diseases, and other sanitary matters within their district.

#### HARBOUR WORKS IN SCOTLAND.

**Eyemouth.**—On the 22nd ult. the memorial stone of a new harbour was laid at Eyemouth. According to the *Glasgow Herald*, the pier of the old harbour was built in 1747, and it was extended and improved, and a new pier added, in 1769-73, after a design by Smeaton. The greatly-increased size of the fishing-boats now used, combined with the development of trade, have rendered harbour-extension imperative; and though a scheme for this has been mooted for several years, it was only about a year and a half ago that it took practical form. A loan of 25,000*l.* was then granted by the Government for the construction of a new low-water harbour, which is now being formed in the bed of the river Ewe, after plans by Messrs. Thomas Meik & Sons, C.E., Edinburgh. The contractor is Mr. George Lawson, Glasgow, and the resident engineer is Mr. William Kidd. The new harbour is 2½ acres in extent, and when completed the harbour will be ¼ acres, or about three times the present area, with a depth of 18 ft. at high water of spring tides, or 4 ft. more than the existing harbour. The quay-walls are of concrete, 20 ft. in height throughout, and along the whole of the quays arrangements can be made for the discharge of fish direct from the boats to the railway trucks. Already a sum of 14,500*l.* has been expended in the construction of the new basin, which is 1,000 ft. in length; and the other 10,500*l.* will be applied to the improvement of the old basin and the formation of a deep-water channel to the sea, which will be 60 ft. in width, and of the same depth as the new basin.

**Dumbarton.**—The twin-screw patent hopper-dredger *Leven*, constructed by W. Simons & Co., Renfrew, for the Dumbarton Harbour Board, successfully underwent a series of official trials at Dumbarton the other day. This vessel was ordered in November last to effect important improvements in the *Leven*, after considerable inquiries as to the best type of dredger adapted for that purpose. The following particulars of the vessel are of interest:—Length on deck, 191 ft.; breadth moulded, 38 ft. 6 in.; depth moulded, 15 ft. The hoppers are placed near the centre of the vessel, and have capacity for 800 tons of its own dredgings. The vessel is built principally of steel, and is sub-divided into ten water-tight compartments. The bucket-

ladder is fixed on the builders' patent traversing carriage, which enables the buckets to dredge in advance of the bow, and can be afterwards brought back and housed on deck, so as not to impede the vessel's sailing qualities. This arrangement will be found of great advantage, as the vessel, instead of lying idle until the tide makes, as is often the case at other ports, will be able to excavate into banks ahead of itself, and so practically cut its own flotation. It can also dredge to a depth of 32 ft. below the light water-line. A separate hoisting engine is fitted up in the forward end of the vessel for controlling the bucket-ladder. Powerful crab winches are placed at the bow and stern for working the vessel; they are of a special design, and are particularly well adapted for the work required; they are triple-gear, and have three separate barrels fitted so that each mooring-chain can be worked independently, also warping ends for use at quays, &c. The buckets are made of steel, and have a capacity of 17 cubic feet, and are driven at the rate of twenty per minute, and when working in sand raise the enormous quantity of 800 tons per hour.

#### ON CIRCULAR HOSPITAL WARDS.

SIR,—It is gratifying to find that Mr. John Brown, by his letter published in your last issue [p. 700], does not contest my statement that 57,392*l.* per 1,000 patients would be a fair estimate of the increased annual charges for nursing and maintenance when the wards of a hospital are designed to contain twenty only instead of thirty beds. "This expense," he says, "will have to be incurred so long as wards for twenty are preferred to those for thirty beds."

I also understand him to admit that the cost of the buildings would also, under these circumstances, be much increased.

This really is my main contention, and I at once admit that if thirty-two beds could be placed in circular wards of 60 ft. diameter (such as those at Burnley Hospital) the difference in the cost between the two systems (although still considerably in favour of the parallelogram plan) would, probably, have been insufficient to induce me to read my paper at Leicester. But I am not aware that any serious proposition for putting thirty beds in a ward has ever been made by the advocates of the circular system. Twenty is the number adopted at the Antwerp Hospital, the wards of which are 61 ft. 6 in. diameter. Twenty is the number of beds at the Burnley Hospital wards, 60 ft. diameter; and the learned Professor Marshall, who was the first to introduce the system into England and who to the present time remains its staunch supporter, takes for his illustration a ward 61 ft. diameter, containing eighteen beds. I can only, therefore, assume that the supporters of the system would scout Mr. Brown's suggestion for placing thirty-two beds in a circular ward, unless the diameter were increased considerably, and then the cost of the buildings would again become abnormally great.

Mr. Gordon Smith, another supporter of the system, shows in the pamphlet referred to by Mr. Brown, that a ward on the circular system, to contain thirty beds, should be 84 ft. diameter, and at this rate the 32-bedded ward suggested by Mr. Brown should be 89 ft. diameter.

This proposition seems to have arisen from a misconception of what I stated in my paper; for he says, in introducing the subject:—"Mr. Snell's experience from his four large parish infirmaries and from the Moabit Hospital, Berlin, as given in his paper, satisfied him that 6 ft. of bed-space is sufficient," and he argues from this that I ought to be satisfied with 6 ft. of bed-space in circular wards.

Now, really, I cannot see what there is in my paper to lead Mr. Brown, or any one else, to a supposition that I consider 6 ft. bed-space to be sufficient in an ordinary hospital ward. It is true I have built workhouse infirmaries with beds this distance apart, but it is because they are workhouse infirmaries, and had I designed these buildings with 8 ft. wall-space, and with 1,200 or 1,300 cubic feet per patient, the Local Government Board would have refused to allow the buildings to be erected, because the cases treated in these hospitals are not considered to be of so severe a character as those in general hospitals.

It should be remembered that I commenced my paper by saying that my arguments applied

only to the wards of general hospitals, and not to hospitals (like workhouse hospitals) erected for special purposes. And before proceeding further, I would call attention to the fact that I have, from the commencement of this discussion, been most careful not to commit myself to any expression of opinion as to what ought to be the accommodation or the wall-space, superficial, or cubic space of hospital wards, whether circular or oblong. I have based my arguments, so far as regards the question generally, upon the opinions of eminent experts, and so far as regards the circular system upon the writings and works of its known advocates.

Mr. Brown says that my large circular ward, 65 ft. diameter, arranged for twenty-two beds, is not one that would be suggested by any advocate of the circular system, and that "Professor Marshall's ward for twenty-two beds is 4 ft. 6 in. less in diameter." Will Mr. Brown kindly refer again to Professor Marshall's pamphlet, and he will find that this gentleman takes for his example a circular-ward, 61 ft. diameter, containing eighteen beds, and although he says twenty-two beds might be put into this space, he, in preference, illustrates the ward to contain only eighteen beds? How can Mr. Brown reconcile this with his statement that a ward 65 ft. diameter, arranged for twenty-two beds, is not one that would be suggested by any advocate of the circular-ward system? Professor Marshall, in the same pamphlet, publishes a suggestion for a ward 84 ft. diameter to contain thirty beds. What, then, is there so unreasonable in my suggestion for a 65-ft. ward containing twenty-two beds? Surely my jump from 61 ft. to 65 ft. 6 in. (4 ft. 6 in. only) in diameter for an increase of four beds is much less in proportion than the Professor's jump of 23 ft. diameter for an increase of twelve beds.

Mr. Brown's objection to what I said with regard to ventilation is, I think, untenable, for one of the arguments of the advocates of the circular system is that the central shaft affords a much better opportunity of getting rid of the foul air of the ward, and this central shaft is an Antwerp made use of in this way. It is quite true that the foul gases need not be carried across the length of the ward into the central shaft, and that they might be carried up in the side walls, as suggested by Mr. Brown, but this has not been done, to my knowledge, at any circular building yet erected, and if the drawings supplied to me by the architects of the Burnley Hospital are correct, Mr. Brown is mistaken in supposing that it is to be done at that building. It is most distinctly shown that the outlet for foul gases will be in the ceiling next the central walls of the staircase. Mr. Brown will also pardon my correcting his assertion that the foul-air outlet-shafts are at the outside walls of the Antwerp Hospital. It is true, as he says, that "the outlets are there below the patients' heads," in the outside walls, but these outlets are connected with trunks which run below the floor and across the whole length of the ward, into the central ventilating-shaft.

All these discussions, however, upon minor matters draw away attention from the main points of my argument, and with your permission I will shortly reiterate them.

First, The highest authorities upon hospital construction allow that thirty to thirty-two beds are not too many patients to have under the charge of one head, or one night-nurse; but if the patients were placed in wards situated at a distance apart additional nurses would be required.

The rectangular form admits of thirty or more beds being placed in a ward; the circular form does not. The largest circular ward erected contains only twenty beds, and attempts to put many more than this number into them either reduces the bed-space below what is considered by experts to be right, or increases the diameter of the ward to inordinant dimensions.

This being the case, I showed that the cost of erecting and working a circular-ward hospital entailed an enormous extra cost, and no argument has yet been adduced to show that I am wrong in this conclusion.

If it can be shown that all the eminent authorities whom I quoted are wrong in their opinions which formed the groundwork of my argument, then I can have no hesitation in admitting that argument to be invalid; but this has been done?



Brown and others get over this question repeating almost word for word what I in my paper would be their reply:—"We nothing to do with the cost; what we e is to erect that description of building, ever it may be, which best adapts to the cure of the patients contained

admitted that, within reasonable limits, view of the question was a right one; the question is, "what is a reasonable ?"

the building "best adapting itself to the of the patients," if designed without reence to the question of cost, would be consisting of isolated wards, each containing patient and having one nurse in constant ndance; but, if the question of economy a to be paramount, the wards should hold y patients each.

he difficulty is to know where to draw the e Miss Nightingale and the medical and utectural advisers of the Herbert, St. mas's, Leeds, Friedrichsham (Berlin), Lari- ère, Bourges, St. Eloi, and many other ospitals, say twenty-eight to thirty- eds is the most prudent unit to adopt. uries made of the superintendents at the ve institutions show that no difficulty what- is experienced in nursing so many, and no er objection is urged against the system. On other hand, many hospitals have been built ing the last twenty-five years with wards ying in accommodation from fourteen to ty patients, but the question naturally es, Did the authorities under whom these ings were erected have it brought under e notice how much more expensive the first e and management would be if this smaller ber were adopted? There is nothing to w that this was the case.

f it be true that hospital accommodation is ently short of what it should be in this try, then is it not serious to contemplate t 105,000, per 1,000 patients is being wasted idulgence in this wasteful system of build- ? Surely the time has come when some ial inquiry should be made into the question, her than that so grave an extravagance be permitted to continue.

is, however, though all-important, is not ly detail of hospital construction affected e circular system of building wards. We e to ask ourselves whether buildings designed n this principle are better adapted "to the e of the patients contained in the wards," use of its circular shape. I have ventured ay not, and that unless Nature's laws be striven, air will not as freely pass through e wards from one side to another, when the idows are 60 ft. apart, as it would if those idows (as in rectangular wards) were 24 ft. rt. Mr. Brown says, in answer to this, "We ver want wind blowing through our wards; e for ventilation we desire the ingress of a eble current of air. However the wind ws, we have it sweeping round the circle, d, by its aspirating effect, gently drawing the e from the ward."

f Mr. Brown is correct in this view, then all e teachings of hospital experts who have vocated narrow wards and cross ventilation e been delusive. But how, I would ask, is e wind to sweep round this circle when, as a tter of fact, two buildings (the nurses' and itary officers') project outwards from it and tstruct its passage? Aspiration, whatever its e, could only occur when the wind was wowing from one or two quarters, and it is e clear that at any time it must be blowing ry hard indeed to produce any sensible aspira- e effect.

I have asked in vain that the supporters of e circular system will demonstrate how, in dience of all mathematical rules, they can tain their assertions that, when the sun is iing or the wind blowing against the straight all of a parallelogram-shaped wall less air a would penetrate through its window open- e than would penetrate an equal number of ndow openings of the same size contained in e wall of a circular ward. I asked also to be wn that the constriction of the feet of the d consequent upon their radiation towards e centre of the circle is not a distinct dis- advantage, where, as in the case of a medical ool, the greatest space for students should be ren round and about the patients. I have t had, and did not expect to have, any reply e these important questions.

H. SAXON SNELL, F.R.I.B.A.

#### DUNFERMLINE HIGH SCHOOL.

SIR,—In your article on the Dunfermline new High School in last week's issue [p. 697], you state that the ventilation extractors were supplied by Mr. Stevens, Leeds. I shall be glad if you will kindly correct this. The ventilators are Stevens's exhaust, but have been supplied by myself.

JAMES EDWARD ELLISON.

#### CONTRACTOR versus ENGINEER.

SIR,—In answer to an advertisement, a contractor sends in a tender on a form supplied by the engineer of a local board, for a storage reservoir. On the form of tender it states the work is to be carried out according to plans and specifications prepared by the engineer; and the contractor finds, after his tender has been accepted, that the specification requires him to keep the work in repair for six months after certified completion, but that the work is not to be considered complete until the reservoir is perfectly watertight.

The contractor maintains that if he carries out the work in accordance with the specification it is all that should be expected of him, and that the matter of the reservoir being watertight should rest with the engineer.

The contractor refuses to sign the contract unless the clause relating to the reservoir being watertight is struck out; and if any of your subscribers could give any information as to the legality of the tender, I should be greatly obliged.

A SUBSCRIBER.

#### PROVINCIAL NEWS.

**Stockport.**—The Stockport Infirmary has been re-opened, after undergoing alterations and renovations at a cost of upwards of 6,000l. The Infirmary was originally constructed on the corridor principle, all the rooms being entered direct from the corridors, accommodation being found for 30 patients, allowing 1,200 cubic feet of space for each. Recently the committee, acting on the advice of the architects (Messrs. Pennington & Bridgen, of Manchester) and the medical staff, determined to entirely re-construct all the wards, to pull down the back part of the hospital and rebuild it on the pavilion principle, and to devote the front portion to purely administrative purposes, for which it was well adapted. The three two-story pavilions, which have now been constructed, afford accommodation for fifty-two patients, allowing a space of 1,200 cubic feet to each, together with sculleries, &c. The convalescent day-rooms, day-nurseries, and servants' rooms, and operating theatres are on the first floor fronting Wellington-road South, the night nurses being provided for in the second story over the portico. The out-patients' dispensary, the rooms for the resident matron, the board-room, and the secretary's office are on the ground-floor, and the kitchen offices, one story in height, are centrally placed in the rear of the main building. The laundry and mortuary, each one story in height, are completely isolated from the hospital. Messrs. T. and W. Meadows, of Stockport, were entrusted with the principal portion of the alterations, Mr. R. Hayward being the sub-contractor for the plumbers' work, and Messrs. Hammett for the painting and decorating. Mr. J. Todd acted as clerk of works.

**Carlisle.**—Extensive alterations at Messrs. Carr & Co.'s biscuit manufactory, Caldergate, under the personal superintendence of Mr. T. Taylor Scott, architect, of Bank-street, have been completed. The changes effected are numerous and varied, great attention having been devoted to the ventilation and fresh air supply, which is a *sine quâ non* in a manufactory of this description where the operatives work in a very high temperature. The large machine-room, in which nearly all the biscuits are made, has been doubled in size, and has also added to its previous complement two new patent travelling ovens of superior arrangement and construction to those hitherto erected. The ovens are 40 ft. long, with a solid external appearance, but internally they form a network of machinery, flues, and furnaces. The large new packing-room forms an elbow to the old one, and is well lighted and ventilated. Adjoining the packing-room and bridging the railway, has been constructed with iron a very complete lavatory for the girls. Messrs. C. & J. Armstrong, builders; Cairns & Co., ironfounders; H. & R. Court, joiners; W. & R. M. Hill, plumbers, painters, and glaziers; and C. J. Nanson, slater, have carried out the various works.

**Wolverhampton.**—The foundation-stone of the new drill-hall for the Third Volunteer Battalion of the South Staffordshire Regiment was laid on the 23rd ult. The building consists of three frontages to Whitmore-street, Stafford-street, and Thornley-street. The large drill-hall, which will be 184 ft. long and 76 ft. wide, will be provided with a stage at the one end and a gallery at the other. In the basement will be an apparatus for heating the whole of the building by hot-water pipes. Messrs. Horsman & Co. are the builders. The total cost of the building will be about 8,000l. The designs for the building have been prepared by Mr. Daniel Arkell, architect, of Temple-row West, Birmingham.

**Bath.**—According to the *Bath Chronicle*, no inconsiderable amount of street widening and improvement has been done by the Surveying Committee within the last few years. And the close of the present municipal year witnesses the approach towards completion of two or three very desirable alterations in the busiest thoroughfares of the city. First in importance is the Monmouth-street improvement. The greatly-increased width of roadway cannot but be welcome to those engaged in vehicular traffic. A particularly awkward corner for pedestrians will have been removed when the Westgate-street improvement is finished. While important thoroughfares are looked after, less important ones should not be forgotten. For example, could not something be done for the top of Gay's-hill?

**Bradford.**—On the 28th ult. the Mayor of Bradford formally opened a new wing which has been erected in extension of the Bradford Infirmary. The new wing will provide accommodation for seventy or eighty additional patients. The building, which has been erected after designs prepared by Messrs. Milnes & France, is three stories high, including a light and airy basement, which is used for porters' day and night rooms, boiler-room, and the like, and which is connected with the basement of the old building by an open corridor on both sides. The ground-floor contains a private entrance for the staff in Lumb-lane, a staircase leading to the upper and lower floors, four rooms originally intended for use by the head nurses, and five small wards intended for two beds each. The first floor contains one large ward, 122 ft. long and 30 ft. wide, intended for thirty beds. The second floor is occupied by a single ward of the same size, which is set apart entirely for thirty-four children. The clear height of the wards is about 14 ft. 6 in. On each floor, in a detached wing, are the bath-rooms, sinks, and water-closets. Adjoining the wards are a nurses' room and scullery. In the latter are lifts for food, coals, and the like. The walls are built hollow and lined with brick, but externally they are built with the millstone grit of the district. The floors are of cement concrete, supported on iron beams, and the ceiling of the top room is fire-proofed in the same way. Above the cement floors are covered with pitch pine, and the floors in all the wards are polished. The warming and ventilating of the wards are combined to a great extent, for the external air is admitted at the rear of each fireplace, there warmed and thrown into the rooms in great volume. No hot water, steam, or other similar contrivance is used, and the air in the wards is kept pleasantly warm by the open fires. Additional inlets for fresh air when required are provided in the shape of vertical inlet tubes, besides which the windows will be largely used as a means of ventilation. Two separate outlet flues of large size are provided for each of the large wards, and these are heated by gas to secure a current in the right direction. The cost of the new wing is about 12,000l., exclusive of furniture and collateral alterations in the old premises. The various works have been executed by the following firms:—Masons' work, Messrs. Hinchliffe & Small, of Bradford; joiner's work, Mr. James Descon, of Shipley; slater's work, Mr. Albert Hill; plasterer's work, Mr. W. H. Hargreaves; plumbers and glaziers' work, Messrs. T. Nanwick & Co.; ironwork, Messrs. Taylor & Parsons; and painter's work, Messrs. L. Morrell & Son, all of Bradford. The tiles for floors and walls have been supplied by Messrs. Maw & Co., and Messrs. Woolliscroft & Co., and the building throughout is warmed by means of Shorland's patent open fire warm-iron generating Manchester grates. The gasfittings are by Messrs. Freeman & Collier. The lifts,







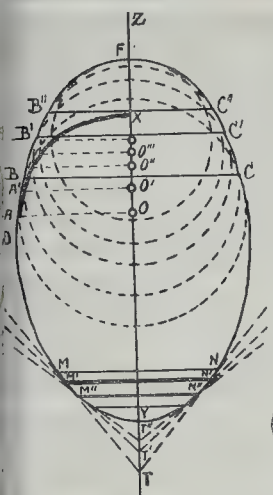


Fig. 199.

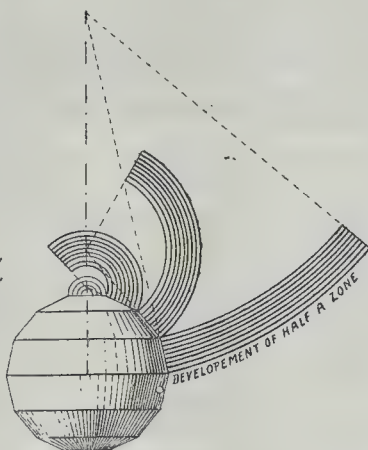


Fig. 201.

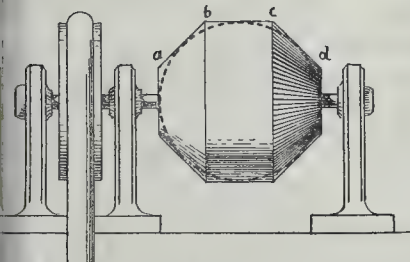


Fig. 200.

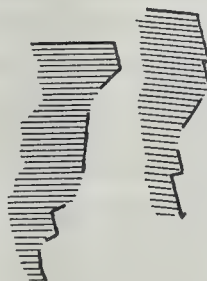


Fig. 202.

## The Student's Column.

### DESCRIPTIVE GEOMETRY.—PART II.

XXX.

#### ENVELOPING SURFACES.

WE have, in article No. II. of the second part (vol. xlviii., p. 816), mentioned a class of surfaces called *enveloping surfaces*,—that is, surfaces formed by the successive intersections of the position of another surface, called the *enveloped surface*, moving through space varying in position, and even in shape according to some given law. The intersection of two successive positions of the enveloped surface (taken infinitely near to one another) is called the *characteristic* of the enveloping surface.

We have already considered in the preceding article on developable surfaces a special case of enveloping surfaces; that is, the surfaces formed by the *motion of a plane* through space, according to a given law; but now we shall consider enveloping surfaces in general,—a question the student will find of more practical importance than at first appears.

Let us imagine a moving sphere (Fig. 199), the centre of which follows the vertical line Z-O-Z', and of which the radius varies in length such a way that its extremity will always touch a curve A-A'. Then two neighbouring spheres, of centres O and O', infinitely close the student should consider our drawing as a figure enlarged by an infinitely strong magnifying glass, will intersect one another along a horizontal circle, projected here on the line Z-O, and the neighbouring spheres, of centres O and O', will intersect one another along a horizontal circle B-B', and so on with every other successive sphere. All these circles, B-C, B'-C', B''-C'', . . . , having their centres in the line Z-O, and their planes perpendicular to the line Z-O, belong, therefore, to a surface of revolution of which Z-O is the axis, and which will touch every one of the spheres; for the circles B-C and B'-C' belong to the surface of

revolution, and also belong to the same sphere of centre O'; so we can conclude that the zone (infinitely narrow) between the circles B-C and B'-C' is common to the enveloping surface and to the enveloped sphere.

In our figure, the meridian of the surface of revolution is formed by a succession of arcs, such as B-B', B'-B'', . . . ; but as these arcs are infinitely small, the meridian is really a continuous line, the shape of which depends on the law which governs the variations of the radius of the sphere. For instance, if the length of the radius is bound to remain always the same, the enveloping surface of the moving sphere will be a *right cylinder*.

If the meridian D-B-F of the surface of revolution be given, then, when we conceive it as generated by an enveloped sphere, the sphere in motion will be bound to be tangent to the meridian curve.

Surfaces of revolution can also be considered as generated by a variable cone. Suppose that through the points M, M', M'' of the meridian D-B-F we draw tangents M-T, M'-T', M''-T'', and that these tangents are made to rotate with the meridian round the axis Z-O; it is evident that these tangents will engender right cones, which will touch the surface of revolution along parallels thereof M-N, M'-N', . . . , &c. We can, therefore, say that a surface of revolution is the enveloping surface of the positions taken by a variable cone of revolution, moving through space with its vertex always on the axis and its generator always tangent to the meridian of the surface of revolution. In other words, the surface of revolution is considered as consisting of a series of conic zones.

Our readers will perhaps remember that, thanks to this consideration, we were able to delineate the shade of surfaces of revolution with the help of cones (see fig. 152, p. 308 ante). Thanks to this consideration also, the workman shapes a billiard-ball on a turning-lathe with the help of a straight-edged chisel. He first cuts out of the solid a few conic zones which envelope the sphere of the ball, as in fig. 200; then he binds these zones together by cutting down

the arrises a, b, c, d, between them so as to form narrower conic zones, and by cutting again the new arrises formed, the turner gets his solid gradually cut down nearer and nearer to the shape of a spherical billiard-ball.

Instead of turning the sphere out of a solid by cutting out the conic zones, we might develop each zone, as in fig. 201, and cut it out of cardboard; then, by fitting the zones over one another and gluing their edges together, we should form a hollow body, which would be near the shape of a sphere.

It is a similar construction which was employed in the first practical example with which we introduced the science of descriptive geometry to our readers (see No. I., Feb. 7). The quadrant which formed the angle of the balcony of a hall was, of course, part of a surface of revolution, the generator of which was given by the section of the balcony; but in cutting out the boards which were to cover its surface, we considered these boards as forming conic zones, and were able thereby to develop them.

Tin-ware manufacturers fashion their wares as enveloping surfaces to the different positions of a plane. They have a cylindrical or conical anvil on which they bend the sheet of tin along a series of straight lines drawn before-hand thereon. The sheet of metal is, therefore, a moving plane, of which narrow strips form the general surface of the tin-ware.

Again, when a wood or stone carver copies a statue from a clay model, he first forms a body composed of planes only, which envelope the surface the figure will ultimately receive, and the surface of the statue is fashioned by cutting down the angles between these planes so as to get gradually to form an enveloping surface of ever smaller and smaller planes.

It is easy to conceive the exact position and direction of straight lines and planes, but it is next to impossible to copy exactly a curve right off. For this reason, Sir Charles Barry advised his pupils to draw all their mouldings by the means of straight lines (see fig. 202), and finish them off by slightly rounding off the angles; for by this mode of drawing one obtains what he called character.

**Royal School of Mines.**—Prof. Warington Smyth, F.R.S., in continuing his lectures in the theatre of the Geological Museum, Jernyn-street, spoke of the inconvenience attending the exaction of royalty where, as in this country, the mineral belongs to private proprietors, when mines are working at a loss, and contrasted it with the system which obtains in other countries where the clearance only is assessed, and not the whole bulk raised. Though the latter may encourage operations, especially in periods of distress, it is often attended with interference in the way of supervision, which Englishmen will not willingly tolerate. He subsequently entered upon the question of inequality in the character of a deposit, referring, in the case of stone, to the general disappointment felt with regard to that used for the Houses of Parliament, where the stone was admittedly from one of the best quarries in the country; but, in consequence of the lack of precaution to have its bed specially selected in the quarry, by a thoroughly experienced man, it has proved so marked a failure. Referring to the much-debated question of the origin of lodes, he preferred to credit Dr. Pryce, of Redruth, author of "Mineralogia Cornubiensis," and not the celebrated Werner, of Frieberg, to whom literature has long attributed it, with first having advanced the now generally accepted theory of their being originally fissures caused by internal movement of the earth, the filling up taking place subsequently. Perhaps the strongest proof which could be advanced in support of this explanation of the fact is the existence of cavities where crystallised or stalactitic formations are frequently to be found lining the sides. Referring to the oft-repeated idea of a resemblance between the mineral veins of the earth and the veins of a tree, he considered such a notion a very far-fetched one, as there was in reality no close resemblance; but instances had come before him where people so impressed spent much capital in the vain endeavour to so follow the small twigs, or veins, as they considered them, until they should ultimately arrive at the trunk, which he could assure them would be a very long time.



### RECENT SALES OF PROPERTY. ESTATE EXCHANGE REPORT.

| Nov. 6.                                                                                                             |       |
|---------------------------------------------------------------------------------------------------------------------|-------|
| Carshalton—59, Avenue-villas, 84 years, ground-rent 10l.                                                            | £200  |
| By W. B. HALLETT.                                                                                                   |       |
| Commercial-road—Ground-rent of 5l., reversion in 28 years                                                           | 135   |
| By G. & D. FIELD.                                                                                                   |       |
| Clerkenwell—86, St. John-street, freehold                                                                           | 1,135 |
| By MADDOX & SON.                                                                                                    |       |
| Nov. 10.                                                                                                            |       |
| By DERRICK, TAYLOR, & CO.                                                                                           |       |
| City of London—A freehold ground-rent of 800l. per annum, reversion in 93 years                                     | 7,500 |
| 45 and 49, Bread-street, 73 years, ground-rent 8l.                                                                  | 8,000 |
| Camden Town—4, Wilnot-place, 69 years, ground-rent 6l.                                                              | 300   |
| Wood Green, Southgate-road—Two freehold houses and shops                                                            | 2,500 |
| Edmonton, Hertford-road—Roundfield House, and 2a, 1r., freehold                                                     | 890   |
| Two freehold residences adjoining                                                                                   | 1,350 |
| By R. A. NOTLEY.                                                                                                    |       |
| Edgeware-road—Improved ground-rents of 46l. 10s. per annum, 31 years                                                | 720   |
| Kentish Town—Improved ground-rents of 27l. per annum, 53 years                                                      | 540   |
| Improved ground-rents at 16l. 1s. per annum, 60 years                                                               | 350   |
| By HARMAN BROS.                                                                                                     |       |
| Hillingdon—180, Barnsbury-road, 40 years, ground-rent 41l.                                                          | 420   |
| Northamptonshire, Watford—An enclosure of freehold land                                                             | 130   |
| By MASTERMAN, EVANS & CO.                                                                                           |       |
| King's Cross—Ground-rents of 157l. per annum, term 56 years                                                         | 3,005 |
| Nov. 11.                                                                                                            |       |
| By HARRIS & JENKINSON.                                                                                              |       |
| Jamaica—The sugar estate called Ducks, and 3,616 acres                                                              | 4,000 |
| The sugar estate called Hog, and 5,097 acres                                                                        | 4,100 |
| The sugar estate called Emily Hall, and 27l. per annum, 53 years                                                    | 6,500 |
| By D. J. CHATTELL.                                                                                                  |       |
| Montserrat—The sugar estate called Stratham Estate, 365 acres                                                       | 1,180 |
| The sugar estate called Hermitage Estate, 820 acres                                                                 | 1,075 |
| By D. J. CHATTELL.                                                                                                  |       |
| The reversion to one-fifth share of 13,399l., invested in Consols, &c., life aged 55                                | 1,800 |
| Paddington—29, Edbrooke-road, 77 years, ground-rent 8l.                                                             | 600   |
| 67 and 73, Walerton-road, 77 years, ground-rent 20l.                                                                | 1,150 |
| 50, Oakington-road, 77 years, ground-rent 7l.                                                                       | 950   |
| By FULLER, MOON, & FULLER.                                                                                          |       |
| Upper Tooting—Norton Cottage, freehold                                                                              | 455   |
| Lower Tooting, High-street—Freehold house and shop                                                                  | 820   |
| A freehold house and shop                                                                                           | 1,280 |
| A plot of freehold land                                                                                             | 1,480 |
| Four plots of freehold land                                                                                         | 145   |
| Mitcham—Four cophold cottages                                                                                       | 320   |
| Nov. 12.                                                                                                            |       |
| By E. STIMSON.                                                                                                      |       |
| Canonbury—55, Compton-road, 59 years, no ground-rent                                                                | 600   |
| Etherith—53 and 55, Plough-road, and a ground-rent of 4l. a year, term 62 years, ground-rent 10l. 10s.              | 520   |
| Camdenwell, 88, Field-street, and 2 and 4, Cork-street, 15 years, ground-rent 16l. 16s.                             | 235   |
| Walworth—3 to 21 odd, Portland-street, 16 years, ground-rent 20l.                                                   | 1,110 |
| By DOWSETT & WOODS.                                                                                                 |       |
| Lincoln's-Inn-Fields—4, 4a, and 5, Sheffield-street, and 13a and 14, Bear Yard, freehold                            | 4,800 |
| 16, Bear Yard                                                                                                       | 800   |
| 6, Sheffield-street, freehold                                                                                       | 625   |
| Slaverston Hill—Freehold ground-rent, 14l., reversion in 98 years                                                   | 355   |
| Improved ground-rents of 48l. 19s., term 65 years                                                                   | 825   |
| By C. O. & T. MOORE.                                                                                                |       |
| Stepney—17, 18, 19, 21, 22, and 23, Bedford-square, 13 years, ground-rent 24l. 16s. 6d.                             | 615   |
| By F. HARRIS.                                                                                                       |       |
| Greenwich—80, Calvert-road, freehold                                                                                | 235   |
| 1 and 3, Calvert-road, freehold                                                                                     | 675   |
| 1, Annandale-road                                                                                                   | 395   |
| Vanbrugh Hill, a plot of freehold land                                                                              | 255   |
| By BRADSHAW & CO.                                                                                                   |       |
| Brighton—14, Chichester-terrace, freehold                                                                           | 4,500 |
| Fifty shares of 100l. each in the Law Life Assurance Society                                                        | 5,400 |
| Nov. 13.                                                                                                            |       |
| By E. TREVAY.                                                                                                       |       |
| Streatham—75 to 81 odd, New Park-road, 1 to 6, Bulina-road, three cottages and stabling, 43 years, ground-rent 20l. | 1,110 |
| 63 to 69 odd, Wellfield-road, 44 years, ground-rent 8l.                                                             | 495   |
| By E. SMITH & CO.                                                                                                   |       |
| Thurloe-square—Improved rental of 8l., term 41 years                                                                | 130   |
| By J. BROWN.                                                                                                        |       |
| Limehouse—Freehold ground-rent of 7l. a year                                                                        | 155   |
| By BAKER & SONS.                                                                                                    |       |
| Africa, Transvaal—Numerous freehold farms, containing 102,416 acres.                                                | 2,062 |

**The Brick and Tile Gazette.**—Some numbers of a publication under this title have been forwarded to us. On opening one of them, for July 15 of this year, the first thing we saw was our article on "Early Plasterers and Plastering" (*Builder*, May 31, 1884), reproduced word for word as an original article, without a syllable of acknowledgment. We do not know if the publication in question is still going on.

### MEETINGS.

| SATURDAY, NOVEMBER 21.                                                                                                                                                              |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| British Museum (Archeological Room).—Miss J. E. Harrison on "The Parthenon Marbles." (11l.) 11 a.m.                                                                                 |  |
| MONDAY, NOVEMBER 23.                                                                                                                                                                |  |
| Surveyors' Institution.—Mr. Edward Smyth on "The Copyhold Re-franchisement Bill, 1884-5." 8 p.m.                                                                                    |  |
| St. Paul's Ecclesiastical Society.—Annual Dinner, First Avenue Hotel, Holborn. 7 p.m.                                                                                               |  |
| Inventors' Institute.—8 p.m.                                                                                                                                                        |  |
| Leads and Yorkshire Architectural Society.—Mr. Arthur J. Gale on "English Impressions of American Architecture." 8 p.m.                                                             |  |
| TUESDAY, NOVEMBER 24.                                                                                                                                                               |  |
| St. Paul's Ecclesiastical Society.—The Rev. C. L. Ashad, M.A., on "The most Remote Church of Great Britain." 7.30 p.m.                                                              |  |
| Anthropological Institute.—Five papers to be read, including one by Mr. J. Theodore Bent on "Insular Greek Costume." 8 p.m.                                                         |  |
| Institution of Civil Engineers.—(1) Mr. John Incey, M.A., on "High-Speed Motors." (2) Mr. Gisbert Kapp, on "Continuous-current Dynamo-Electric Machines, and their Engines." 8 p.m. |  |
| WEDNESDAY, NOVEMBER 25.                                                                                                                                                             |  |
| Archaeological Section of Birmingham and Midland Institute.—Mr. Cecil I. Davis on "Gleanings in a Gloucestershire Parish." 7 p.m.                                                   |  |
| South Kensington Museum (Lecture Theatre).—Miss J. E. Harrison on "The Mythology of the Iliad as illustrated by Greek Vase Paintings." (IV.) 5.15 p.m.                              |  |
| Liverpool Engineering Society.—A paper by Mr. D. A. Quiggan, "On the Design and Construction of Steel and Iron Ships." 8 p.m.                                                       |  |
| THURSDAY, NOVEMBER 26.                                                                                                                                                              |  |
| Society of Antiquaries.—Mr. J. H. Middleton, F.R.S., on the "Newly-Discovered Saxon Church at Deerhurst." Two other papers will also be read. 8.30 p.m.                             |  |

### Miscellaneous.

**Liverpool Engineering Society.**—The usual fortnightly meeting of this society was held on the 11th inst., at the Royal Institution, Colquhoun-street, Mr. W. E. Mills (President) in the chair. A paper by Mr. Thomas Duncanson, Assoc. M.Inst.C.E., entitled "Service Reservoirs," was read by the author. He first referred to the comparatively small reservoirs required for regulating variations in the consumption of water, and obviating the inconveniences from accidents, and showing that under varying circumstances the service reservoir may properly fulfil its functions with a capacity from one to six days' supply. He then pointed out the desirability of covering service reservoirs, and proceeded to consider the subject under the heads of open and covered reservoirs. Open reservoirs, he stated, were usually constructed much on the same lines as storage reservoirs, with earthenwork embankments, rendered watertight by clay puddle. Covered reservoirs were dealt with under the heads of, (1) materials used to insure watertightness; (2) walls; (3) floors; (4) roofs. In referring to the question of materials used to insure watertightness, the author recommended clay-puddle for adoption when the foundation is on clay; Portland cement when it is on earth, gravel, or rock; and artificial asphalt when on rock. The principles on which the walls should be proportioned and the best formation of the floors were then dealt with. Referring to the construction of the roof and the methods of supporting it, the author pointed out the desirability of supporting it on brick, stone or concrete pillars and arches, instead of on columns and girders. In conclusion, the cost of reservoir construction was considered, and it was stated that, although this varied much for different localities and sizes, an average price for open service reservoirs would be about 10s. per 1,000 gallons capacity, and for covered service reservoirs, about 4l. 5s. per 1,000 gallons capacity.

**City Markets for Fish, Fruit, and Vegetables.**—The Markets Committee have unanimously determined to recommend the Corporation to adapt the Farringdon Fish Market to a fruit-market, abolishing the old fruit-market in Farringdon street; and to erect a new fish-market on some vacant land at the western end of King-street, Smithfield. The deficit upon the Central Fish Market during the past year was 9,873l., and the loss upon the Farringdon Fruit and Vegetable Market during the same time amounted to about 2,300l. It is estimated that the building of the new Fish (and other Provisions) Market will cost 25,000l. It is contemplated that these changes will reduce the present deficiency upon the markets in question to 400l., and enable the Corporation to sell the site of old Farringdon Fruit Market for something like 130,000l.—*Citizen*.

**Surveyorship to the Grocers' Company.**—Mr. H. C. Boyes, F.R.I.B.A., has been elected to this office.

**Wages of Building Operatives in New South Wales.**—From the Statistical Register of New South Wales we glean some interesting details respecting the average rates of wages of building operatives in that colony during the last few years. Stonemasons, it appears, received 11s. per day in 1876, after which, in 1877, the minimum declined to 10s., rising again in 1882 to 11s., at which point it has since remained. Stonemasons' labourers received 8s. in 1876. In 1877 the maximum rose to 10s., sinking to 8s. in the following year, and remaining the same ever since. In the wages of plasterers there has been an increase, the rates in 1884 being from 11s. to 14s. as against an average of 12s. in 1876. Plasterers' labourers receive from 7s. to 9s. as against 8s. in 1876. The wages of bricklayers have fluctuated somewhat during the same period, being 12s. in 1876, from 10s. to 12s. during 1877-1881, and from 12s. to 13s. during 1882-4. The wages of bricklayers' labourers have risen from 8s. in 1876, to from 8s. to 10s. in 1884. Carpenters and joiners' wages have in like manner risen from 9s. to 11s. to from 10s. to 12s. The wages of painters are from 10s. to 12s., as against 10s. in previous years. This increase in the current rate of wages is a result of the extensive building operations going on in all parts of the colony, but more especially in Sydney and its suburbs. It should be mentioned that, except where heavy masses of stone have to be raised exterior scaffolding is seldom used; also that bricks, mortar, and other heavy materials, are often raised by steam power to the height required, manual labour being less used for this purpose than in England.

**Crown-street Warehouses, Soho.**—Not that the eastern side of Crown-street is a course of demolition by the Metropolitan Board of Works for the new street from Tottenham Court-road to Charing-cross, Messrs. Crossen & Blackwell's warehouses, which had to be kept down owing to the narrowness of the street and threats of proceedings for light and air have just been completed. They are of brick, with Pether's patent ornamental brick panels under the windows, with Portland stone cornices, strings, window-heads, &c. The columns of the windows, except on the top floor and tower, are of cast iron. The principal feature of the warehouse is the circular tower at the northern angle, which is a little higher than the remaining part of the building, and has a high roof, covered with purple and green slates a little more than halfway up, the remainder being lead. A spiral stone stair runs up the tower, with two light circular-headed windows lighting the staircase, a following the curve of the string-course. The ground-floor is fireproof, being constructed of brick arches on cast-iron "springs" or "skebacks," covered with Wilkinson's patent cement flooring. The premises were originally carried out by Messrs. Macey & Sons, who have just completed the remaining unfinished portion under the direction of Messrs. Romaine & Aitchison, from drawings by the late Mr. R. R. Romaine.

**The Decay of the American Obelisk.**—As was the case with our own Cleopatra Needle on the Thames Embankment, before preventive composition was applied, the corresponding Egyptian obelisk, placed in Central Park, New York, is found to be rapidly crumbling away under the influence of its climate. For 4,000 years the needle suffered comparatively little change in the dry, sunny air of Egypt; but although it has been in America only five years, there are unmistakable signs of its serious decay. Fragments of stone are found scattered at the base of the needle, and flakes, 1 in. or more in length, are readily picked off with the fingers. On the eastern side of the monolith there is a fissure 3 ft. in length, and sufficiently wide to admit the insertion of a knife-blade for a distance of 2 in. or 3 in. A finer crevice extends to a much greater depth. The vein containing the fissure can be traced to the south and west side. Should this large fragment split off, the obelisk would undoubtedly fall. These indications have led the Park Board to consider means for its artificial preservation.—*Iron*.

**Tanworth Church, Birmingham.**—The church, which has hitherto been lighted by means of single-wick lamps, has just been furnished with polished brass coronas and brackets, by Messrs. Jones & Willis, the burner used being their patent "Hesperus."



**Turo New Post-office Buildings.**—The plans for this building, which have gone through many vicissitudes in preparation, have been finally sanctioned by the Office of Works and the Treasury on behalf of the Post Office. The new premises will be Classic in style; the ground-floor to the first cornice will be built of granite, above this in Plymouth limestone, relieved with Bath stone quoins, moldings, pilasters, and cappings. Internally, the new building, with its three floors, will possess ample space and every convenience for carrying on the postal business of the City. On the ground-floor, entered through a tiled vestibule and inner folding-doors, will be the public office, 27 ft. by 21 ft. The different floors will be connected by lifts, pneumatic tubes, and speaking-tubes, and adequate provision will be made for heating and ventilation in each room. Throughout, the Office of Works have examined and approved every detail, and carefully provided for the personal comfort of the employees, which there is provision for both sexes. The buildings are expected to be ready for occupation by Michaelmas. The architect is R. Trevail.

**Sheffield School of Art.**—The annual meeting of the Sheffield School of Art was held at week, Mr. John Fowler in the chair. The Council, in their report, expressed deep regret at recording the death of the two oldest members of the council, namely, Mr. M. E. Adfield, who died on the 9th of March last, and Ald. Robert Leader, J.P., both of whom devoted much valuable time and rendered important services to the school. In accordance with rule 8, Messrs. J. Y. Cowlishaw, Charles Hadfield, and J. B. Mitchell-Withers, retired from the council by rotation, and had been re-elected, and Mr. Charles Belk (the Master Cutler) had been elected in the place of the late Mr. M. E. Adfield. Mr. J. Cook, the head master, reported that the attendance during the year ending July 31, 1885, had been:—Morning class, 93; male evening class, 223; ladies' evening class, 65; terriclife branch evening class, 15; Lowfield branch evening class, 23; total number of students, 419. The department awards for the year are:—Two silver medals, four bronze medals, seven national book prizes for works, and three for examinations, making sixteen awards. The reports of the council and the head master, and the abstracts of the treasurer's accounts, were approved and adopted.

**Examination of Local Surveyors and Inspectors of Nuisances.**—At an examination held November 12th and 13th, by the Sanitary Institute of Great Britain, thirty-nine candidates presented themselves, eleven as Local Surveyors, and twenty-eight as Inspectors of Nuisances. Questions were set, to be answered in writing on the 12th, and the candidates were examined viva voce on the 13th. The Institute's certificate of competency to discharge the duties of Local Surveyors was awarded to R. E. W. Berrington, W. Santo simp, A.M.I.C.E.; and to discharge the duties of Inspectors of Nuisances to W. J. Bartlett, J. J. Bugler, T. G. Dee, S. O. Diamond, S. Dyer, Emptage, P. Gaskell, A. A. Goodwyn, A. A. Hrist, J. T. Hazell, D. H. Jones, W. M. Lowick, E. Morris, G. Reavell, jun., N. Simmons, A. F. Stanley, F. P. Treppess, B. Swenson, T. W. Titts.

**The Proposed Mansion House Subway.**—On Tuesday last, at a meeting of the City Commission of Sewers, the Streets Committee brought up a report on the proposed construction of a subway at the Mansion House. They submitted an opinion by the Attorney-General Mr. J. Henderson that the commission had power to make subways in the manner suggested, or in any similar manner, and they could not apply the rates to a purpose which was unauthorized. The only way in which the proposed improvement could be legally constructed could be by getting statutory powers for the purpose. Mr. Altman moved that in order to give time Parliamentary notice be given of a Bill empowering the commissioners to construct the subways, should they so decide. Mr. Shaw, in an amendment, proposed that a report from an engineer on the subject be printed and considered before the commission committed itself to promoting a Bill in Parliament to amend the sewers Act. The amendment was carried, and it is understood that Saturday is the last day on which Parliamentary notice can be given for next Session, the matter is shelved for a year. —Morning Post.

**A Refuse-Destructor for Whitechapel.** Last week Mr. Robert Gladding, Chairman of the Whitechapel District Board of Works, laid the foundation-stone of the shaft of the Destructor now being erected in Wentworth-street, for the purpose of dealing with the local refuse. Among others in attendance were Colonel Munro (Metropolitan Board of Works), Mr. Little (builder of the works), Mr. Wolsey (superintendent of the works), Mr. Charles Thompson (foreman of the bricklayers), Mr. W. Warner (representative of the engineers and patentees of the method, Messrs. Manlove, Alliott, Fryer, & Co. of Nottingham), Mr. Turner (Clerk of the Board), Mr. La Riviere (surveyor), and many others interested in the treatment of refuse. At the opening of the proceedings, Mr. La Riviere, the surveyor, explained that the shaft had been calculated with every care and thought, and the works were having applied to them all the various improvements of construction which have been obtained by the experience of the engineers in those destructors they had already erected. He had, therefore, every confidence that the object for which the works are being constructed would be most successfully attained. The stone having been duly lowered with the customary formalities, was declared to be well and truly laid. Standing upon the foundation, Mr. Gladding proceeded to explain the causes which had induced the District Board to take the important step of erecting a destructor. He claimed the occasion as one marking distinct municipal progress—a step not taken without long and patient inquiry on the part of the Board, most zealously and ably assisted by their two chief officers, Mr. A. Turner and Mr. La Riviere. By the destructor, it was hoped and believed that an efficient means would be afforded of getting rid of all the abominous refuse and waste material in the district in such a way as to injure no one, while conferring a great benefit on all.

**Manchester Architectural Association.** This Society inaugurated its eleventh session by a *soirée*, given on the Tuesday of last week, when the meeting was addressed by Mr. Lawrence Booth, the President, and by the Bishop of Salford, who was present as a guest. Mr. Adamson, Mr. Murgatroyd, and Mr. France (President of the Bradford Society of Architects), also addressed the meeting. The President of the Association will deliver his inaugural address on the 24th.

PRICES CURRENT OF MATERIALS.

| TIMBER.          |          | £. s. d. | £. s. d. |
|------------------|----------|----------|----------|
| Greenheart, B.G. | ton      | 6 10 0   | 7 10 0   |
| Teak, E.I.       | load     | 12 10 0  | 15 10 0  |
| Sequoia, U.S.    | ft. cube | 0 2 6    | 0 2 9    |
| Ash, Canada      | load     | 3 0 0    | 6 0 0    |
| Birch            | do       | 3 0 0    | 4 10 0   |
| Elm              | do       | 3 10 0   | 5 0 0    |
| Fir, Dantia, &c. | do       | 1 13 0   | 4 10 0   |
| Oak              | do       | 3 0 0    | 5 0 0    |
| Canada           | do       | 6 0 0    | 7 0 0    |
| Pine             | red      | 3 0 0    | 4 0 0    |
|                  | yellow   | 3 15 0   | 5 5 0    |

TIMBER (continued).

|                                        | £. s. d.    | £. s. d. |
|----------------------------------------|-------------|----------|
| Lath, Dantia                           | 100 fathoms | 6 0 0    |
| St. Petersburg                         | do          | 6 0 0    |
| Waincoat, Riga                         | log         | 2 15 0   |
| Deals, Finland, 2nd and 1st            | std. 100    | 8 0 0    |
|                                        | do          | 6 10 0   |
| Riga                                   | 4th and 3rd | 6 0 0    |
| St. Petersburg, 1st yel.               | do          | 9 0 0    |
|                                        | 2nd         | 7 0 0    |
|                                        | white       | 5 0 0    |
| Swedish                                | do          | 6 0 0    |
| White Sea                              | do          | 8 0 0    |
| Canada, Pine 1st                       | do          | 18 0 0   |
|                                        | 2nd         | 12 0 0   |
|                                        | 3rd, &c.    | 7 0 0    |
|                                        | Spruce 1st  | 9 0 0    |
|                                        | 3rd and 2nd | 6 10 0   |
| New Brunswick, &c.                     | do          | 5 0 0    |
| Battens, all kinds                     | do          | 4 0 0    |
| Flooring Boards, sq. 1 in.—Pine, first | do          | 0 9 0    |
| Second                                 | do          | 0 7 0    |
| Other qualities                        | do          | 0 5 0    |
| Cedar, Cuba                            | foot        | 0 0 34   |
| Honduras, &c.                          | do          | 0 0 3    |
| Australian                             | do          | 0 0 3    |
| Mahogany, Cuba                         | do          | 0 0 5    |
| St. Domingo cargo av.                  | do          | 0 0 54   |
| Mexican                                | do          | 0 0 4    |
| Tobacco cargo av.                      | do          | 0 0 4    |
| Honduras cargo av.                     | do          | 0 0 44   |
| Rosa, Rio                              | ton         | 7 0 0    |
| Bahia                                  | do          | 6 0 0    |
| Satin, St. Domingo                     | ft.         | 0 0 0    |
| Porto Rico                             | do          | 0 0 0    |
| Walnut, Italian                        | do          | 0 0 4    |

METALS.

|                           |     |         |         |
|---------------------------|-----|---------|---------|
| Iron—Pig in Scotland      | ton | 2 2 6   | 0 0 0   |
| Bar, Welsh in London      | do  | 4 15 0  | 5 2 6   |
| " " in Wales              | do  | 4 7 6   | 4 12 6  |
| " " Staffordshire, London | do  | 6 0 0   | 7 0 0   |
| Sheets, single, in London | do  | 7 10 0  | 9 0 0   |
| Hoops                     | do  | 8 5 0   | 7 5 0   |
| Nail-roads                | do  | 8 7 6   | 7 0 0   |
| Corrals                   | do  | do      | do      |
| British, cke, and ingot   | ton | 43 10 0 | 44 10 0 |
| Best selected             | do  | 43 10 0 | 46 0 0  |
| Sheets, strong            | do  | 52 0 0  | 0 0 0   |
| " " India                 | do  | 48 0 0  | 48 10 0 |
| Australian, fine cast     | do  | 0 0 0   | 0 0 0   |
| Chili, bars               | do  | 40 17 6 | 41 5 0  |
| YELLOW METAL              | lb. | 0 0 44  | 0 0 42  |
| Lead—Pig, Spanish         | do  | 11 7 6  | 0 0 0   |
| English, com. brands      | do  | 11 12 6 | 0 0 0   |
| SPRINGS                   | do  | do      | do      |
| Silesian, special         | ton | 14 5 0  | 14 10 0 |
| Ordinary brands           | do  | 14 0 0  | 14 5 0  |
| TIN—                      | do  | do      | do      |
| Strait                    | do  | 90 5 0  | 91 15 0 |
| Australian                | do  | 91 7 6  | 92 0 0  |
| English ingots            | do  | 94 0 0  | 0 0 0   |
| TRIPPLATES—               | do  | do      | do      |
| IX coke                   | box | 15 0 0  | 16 0 0  |
| IX ditto                  | do  | 21 0 0  | 25 0 0  |
| IX charcoal               | do  | 17 8 0  | 20 0 0  |
| IX ditto                  | do  | 24 0 0  | 28 0 0  |

OILS.

|                        |      |         |         |
|------------------------|------|---------|---------|
| Linseed                | ton  | 22 0 0  | 22 10 0 |
| Coconut, Cochin        | do   | 30 10 0 | 31 0 0  |
| Ceylon                 | do   | 27 10 0 | 0 0 0   |
| Copra                  | do   | 28 10 0 | 0 0 0   |
| Palm, Lagos            | do   | 29 0 0  | 0 0 0   |
| Palm-nut Kernel        | do   | 28 0 0  | 0 0 0   |
| Rapeseed, English pale | do   | 24 10 0 | 0 0 0   |
| " " brown              | do   | 22 15 0 | 0 0 0   |
| Cottonseed, refined    | do   | 19 10 0 | 20 0 0  |
| Tallow and Oleine      | do   | 25 0 0  | 45 0 0  |
| Lubricating, U.S.      | do   | 7 0 0   | 10 0 0  |
| " " Refined            | do   | 4 0 0   | 15 0 0  |
| TERPENTINE—            | do   | do      | do      |
| American, in cks.      | cwt. | 1 7 0   | 1 7 3   |
| Tar—Stockholm          | brl. | 0 19 6  | 1 0 0   |
| Archangel              | do   | 0 11 6  | 0 12 0  |

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitomes of Advertisements in this Number.

| CONTRACTS.                                   |                              |                                   |                          |       |
|----------------------------------------------|------------------------------|-----------------------------------|--------------------------|-------|
| Nature of Work, or Materials.                | By whom required.            | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
| Making-up Roads                              | Wandsworth Bd. of Wks        | Official                          | Nov. 24th                | ii.   |
| Roadmaking and Paving                        | Fulham Board of Wks.         | do.                               | Nov. 25th                | ii.   |
| Repairs to Infirmary                         | St. Saviour's Union          | Jarvis & Son                      | Nov. 26th                | ii.   |
| Enlargement of Postal Sorting Office         | Com. of H.M. Works           | Official                          | Nov. 27th                | ii.   |
| Roadmaking, Excavating, &c., North Hospital  | Met. Asylums Board           | Pennington & Bridgen              | do.                      | ii.   |
| Laying-out and Planting Grounds              | do.                          | do.                               | do.                      | ii.   |
| Drainage and Sanitary Works, Ashford         | Magna, W. L. Sch. Dist.      | Keith D. Young                    | do.                      | ii.   |
| York Paving                                  | Gravesend Corporation        | Official                          | do.                      | ii.   |
| Broken Guernsey Granite                      | Fenchley Local Road          | G. W. Brumell                     | Nov. 28th                | ii.   |
| Pipe Sewers, &c.                             | Romford U. R. S. A.          | Brundell, Simmons, & Co           | Nov. 30th                | ii.   |
| Surface Drains, &c.                          | Tottenham Local Board        | De Pape                           | Dec. 1st                 | ii.   |
| Wood-Paving                                  | Westminster Bd. of Wks       | G. R. W. Wheeler                  | Dec. 2nd                 | ii.   |
| Brick Sewers                                 | Borough of Leicester         | Official                          | Dec. 3rd                 | xiii. |
| Iron Pier, Lee-on-the-Solent                 | E. A. Robinson               | do.                               | Dec. 5th                 | ii.   |
| Sea Waterworks                               | Gt. Yarmouth U. S. A.        | J. W. Cockrill                    | Dec. 8th                 | xiii. |
| Gas-holder Tanks, &c., Bridgend              | Glanorgan Co. Lunatic Asylum | Giles & Gough                     | do.                      | ii.   |
| Strengthening, &c., Albert Suspension Bridge | Met. Board of Works          | Official                          | Dec. 17th                | ii.   |
| Slaughter-House, &c., Moscow                 | The Commune, Moscow          | do.                               | Dec. 27th                | ii.   |

| PUBLIC APPOINTMENTS.                |                     |         |                        |       |
|-------------------------------------|---------------------|---------|------------------------|-------|
| Nature of Appointment.              | By whom Advertised. | Salary. | Applications to be in. | Page. |
| Surveyor and Inspector of Nuisances | City of Chichester  | 120l.   | Nov. 28th              | xvi.  |



## TENDERS.

|                                                                                                                       |             |
|-----------------------------------------------------------------------------------------------------------------------|-------------|
| CAMBRIDGE.—For erecting Cambridge University Laboratory. Mr. J. J. Stevenson, architect. Quantities by Mr. J. Goady.— |             |
| Lawrence & Sons, London .....                                                                                         | £22,900 0 0 |
| Henry Lovatt, Wolverhampton .....                                                                                     | 22,405 0 0  |
| Holland & Hutton, London .....                                                                                        | 23,377 0 0  |
| George Dobson, Colchester .....                                                                                       | 20,450 0 0  |
| L. Loveday, Leicestershire .....                                                                                      | 19,850 0 0  |
| J. Parnell & Son, Rugby .....                                                                                         | 19,777 0 0  |
| Wm. Sindall, Cambridge .....                                                                                          | 19,599 0 0  |
| John Bentley, Waltham Abbey .....                                                                                     | 19,354 0 0  |
| P. Horsman & Co., Wolverhampton .....                                                                                 | 19,300 0 0  |
| Bull, Sons, & Co., Southampton .....                                                                                  | 19,300 0 0  |

CHARLTON.—For alterations and additions to the entrance lodge and new gates and piers, Charlton Cemetery. Mr. John Rowland, architect and surveyor, Old Charlton. No quantities.—

|                      | Gates and piers. | Alterations & additions. |
|----------------------|------------------|--------------------------|
| Stephens .....       | £45 0 0          | £20 0 0                  |
| Barham .....         | 53 0 0           | 275                      |
| Grant .....          | 41 10 0          | 271                      |
| Cattell .....        | 36 0 0           | 269                      |
| Proctor .....        | 61 0 0           | 268                      |
| William & Sons ..... | 46 17 0          | 235                      |
| Stacey .....         | 32 0 0           | 233                      |
| Loneragan .....      | 59 0 0           | 220                      |
| Johnson .....        | 34 10 0          | 218                      |
| Smith .....          | 34 19 0          | 212                      |
| Fenn .....           | —                | 205                      |
| Reeves .....         | 51 0 0           | 185                      |
| Congdon .....        | 41 12 0          | 179                      |

[Surveyor's estimate, £97, and 1817, 17s.]  
\* Accepted for gates,  
† Accepted for alterations, &c.

GRAYS.—For additions and alterations to the King's Arms public-house, Grays, Essex, for Messrs. Ince & Co. Mr. John Hudson, architect, Leman-street.—  
Bentley, Waltham Abbey .....

J. & H. Cooke, Mile End .....

J. S. Hammond & Son, Romford .....

LAMBETH.—For tiling walls of kitchen and other works at the Workhouse, Kenner-road, for the Guardians.—  
Brown, Norwood .....

C. Musfield, Stamford .....

W. Nash, Kensington .....

Roberts .....

Seed .....

Swan & Barlow .....

Cox & Hamilton .....

Blenden (accepted) .....

LONDON.—For sinking wells at the Ladywell and Forest Hill Public Baths. Messrs. Wilson, Son, and Edwinkle, architects, East India-avenue.—

Tilley & Son .....

Speller .....

Dowry .....

Baker & Son .....

LONDON.—For sanitary works at Berkeley House, for the Baron de Barreto. Mr. J. Kingwell Cole, architect, Mount-street, W. Messrs. Baitam & Co., surveyors.—  
J. Hold, Edgware-road .....

Wall Bros, Kenish Town .....

NEWMARKET.—For stabling and additions to Grafton House, Newmarket, Cambridge. Mr. Baron L. de Hirsch. Mr. J. B. Corby, architect and surveyor, Stamford.—  
Law & King, Luttreth .....

Farrow, Wisbech .....

Thoday & Son, Cambridge (accepted) .....

OKTID (Surrey).—For the erection of a store at Oxted, for Messrs. Young & Berry. Mr. A. R. Stanning, architect, Cannon-street. Quantities by Mr. W. B. Brown, Henrietta-street, Covent Garden.—  
Loveland .....

Lawrence & Sons .....

Roberts .....

Crosley .....

Worsell .....

Nightingale .....

Chasid .....

Ma. land, Chislehurst (accepted) .....

SOMERSHAM (Hunts).—For the erection of five loose boxes at Pedley House Farm, for Messrs. Foster. Mr. J. Carter Jones, surveyor, Cambridge.—  
Hicks .....

Worboys .....

Saint & Sons (accepted) .....

STRATFORD.—For new show-rooms at rear of Broadway, for Mr. J. R. Roberts. Mr. J. Kingwell Cole, architect, Mount-street, W. Messrs. Baitam & Co., surveyors.—  
Wall Bros, Kenish Town .....

Palmer & Co., Old Gravel-lane, E. ....

WESTGATE-ON-SEA.—For the erection of two shops and premises at Westgate-on-Sea, Thanet (exclusive of plumbing and decorating work, stoves, and chimney-pieces), for Mr. R. T. Jarman. Mr. A. Gordon Collins, architect, Westgate-on-Sea.—  
Paramor & Son, Margate .....

W. Frostick, Westgate .....

W. Martin, Ramsgate .....

H. Bowman, Ramsgate (accepted) .....

Staines.—The list of tenders for villa given last week was, we are informed, incomplete; the two following should be added to it:—Hiscock, 625*l.*; Cargreen, 555*l.*

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our Office, 45, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

## TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

T. B. (thanks for your appreciative letter).—R. C. J.-J. C. R.—G. J.-T. C.—W. C. W.—J. S. W.—T. G. S.—O. B. Washington (M.S. received).—P. (we have already given our opinion on the subject).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusive business matters should be addressed to THE PUBLISHER, and not to the Editor.

## PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

CHARGES FOR ADVERTISEMENTS.

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Six lines (about fifty words) or under .....

Each additional line (about ten words) .....

Term for Series of Trade Advertisements, also for special Advertisements on front page, Competition, Quotations, Sales by Auction, &c. may be obtained on application to the Publisher.

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Each additional line (about ten words) .....

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### Books for Architectural Students.—II.



our last article we looked through the list recommended by the Institute as far as regards the works on the history and the artistic aspect of architecture; we now continue the

subject with some remarks and hints on the works on sanitary science, construction, and professional practice.

In regard to the study of books on sanitary science it must be noted that the date of a book is here of some importance, for sanitary science stands on a very different ground from architectural art and design. That which was once good and admirable in art is always so; it does not depend upon the progress of "discovery," in the scientific sense. That which was once held good in science, however, may be overthrown by the fuller knowledge of a later generation; and this is particularly the case in regard to sanitation, which is almost entirely a modern science, and is still in such a state of progression that a few years' experience may alter the minds of the best informed men upon important points which were before supposed to be settled. Accordingly, all the books in the Institute upon this subject are quite modern works, the oldest only dating from 1874. The full study of the general principles of hygiene includes a great deal which belongs more properly to the sphere of the physician than the architect, and the latter will find some selection necessary in the study of so extensive a subject,—considering that life is short and time is limited. What the architect mainly requires to be informed about are the conditions of soil and formation of the ground which render a site naturally healthy or unhealthy; the best means of conveying away the insanitary off-scourings of human habitations, in such a manner as to get rid of all danger to life and health from their influences; and the means by which the movement of air can be controlled, so as to get rid of foul air and admit fresh air. These two latter subjects, which may be otherwise classed as "drainage" and "ventilation," are thus closely connected with each other; efficient drainage requires such control of the air as will shut out foul gases, or carry them off where they can do no harm; and efficient ventilation such control as will ensure an ample supply of fresh air without draughts. Heating is commonly spoken of in connexion with ventilation, and rightly so in as far as this, that the means employed for heating ought to be such as to assist the ventilation system and work in harmony with

it; otherwise mere heating is, in itself, a much easier and simpler subject than ventilation, and more directly controllable by mechanical means.

In advising students to limit their ground of study in sanitation to what bears directly on practice, we wish them to understand not that the subject is of less importance, but that it is so important to a modern architect that he had better go straight to the mark in endeavouring to master all that directly concerns his work in a practical sense. In this light we regard Parkes's "Manual of Practical Hygiene" as too large in scope for an architectural student; it goes into much which is more properly medical; but the chapters on ventilation are very valuable to the architect. Similarly, Mr. Bailey Denton's work on "Sanitary Engineering" is very largely occupied with the treatment and disposal of sewage, which is an engineer's rather than an architect's subject. Mr. Baldwin Latham's "Sanitary Engineering," a work of about the same size and general scope, is more directly fitted to be of use to the architectural student; it contains a great body of information, accompanied by copious illustrations of various forms of sewers, traps, water-closets, &c., with full remarks on their special merits or defects; and it is one of the books in the list which a student would do well to purchase and study thoroughly. Professor Corfield's "Water Supply, Sewerage, and Sewage Utilisation" (originally a course of lectures to the cadets of the Royal Engineers at Chatham) includes an excellent and concise treatise on water and water-supply; and though these lectures are also largely occupied with specially engineering subjects, the book is an inexpensive one which it is worth while to procure for the sake of the portions more directly bearing on architectural work. Another book, also a small one, which may be specially recommended to young architects, is Dr. Pridgin Teale's "Dangers to Health," which deals entirely with the subject of house drainage in detail, and gives a series of most instructive diagrams, sections of houses and their drainage systems, placing examples of the wrong way and the right way of doing it side by side, accompanied by brief explanatory comments: it is one of the most thoroughly clear and practical books of instruction in house sanitation that can be named. Mr. Bailey Denton's "House Sanitation" is an authoritative work of convenient size, but not very comprehensive in its illustrations, which, however, are admirable as far as they go. Mr. Hellyer's "Lectures on Sanitary Plumbing" is, perhaps, more for plumbers than architects, though it gives the latter a good many hints as to where to catch the plumber tripping; his other book on the list,

"The Plumber and Sanitary Houses," is very useful for details of sanitary work, and gives sections of houses with the arrangement of pipes and drains: this is a book of small size, and this and Dr. Teale's book would be very good to study together; the latter shows what ought to be aimed at, the former the detail of carrying it out.

The Institute list of works on materials and construction is a formidable one for a young student to face, and it errs certainly on the side of being too voluminous. We will take, first, the books treating of construction and mechanical principles generally. Ashpitel's "Treatise on Architecture, including the Arts of Construction," is divided into two portions, the aesthetic (as it would now be called) and the practical, of which the latter is an admirable all-round summary of the constructive side of building, and very interesting reading, but there is nothing in it that will not be found in more detail in Gwilt. Rondelet's "Art de Bâtir" is a standard work of its day, and deserves to be called a great architectural book, but it is not one of those from which a young student would find it easiest to learn, and the Institute list, in which it is merely described as "4to. Paris, 1812," gives no hint of the folio volume of plates, which form great part of the value of the work, and no hint either of the supplement by Blouet (1847), and the splendid folio volume of plates accompanying this also, and which, to the student, is probably the most valuable portion of the whole. Rondelet is a difficult and costly work to procure; but provincial students, who cannot avail themselves of the Institute Library, will probably find it in any good public library. "Notes on Building Construction," in three volumes, is a general work published by the Department of Science and Art, for the use of students in the South Kensington Schools; it goes into a great deal of practical detail, and is intentionally a student's text-book: it bears no author's name, and, therefore, does not come with the special authority of any known scientific expert, but appears to be generally a good book, though not a book of the first order, and neither very well arranged, nor very well illustrated; but it is a book easily procured, and probably not expensive for its size and the amount of miscellaneous information to be found in it. Of the other general books on construction, there is Moseley's "Mechanical Principles of Engineering and Architecture," an authoritative work of the first class in its way, but occupied very largely with subjects which are purely engineer's work; and the same may be said of Rankine's "Applied Mechanics." Moseley, however, contains a great deal also that directly bears on architectural construction, and as it is not a large or



costly book, it is one that the student may be recommended to procure. Rankine's "Manual of Civil Engineering" is also, as its title implies, largely occupied with engineering subjects, but contains a full and valuable treatise on surveying and levelling, a subject the special treatment of which does not appear to be directly included in the list otherwise.\* Still, it is hardly an architect's book. Col. Seddon's "Building Trades and Building Construction" is another series of Chatham engineering lectures, by an author who combines a great amount of practical and theoretical learning; this is a most useful book for a young architect, and well worth his while to procure; it abounds in concise practical information, some of it on out-of-the-way points which are not generally touched upon in treatises of this kind. The pith of much of the information found at greater length in the other works we have been mentioning is put in a concentrated form in Mr. Tarn's book on "The Science of Building," which treats of mechanical principles of construction, and of the properties of timber, stone, and iron; and perhaps this is one of the best books in the list for a student to commence his study of the scientific side of architecture with; filling up the details by subsequent reference to more elaborate special works.

Among the books on special branches, Tredgold's "Carpentry" is, of course, a well-known and standard work, but we may strongly recommend to the student another book on the list, more modern and of less wide-spread reputation than Tredgold, but an excellent work,—Newland's "Carpenter's and Joiner's Assistant." This gives a great deal of practical application of geometry to the setting out of work, and copious and fine illustrations of timber construction of every kind, by a very able and competent engineer. It is a work in two thick volumes, and, as it is twenty-five years since it was issued, is, perhaps, difficult to procure now; but for those who can find it in or procure it from a library, it is a most useful book, and pretty nearly exhaustive of its subject.

Of the works on iron, Hodgkinson (1846) has been long a standard one, and most recent works have been a good deal based on Hodgkinson's experiments, though some of his results have been called in question by those of more recent experiments conducted with better means of ensuring accuracy. Fairbairn's "Application of Cast and Wrought Iron to Building Purposes" contains the cream of Hodgkinson, with something else added, and is a more useful book to the modern student.† Stoney's "Theory of Strains in Girders" gives the principles of the subject, Humbert's "Handy-book for the Calculation of Strains on Girders" the application of it. Of the remaining books in this department of the list, Stock's "Shoring and Underpinning," the work of a clever young man who did not live to make the reputation he probably would have made, is rather descriptive of actual practice (in London) than a book of instruction by an expert; but it contains the results of a good deal of observation. Mr. Robson's "Modern Domestic Building Construction" is chiefly valuable to the student as containing a very good model specification for domestic work, and, perhaps, should have better come under the "specifications" section of the list. Ware's "Tracts on Vaults and Bridges" is an old work (1832) which has retained a reputation, in spite of being very badly written and arranged, or rather with no arrangement at all, chiefly on account of the originality and practical suggestiveness of the author's remarks and diagrams on the equilibrium of masses in vaulting and buttress construction; but it is hardly a book to have put into a student's list.

The last section of the Institute list is that which deals with "Specifications and Professional Practice." On the head of specifications, Bartholomew's book is the oldest standard

\* On this subject we may recommend Jackson's "Aid to Survey Practice" (not on the Institute list).

† Messrs. Crosby Lockwood & Co.'s modern edition of Tredgold's book "On the Strength of Cast Iron" contains also Hodgkinson's experiments. This book is not on the Institute list.

work, but in form and in many details it is out of date now, and its real value consists in the amount of practical information and suggestion which is to be extracted from its voluminous pages. The late Prof. Donaldson's "Handbook of Specifications" is a publication of a number of specifications of works actually carried out, which were put into the hands of the author for publication. In some respects, this also is out of date, as every book of the kind must become in time. For example, there is no mention in it of terra-cotta, a building material which has come into use since the book was published, and which requires a good deal of special knowledge; and the specifications in regard to concrete are in some particulars superseded by more recent experience. It is exceedingly useful for a young architect to look through such a book, but it is not wise to trust to precedent in this branch of practice, or to take the specifications of others as matter for mere imitation. They should be regarded as suggestions, to be tried by the architect's own knowledge and his own ideas of what he wants. Probably when a young architect writes his first specification for actual practice, he gets, if he goes about it in a thorough manner, one of his most valuable practical lessons. He is compelled to think out in detail what he wants, how he wants it done, and what is the best way to express his intentions; and, if he follows a precedent too closely, he is only likely to be tempted to save himself the trouble of really thinking out his own work. Therefore, we do not attach very much value to this class of study book, unless used merely as a suggestion and memorandum of the main points to be kept in mind. In regard to the legal and business side of professional practice, Emden's "Building Leases and Building Contracts" is a very large and exhaustive work, valuable as a reference book, but much larger and more elaborated than any architect is likely to find necessary to him unless he intends to devote himself chiefly to arbitration and agency of property, which is, of course, not purely architectural work. The books by Mr. Banister Fletcher on "Dilapidations," "Arbitrations," "Quantities," and "Light and Air," are all admirably done, of moderate size and not costly, and the student would do well to procure these. Dobson and Tarn's "Student's Guide to Measuring" is a very useful book, commencing with a study of the application of geometry to the calculation of superficial areas, and then proceeding to the details of practice; and let it be remembered that every architect should know how the measuring-up of work is carried out, even if he does not intend to concern himself practically in carrying it out, or he (and his clients) will be at the mercy of the contractor in many cases. Leaning's "Quantity Surveying" is a fuller treatise, more adapted for those who intend to make this an important branch of their practice. An exceedingly useful small work is Knight's "Annotated Model By-laws"; it gives the Local Government Board By-laws, with comments bringing out their full scope and the meaning and object with which they were framed, which is not always apparent on the surface of them. Roscoe's "Digest of the Law of Light" and "Digest of Building Cases" (both small books) are rather useful perhaps to the architect in practice than to the student; they give precedents of cases on which judgment has already been given, and afford thereby a clue to an architect as to the legality of his position in case of any dispute in connexion with the rights of his client or contractor. The subject of right of light, it may be observed, is one on which it is very important for any architect practising in a large town (especially) to be well informed, otherwise he may get his client into unexpected difficulties involving pecuniary loss. Jenkins and Raymonds's "Architect's Legal Handbook" is also useful, in conjunction with some of the others in the list, as a concise treatise on the general state and bearing of the law on matters connected with building. Noble's "Professional Practice of Architects" (1836) should not have been inserted in a student's list. It is an interesting book, giving a good deal of

information about London building and property at the time it was written, but is of direct practical value to a student now.

The list of books suggested by the Institute, we think (and we believe some of those who are officially responsible for it agree with us) rather too large, and somewhat calculated to bewilder and alarm those for whose suggestion it was drawn up. We heard of an enthusiastic provincial student who, on obtaining it, sent an order to a well-known architectural publisher for "the lot," and was a good deal staggered on being told that it would cost him about 150*l*. We have endeavoured to give such a *résumé* of the special value of the books as may guide students in making a selection, and also to indicate what books it would be well to procure, among those which can be procured at a moderate cost, and what are most useful among those for which most architectural students would find it necessary to betake themselves to a good library. We may observe, in conclusion, that the disadvantage of being only able to consult a book at a library, instead of having it at home, is somewhat counterbalanced by the impulse which these conditions often give to concentrated and intelligent study. A book at home is not unfrequently only skimmed, with the idea that it can be taken up again for fuller reading at any time. A book at a library, which is only available at limited hours and by visiting the library, must be studied with the intention of getting the pith of it, and with that practice of making careful notes which does more to compel the reader to understand the book, and to stamp its teaching on his memory, than any great deal of more extended but superficial reading can achieve.

## THE PROPORTION OF THE HUMAN FIGURE.

BY CHARLES ROBERTS, F.R.C.S.



FROM the earliest historic times the study of the physical proportions of the human body appears to have exercised a singular fascination over the minds of men, the reason for which is not at first sight very obvious. Was it the vanity of man which first taught him that "the proper study of mankind is man," as Pope hints? or was it the belief that man was made in the image of God,—a belief which must have existed far beyond the limits of the Jewish nationality, as we find the Egyptians, Assyrians, Hindoos, and, above all, the highly-civilized Greeks, making their gods in the likeness of man? The study probably owes its origin to a simpler and more prosaic cause, namely, the necessity which men in early times felt for measuring instruments which they had not yet invented, and were obliged to extemporize, by the use of various parts of their bodily frame. Thus the cubit of the ancient Egyptians and Israelites was the length of the arm from the elbow to the extremity of the fingers; the span was the space covered by the stretched-out thumb and middle finger; the hand, still used in this country for measuring the height of horses, was the breadth of the four fingers; the inch was the breadth of the thumb; and the foot still in use among us, was at first the length of the human foot. The fathom was the length of the arms extended horizontally, and it is still measured in that way by our sailors.

From applying these several measures to extrinsic objects it was a short and easy step to applying them to the proportions of the body itself. Hence the cubit was considered the fourth part of the total stature, and the foot the sixth part. The lengths of the hand and of the face were the same, and constituted the ninth part, while the whole height of the head formed from the seventh to the eighth part of the stature. It is easy to understand, moreover, how these rules or canons of proportion became petrified, as it were, among the statuary of early and imperfectly-civilized nations like the Egyptians, who were artisans rather than artists, and resulted in the production of sculpture of great uniformity and comparatively little artistic merit; and that similar rules of proportion were applied to their other



works, and notably to those of an architectural character.

Beyond this mechanical development of the rules of proportion in the human figure, and, perhaps, in consequence of it, there is in the human mind a consciousness or faculty of proportion just as there is a consciousness of form and of colour, which, like these faculties, constitutes one of the chief elements in our sense of the beautiful. Of these three faculties of the artistic tripod the sense of proportion is the least developed, and the rarest, because it is of the least use in the survival of the race; while the sense of colour is the most highly developed, and the commonest because it best serves this end.\*

Whatever may have been the origin of the study of human proportions, it is certain that when once established a great variety of methods were adopted, although the total height of the body appears to have been accepted as the starting-point in nearly all of them.

In this, as in some other branches of knowledge, we find the usual astrological jugglery with figures. In an ancient Sanscrit manuscript, entitled *Silpi Sastri* (a treatise on the fine arts), and the oldest work of the kind in existence,† the human figure is represented as divided into 480 parts; while at a later period 360 parts (the number of degrees in a circle), are employed, because these numbers (like our own duodecimal system), admit of being divided into the greatest number of even factors. Another proportional method was to represent the total height by 100, 1,000, or other even number, and the various portions of the body as ratios of these numbers. This method was a favourite one with the writers of the Renaissance period, and is in use at the present day.

According to Diodorus Siculus, the ancient Egyptians settled the dimensions of their figures with such minuteness and accuracy of measurement that their statues executed portions of them in different blocks of stone, which, when put together, possessed such perfect harmony and agreement as to excite universal admiration; and he asserts that two Greek sculptors, Telecles and Theodorus, following this method, made a statue of the Pythian Apollo, one half of which was executed in Samos and the other at Ephesus, which was considered a marvel of symmetry and perfection.

The Greeks have, unfortunately, left no account of their method of studying the proportions of the human body, which they succeeded in representing in its ideal perfection, but it is obvious from some of their earlier works that the Egyptian canon was the A.B.C. of their studios, and long remained the guide of their ordinary sculptors; while, according to Diodorus, a "simple glance of the eye" sufficed for their men of genius. It is said, indeed, of Phidias, that he employed twenty models, and, taking from them the most beautiful parts, combined them together to form a perfect figure, but it is obvious that this must have been effected by that fine mental faculty of proportion to which I have referred, and not by any method of actual measurement. Mr. Long and Mr. Storey have given us this year two pictures of Zeuxis following the same method in the sister art of painting. The fact that Polykleitos should have produced his *Doryphoros*, or spear-bearer, as the canon par excellence of proportion, or type of beauty, in man,

\* My inquiries lead me to the conclusion that the perception of colour is more largely developed in women, who have a much finer sense of tints and shade, and are very rarely colour-blind, than in men, while men possess a finer perception of form and proportion; hence, perhaps, the reason why women often excel in decorative arts, but do not succeed as sculptors, architects, or composers. This may also account for the "British Matron's" non-appreciation of the nude figures of some of the Royal Academy pictures in this year's exhibition.

† I may observe here, in reply to the outcry being made about the physical degeneracy of the human race, that the proportions given in this ancient work represent the total stature as a little less than seven heads,—proportions which are found in some of Raffaele's best pictures, and in the mass of the European population of the present day. The middle point of the body was somewhat higher then than now, which would imply an increase in the length of the lower limbs. The proportions of the *Silpi Sastri*, indeed, more closely agree with those of women than of men of the present day.

shows that the subject of human proportions must have been a serious study among the Greeks. Probably they made more use of the living model and had more and better examples of well-proportioned ones than we possess at the present day.\* The terms employed by teachers and writers of a later date to distinguish the study of human proportions also show how much importance was attached to it. Philostratus the younger called it analogy; Pliny the elder, symmetry; Pliny the younger, equality and congruity; Vitruvius, commensuration; and Cicero, the agreement of the parts and the proper composition of the members, all of which are more expressive and appropriate than our modern scientific term anthropometry, but, unfortunately, having lost their original meaning in our language, cannot be revived.

Vitruvius's rules of proportion of the human figure are well known through the late Mr. Joseph Bonomi's translation of the fragments preserved by Leonardo da Vinci. They are very simple and easy to remember, but, unfortunately, are not very true to nature, and their simplicity suggests that they were probably intended rather as a "rule of thumb" than a canon of proportion taken from the *Doryphoros* of Polykleitos, from which they are supposed to have been constructed.

The winter exhibitions have given us many glimpses of the importance which was attached to the study of human proportions by the great painters of the Renaissance. In 1879 some studies of Verocchio's, from Christ Church College, Oxford, were exhibited at the Grosvenor Gallery, and others by Michelangelo, Raffaele, and Da Vinci, were displayed on the walls of the Academy. Verocchio was the master of Da Vinci and of Perugino, and the latter in his turn was the master of Raffaele: hence it is probable that the same principles of proportion were taught and practised by all these distinguished painters. A large work by Albert Dürer, which was exceedingly popular at the time it appeared, shows how far astray a clever man may go if he gives up the observation of the living model, and trusts himself to a theory. Dürer begins by giving the measurements of a strongly-built peasant, the length of the foot being the sixth, of the head the seventh, and the hand the tenth part of the total height, and ends by presenting figures, in which are represented the (theoretical) proportions of men and women of nine and ten heads in stature, with absurd elongated forms which are never found in nature.

It was at this period that other sciences began to influence the views previously held of the study of human proportions. Vesalius's dissections were portrayed by Titian, and hence we have the origin of artistic anatomy so much studied,—and I think so much over-studied, to the neglect of the living model,—at the present day. The advances made in mathematics led, in the hands of Leon Battista Alberti, sculptor and architect (best known to us by his large works on architecture), to the first development of human proportions as a science. Alberti tells us that he selected a great number of models which were considered beautiful and regularly formed; he measured them and compared them with each other; he put aside all that was excessive either way, and he confined himself to arriving at a mean amongst the finest specimens of mankind. His standard was the sixth part of the stature, which he probably took from Vitruvius, which he called a *foot*, because it agreed with the length of the human foot. The foot was divided into ten equal parts or *unces* (onces, unces); the ounce in its turn was subdivided into ten equal parts or minutes, so that each minute formed the six-hundredth part of the stature. According to Quetelet, the well-known Belgian mathematician and statistician, we have

\* "It is wrong," says Quetelet, "to think that the men of our own time and country differ essentially from the structure which is to be observed in Greek statues. The fitness and beauty of the features, the expression of the face, the elegance of the form, may not be the same, but the proportions are not different. Everything, on the contrary, tends to establish the fact that the human type in our era is identical with that which is deduced from the observation of the most regular ancient statues." Quetelet infers from this that the Greeks must have copied by measurements their living models.

here the employment of two methods of research, which were almost unknown at the time, namely, the use of averages, and the decimal system. It is obvious that Alberti understood that there existed a typical form of man which can only be demonstrated by gathering measurements from a large number of men, and eliminating all that is accidental in the individual forms by means of averages.

It is very singular that Alberti's views, published at the beginning of the fifteenth century, should have been ignored by the numerous writers on the subject of human proportions who followed him, and who adhered persistently to the purely conventional ideas which had been handed down in an imperfect form from earlier writers, till we find our own distinguished artist, Sir Joshua Reynolds, dilating on views of a similar but more comprehensive kind, to the students of the Royal Academy in 1770, of which institution he was then President. "All the objects which are exhibited to our view by nature," says Sir Joshua, in language suitable to art students, "upon close examination will be found to have their blemishes and defects. The most beautiful forms have something about them like weakness, minuteness, or imperfection. But it is not every eye that perceives these blemishes. It must be an eye long used to the comparison of their forms, and which, by long habit of observing what any set of objects of the same kind have in common, has acquired the power of discerning what each wants in particular. By this means we acquire a just idea of beautiful forms; we correct nature by herself, her imperfect state by her more perfect, and make out an abstract idea of forms more perfect than any one original. . . . From reiterated experience and a close comparison of the objects of nature, the artist becomes possessed of a central form from which every deviation is deformity. . . . As there is one general form which belongs to the human kind at large, so in each class there is one common idea and central form which is the abstract of the various individual forms belonging to that class. . . . I must add further, that though the most perfect forms of each of the general divisions of the human figure are ideal and superior to any individual form of that class, yet the highest perfection of the human figure is not to be found in any one of them. It is not in the Hercules, nor in the Gladiator, nor in the Apollo, but in that form which takes from them all, and which partakes equally of the activity of the Gladiator, of the delicacy of the Apollo, and the muscular strength of the Hercules."

Reynolds's views are often spoken of as idealistic, and therefore of little practical value to the student of human proportions; but in truth they are of the highest value to both art and science, as they admit of mathematical demonstration, and embody the principle of the modern science of anthropometry.\*

#### THE LITERATURE OF SANITATION.

TWO official documents have been recently published within a week of each other, and each of them calls for the serious attention of the community at large. We allude to the supplement to the forty-fifth annual Report of the Registrar-General of Births, Deaths, and Marriages in England, and the Report of the Government Commission appointed to inquire into the causes and treatment of Asiatic cholera.

By the former it is shown that the reduction of the death-rate in the United Kingdom has proceeded *pari passu* with the progress of sanitary reform, the money invested therein "yielding an annual return of 2,000,000 years of life." And the latter concludes, after an exhaustive inquiry into the genesis and pathology of cholera, with the statement that "sanitary measures, and sanitary measures alone, are the trustworthy means to prevent outbreaks of the disease, to restrain its spread, and to mitigate its severity, to be found."

\* To be continued.





The predictions of sanitarians have been verified by accomplished facts. We owe the improved health of the nation to what they have done in the past, and it is to their work in the future that we must mainly look for aid in our never-ending conflict with disease.

It is not surprising that, in the face of the success which has rewarded a movement which is still young, it has already a copious and increasing literature of its own; or that its principles, which are few and simple, should be formulated and enforced by many hands and in many shapes for all classes of readers.

In "Dwelling-houses, their Sanitary Construction and Arrangement" (London: H. K. Lewis), Professor Corfield has compressed into a hundred wise pages all that need be known on the subject by the ordinary reader,—dealing in turn with questions of site, subsoil, house construction, warming, ventilating, drainage, water-supply,—and in detail with the numerous sanitary fittings and appliances required by modern usage. We have but little criticism to offer and but few omissions to note.

Under the head of sewage he recommends a fall of at least one in forty-eight, which is, in many cases, almost impossible, and, according to other authorities, quite unnecessary; one in hundred being thought by them to be sufficient. It is somewhat hard upon Mr. Norman Shaw to represent in a book bearing date 1885 the particular system of water-closet construction advocated by him as a "proposal," seeing that it has been successfully put in practice in a very large number of instances.

The writer truly says that the principles involved are simple, and that success depends upon attention to details of execution. Such details are of a technical nature, and the only security for their proper execution lies in the employment of a competent and trustworthy surveyor.

It has been reserved for an American author, Mr. Glenn Brown, to furnish a complete and succinct history of the domestic water-closet,\* and it may surprise many to learn that this contrivance is in its essentials amongst the earliest of man's works. A system of water conveyance is thought to have been employed by both Egyptians and Greeks, and is known to have been perfected by the luxurious Romans. In the palaces of the Roman Emperors the water-closet was a sumptuous apartment adorned with marble and mosaic,—vases of silver and gold were the receptacles; the seats were elaborately designed and carved, and cisterns of water with cocks and taps were provided for flushing the channels by which the waste matters escaped. A water-closet in Pompeii is figured in the book, in which a constantly running streamlet of water courses along the ground in front of the seat, and is diverted with a sharp turn and an accelerating drip or fall into the outgoing drain or channel.

The Mediaeval "garde-robe" has been often illustrated, that at Pierrefonds being specially noteworthy for the ventilating shaft carried from the cesspit to the top of the building,—the first instance of a soil-pipe being carried up through the roof."

It is curious,—and somewhat humiliating,—to note a return to comparative barbarism in this matter in the last and the immediately preceding centuries. Unlike the palaces of the Roman emperors, that of Versailles had neither privies nor water-closets, and the desire for personal cleanliness appears to have departed from Europe. The Parisians threw their *secrets* out of their windows into the public streets,—a practice which obtained in Edinburgh almost within living memory: men with buckets and an ample cloak to enshroud their clients perambulating the public thoroughfares, which resounded to the familiar cry of "Wha wants me for a bawbee?" In Warsaw we are told privies have not even now been fifty years in use, and it is only quite recently that close stools, which required to be emptied every night, have disappeared from the best houses in Berlin. In England we were not much better off; for Aubrey, writing in

1718, describes a water-closet which he had seen at Beddington in a manner which shows that it was regarded somewhat as a curious novelty.

The modern contribution to the construction of these conveniences consists in various expedients for regulating and economising the water supply, and the long series of plungers, valves, &c., are all directed to this end. It is curious that, after exhausting so much ingenuity in contrivances of the kind, we are returning to the simple hopper and abandoning all the cranks, wires, valves, &c., which have made the domestic water-closet one of the most intricate of household machines.

The author treats the subject chronologically, and discusses in turn the merits and defects of each successive type, illustrating his remarks by numerous clearly-drawn diagrams. He deals indifferently with English, American, and Continental inventions, and maintains a strictly impartial attitude in his treatment of them all. The short hopper-wash-out closet, with the syphon two-gallon flush, claims his preference, and second in his estimation he places Doulton's valve-closet, which he considers the best of that class.

Bean's closet, so largely used in Scotland, and figured on p. 39, has, however, many excellent points, amongst which its extreme simplicity is not the least commendable.

In "Healthy Foundations for Houses,"\* the same writer reprints, with additions, from the *Sanitary Engineer* a series of thoughtful papers which appeared in that periodical in 1884. The title exactly describes the work, which is thorough and trustworthy. It is written in a popular style, and is presumably intended for the ordinary reader. Such being the case, it would have been well, perhaps, to give the reasons for such a dictum as "Bricks are not suitable for the purpose of making drains," because the ordinary reader will inevitably ask why? The vexed question of the best manner of bedding and jointing pipes does not appear to have been entered upon, and the statement that slate is almost universally used in England for a damp-course is not quite accurate. Its liability to crack has led to its being almost universally discarded except in those cases where economy rules. The book is, however, full of sound information, and is copiously illustrated by the author's drawings.

"Bad Drains and How to Test Them,"† by R. Harris Reeves, deals mainly with an invention of the author's, which he calls a "detector," or gas-pressure gauge, and with which he has tested the soundness or otherwise of many drains. He says that it does not require a large amount of scientific knowledge to ensure a healthy dwelling, but that sound pipes and tight joints are the real desiderata. Small as is the scientific knowledge required, the surveyor of the period is, it appears, quite innocent of it. The writer has a very poor opinion of this functionary, who is ignorant and prejudiced, and, having committed all sorts of errors, will not, when convicted, repent and amend, but perseveres in wrong-doing and brazens out his errors. The book is little more than an attempt to exalt the medical profession at the expense of the professional surveyor, and to advertise the incomparable "detector." There is not much in it.

A guide to sanitary house inspection by William Paul Gerhard, C.E. (John Wiley & Sons, New York), is in effect a schedule of the points to which every one in selecting a dwelling should look and which most people do, in fact, overlook. How is a man who is compelled to rent an average London house to see that the foundations are dry, the bricks hard and sound, the damp-course all that could be desired, the drains theoretically and practically perfect, the plumbing of the highest class, the warming and ventilating arrangements sufficient and efficient, and the surrounding neighbourhood unexceptionable? If nothing less than all this will satisfy him he will be compelled to build himself a house or to remain houseless. The ideally perfect house is unattainable "ready-made."

Of a somewhat similar character is a handy little volume on "Taking a House," by H. Percy Boulnois, M.I.C.E. (E. & F. N. Spon, London). Every question which should concern the searcher after a house which ought to prove a "home, sweet home," is here discussed, and no one can find fault with the writer's conclusions. The one difficulty is that such houses are not to be found and we must make the best of those in the market. Certain patent defects can in most cases be amended, and with this we must perforce for the present be content. Much would be gained if the Legislature would insist upon an efficient damp-course for every new house and a damp-proof covering for the area it occupies; and if the certificate of a duly-qualified surveyor that the drainage and water supply were sanitarily perfect were necessary to render a tenant's agreement with his landlord binding, we might look for reasonably wholesome dwellings. And for more than this it would, perhaps, be Utopian to hope,—at least, until house-builders find it to their interest to build honestly and plainly instead of dishonestly and showily, and house-occupiers can make up their minds to pay in rent what they are now compelled to pay for physic.

#### NOTES.



WE are glad to learn that the Metropolitan Board of Works has instructed its Solicitor to appeal against the decision of the magistrate at Worship-street Police-court (Mr. Hosack) in the Chatham-gardens, Hoxton, case. This case, it will be remembered, was the subject of a letter entitled "Planning for Evil," written by Mr. George Godwin, which appeared in this journal on the 3rd of October last (p. 478). It was further commented upon in our columns under the heading "Notes" on October 24 (pp. 562-563), and on October 31 (p. 595), and a brief report of the proceedings before the magistrate will be found in our number for the last-named date (p. 625). As we have in substance previously remarked, the case is a most important one, not merely with respect to the technical point raised as to the definition of "a new street," but more especially with regard to the permissible conditions of light and air under which large blocks of dwellings in flats for artisans are to be erected. The sanitary dangers attending the housing of large numbers of families in long and lofty structures of this description when built too close together, when closely hemmed in by surrounding property, and when the access to them is a *cul-de-sac*,—all three conditions obtaining in the case in question,—are obvious, and we hope that the result of the discussion of the subject will tend to greater vigilance and caution in similar cases. It is the decided opinion of many competent observers that several blocks of artisans' dwellings in flats have of late years been erected under conditions of planning and site which give rise to serious forebodings as to what may happen in the event of outbreaks of infectious diseases in such buildings.

SOME time ago we referred to a proposal made for getting rid of the sewage of London by conveying it out to sea in barges or vessels specially constructed for the purpose. The subject has since been under the consideration of the Metropolitan Board of Works, and at the meeting of that body announced for Friday, November 27th, the Works and General Purposes Committee will present a report detailing the steps which the Committee are taking under the references by the Board on the subject, and recommending that an advertisement be issued inviting designs and estimates for the construction of one vessel capable of taking out to sea 1,000 tons of settled sludge, daily, such advertisement to state that, in the event of the Board not accepting any of the tenders, a premium of 500*l.* will be given for the design which may be considered the best. The report of the Committee will contain the following further recommendations:—

"That letters be addressed to Mr. J. O. Phillips, Secretary and Manager of the Gas Light and Coke

\* Water Closets: a Historical, Mechanical, and Sanitary Treatise. By Glenn Brown, Architect. New York: Industrial Publication Co.

With fifty-one illustrations. By Glenn Brown, architect. New York: D. Van Nostrand.

† London and New York: E. & F. N. Spon. 1885.



Company, and to Mr. J. Casey, thanking them for their communications on the subject of conveying the sludge out to sea, but stating that their terms are too high for the Board to entertain, as they have reason to believe that the sludge, whether pressed or in its crude state, can be dealt with in a much less expensive manner.

That Messrs. Jenkin, Son, & Nephew be informed, in reply to their letter transmitting a communication from Mr. W. Astrop, containing details of his process for the treatment of sewage, that the Board are not prepared to adopt the same.

THE Metropolitan Board of Works have given notice of their intention to bring in a Bill in the ensuing Session of Parliament giving the Board further powers with regard to theatres and other places of public entertainment in the metropolis. The Bill will provide that before such places are licensed a certificate shall be obtained from the Board as to the efficiency of the structural and other arrangements and appliances therein for the safety of the public and for protection from fire. The Bill will also empower the Board to frame by-laws for regulating the appliances for the extinction of fire and the internal arrangements to be observed in places of public resort. It does not appear that any attempt will be made by the Bill to abolish the dual jurisdiction of the Board and the Lord Chamberlain with regard to theatres, and of the Board and the licensing magistracy with regard to music-halls, which is felt by the proprietors of these places to be embarrassing and oppressive, and by the public to lead to the neglect and evasion of salutary regulations. The Board also proposes to introduce a Bill to regulate the stacking of firewood in the metropolis. The opposition aroused by the Board's proposal to legislate with reference to the stacking of timber some years ago appears to have deterred them from further attempts in this direction.

WE are glad to see that the question of the enlargement of Hampstead Heath by securing Parliament Hill for public use in perpetuity, is not to be let drop, and notice has been given of application for leave to bring in a Bill in the next session of Parliament to acquire the lands referred to, the property of Sir Spencer Wilson and Lord Mansfield. From some recent correspondence in the *Times*, it appears that Lord Mansfield had never expressed any reluctance to part with his portion of the land on reasonable terms, for the public good, but that he required a definite offer to be made to him, and none had ever been made.

SOME talk is being made about the desirability of retaining the site of old St. Paul's School, now demolished, as an open space adjoining the east end of the cathedral. We are entirely in favour of gaining open spaces where possible, especially in the vicinity of a great building, but this particular case is one requiring careful consideration. The pecuniary value of the site must be very great; it is not large enough to operate very materially in affording a better view of the cathedral from the east, and it may be found that the advantage of retaining it as open space, if the Corporation should be induced to entertain the idea, would hardly counterbalance the expenditure required from the rates. If some of the adjoining buildings north and south of the site could be also purchased and cleared away it would be another thing. We should then have the means of making something like a *place* eastward of the cathedral; and it would be more worth while to do this than to purchase the St. Paul's School site only, unless the latter were secured as the first instalment of a larger scheme definitely resolved upon, and to be carried out when opportunity arrived.

SIR E. BECKETT'S last exploit at St. Alban's has been to demolish the interesting and picturesque Norman turret on the south transept, which was among the most characteristic of the ancient features of the building. We have received indignant letters about it from two or three quarters, but the mischief is done now; and as to any comment on the subject, the matter is past that. If any

public opinion is ever aroused on the subject in this architecturally-ignorant country, the custodians of the building will find they have a heavy account to give for having turned over what is a national possession, held in trust by them, to an irresponsible individual to pull to pieces as he pleases. As we have said before, there is not another civilised country in which such a thing would be possible.

IN regard to the newly-discovered Saxon chapel at Deerhurst, we are informed that the Ecclesiastical Commissioners have given permission to the Society for the Protection of Ancient Buildings to restore the chapel at the Society's own cost. The expense will not amount to much more than 100*l.* to do all that is needful in the way of repairs. We have no doubt the work will be done by competent hands, but the announcement is rather an odd one in regard to a society which is understood to set its face against all restoration of every kind.

THE decease of some celebrated personage has not unfrequently been made use of as an excuse for restoring churches, under the pretence of raising a monument to the memory of the dead; but we have never yet heard of a national subscription being utilised for that purpose. It appears, however, from the *Times* correspondent at Madrid, that very little of the Mansion House fund which was raised last winter for the relief of the sufferers from the earthquakes in Southern Spain has found its way to its intended destination, but that at about the same time that the money arrived a wave of restoration passed over Spain, and by a curious coincidence the Archbishop of Granada has been enabled to indulge his ecclesiastical tastes at the expense of English sympathisers with his suffering countrymen. This is the inference of the *Times* correspondent, an inference for which we are not responsible.

THE case of *Harris v. De Pinna*, which was heard last week, is an important one in regard to the law of light. As appears from the report, there was a claim in respect of a shed, with open sides and several floors, which was used for the purpose of storing timber. Mr. Justice Chitty held that this structure did not fall within the words of the third section of the Prescription Act, "dwelling-house, workshop, or other building." It was held in *Courtauld v. Legh* that an uncompleted uninhabited house was entitled to a prescriptive right to light, but here it is clear this was in fact a simple collection of enormous shelves. In many cases the question of the alteration and the change of windows has been lengthily discussed, and these cases rest on the assumption that there must be a definite opening through which to admit the light in order to found a right. To say that such an erection as this with open sides was entitled to the right to light would cause every shed in the kingdom to be obtaining a light, an idea which we are confident did not enter the mind of the Legislature when it passed the Prescription Act. In our lay opinion, therefore, the decision of Mr. Justice Chitty is quite right.

AN important work on "Modern Ornamentation," by Dr. Dresser, is announced by Mr. Batsford as in preparation, to be published in ten monthly parts. It will comprise a series of original designs for the patterns of textile fabrics, for the ornamentation of wood, metal, and pottery, and for the decoration of walls, ceilings, &c. It is described as intended to be of use to manufacturers who have to apply patterns to their productions. It is to be hoped that those to whom it is specially addressed will seek to benefit by it in the right way, by making it a basis of original study, not by merely copying patterns from it, which does no good to either art or artist.

A FACULTY was granted by Dr. Espin, Chancellor of the Diocese of Liverpool, on the 3rd of this month, for the erection of chancel gates, designed by Mr. Pearson for the

church of St. Agnes, Toxteth Park, near Liverpool. There was no opposition, but Mr. Thurnam, who appeared in support of the application, recited several precedents in favour of it, the general bearing of which went, however, to show that the matter is viewed as one for the exercise of discretion in special cases. Chancellor Espin took this view. The church in question, he said, was one of great richness and excellence of ornamentation in the chancel, and the protection of gates, if not necessary, was expedient. "It must be understood, however," said the Chancellor, "that this is not to be drawn into a precedent."

IN regard to the Stone Bow at Lincoln, the threatened demolition of which we referred to the other day (p. 711, *ante*), we understand that the Corporation have called in the aid of Mr. Pearson, to advise them how best to treat the structure so as to provide for necessities of traffic without injury to its architectural character and historic value.

WE have been appealed to touching certain proposed additions and alterations to the Eton School buildings, which it is averred will involve the sacrifice of old buildings and old associations, and we observe "A Present Etonian" writes on the subject in the *Times* of Thursday. An Etonian also (obviously, from internal evidence, the same hand), in a facetious *libellus* with the signature of "Peccator Maximus," gives sundry extracts from the lucubrations of "Sparrow on House-tops" in regard to recent developments of skyline at Eton, and also much argumentation on the proposed further changes. It appears to be tacitly admitted on all sides that new buildings are wanted: what is complained of is that the old houses occupied by masters in Weston's Yard are to be pulled down, and that the library is to be removed and placed in "Upper School," whereby various time-honoured memoranda and signatures of great men shall be hidden. Touching the houses, "Peccator Maximus" gives a photograph of them, and they are pleasant-looking old-fashioned habitations, which, were it our happiness to live at Eton, we should be loth to see removed. At the same time we feel suspicious about the agitation on the subject, because the cogitations of "Peccator Maximus" savour of that overwrought sentimentality so rife nowadays, which sees sanctity in every old wall because it is old, and unholiness in all that is new. Nor can we, who have not been consulted concerning the proposed additions to the school buildings, undertake to affirm that the projectors of them do not know best what they want and what it is possible to do. We do say, however, make the new buildings without interfering with the old, if by any means it can be done: so far we are ready to say to "Peccator,"—"Pecca fortiter."

A "County Surveyors' Society"—A meeting convened by Mr. T. H. B. Heslop, the County Surveyor of Norfolk, was held at the Westminster Town-hall on November 19th, for the purpose of discussing the desirability of forming a County Surveyors' Society.—Mr. C. H. Howell, County Surveyor of Surrey, was voted to the chair.—Mr. Heslop informed the meeting that, in reply to the forty-two circular letters he had sent out to county surveyors in England, thirty-eight replies had been received; thirty-three of these were strongly in favour of forming the society, and he (Mr. Heslop) gathered that the remaining five gentlemen would be quite willing to join such a society when actually formed, and therefore there could be no doubt that the wish for such a society was practically unanimous.—It was proposed by Mr. Groves, County Surveyor of Salop, and seconded by Mr. Kyanersley, County Surveyor of Northumberland, "That it is desirable that a County Surveyors' Society be formed for England and Wales, for the purpose of watching over all matters affecting the office of County Surveyors." Carried unanimously.—Mr. C. H. Howell was elected president for the year; Mr. F. H. Pownall, County Surveyor of Middlesex, vice-president; Mr. T. H. B. Heslop, hon. secretary and treasurer; and the gentlemen present were formed into a committee, with power to add to their number.



## FOREIGN RAILWAYS AND ENGLISH RAIL-MAKERS.

In the present condition of the iron trade the announcement of the resolution, on the part of the Chinese Government, to introduce the railway system into that vast and populous empire might raise a glow of hope in many a hungry man, if he could entertain any reasonable expectation of our ministering to the wants of China, in this respect, let us say in such a way as we did to those of France from 1833 to 1855. Of this, unfortunately, there is but small promise. Deeply, therefore, does it concern all those who live by the mineral and metallurgical industry of England to inquire why this should be so.

We are too apt to think, from the dead slack which has fallen on public works in this country as far as construction is concerned, for the last few years, that the same lack of enterprise is displayed elsewhere. If we judge from the demand made on our rail-makers, our engine-makers, and other of our mechanical engineers, such would, indeed, seem to be the case. But as far as the world in general is concerned, the construction of railways abroad is going on with an annually increasing energy and vigour. From 1840 to 1880 the yearly addition to the length of railway open in the world was at the rate of 10 per cent.; each year showing an advance to that extent on its predecessors. From 1872 to 1882 the growth of the railway system has been less rapid, averaging 5½ per cent. for each year of the decade. But at this rate, if we had continued to command the supply, we should have exported nearly 70 per cent. more railway iron in the latter than we did in the former year. What, however, was the fact?

In 1882, notwithstanding a reduction of 44 per cent. in the price of pig iron, and of 53 per cent. in that of railway bars, since 1872, our export of railway iron was positively less, by 9,000 tons, than was the case in 1872. It is hard to exaggerate the importance of this simple comparison.

Again, during the same decade, 16 per cent. was added to the length open of railways in the United Kingdom. But during the same period the United States and the twelve principal countries of Europe added 70 per cent. to the aggregate length of their railways. Seventy per cent. more railway iron was required by the world in a year than had been required ten years previously, and out of this large demand we obtained only so many orders, at low prices, as to fail to maintain our own output of this class of goods. Is it possible to show more uncomfortable figures as to the manner in which the supply of the foreign iron market is shifting from our grasp?

About one-half the iron made in the United Kingdom is made for export. In 1882, 3,560,000 tons of iron were made, and 4,350,000 tons were exported; 24 per cent. of which was railway iron. Twenty-seven per cent. more weight of iron was, indeed, exported in 1882 than had been the case in 1872. But 24 per cent. less money was received for the larger than was received for the smaller weight.

During the year 1873, 10,686 miles of railway were opened for public traffic. If we allow the rough estimate of 150 tons of iron per mile, that meant a demand for 1,600,000 tons of railway iron. In the year 1883, 18,346 miles of railway were opened. That, at the same allowance, meant 2,850,000 tons of railway iron wanted in the year. But in 1872 we exported 945,420 tons of "rail-road iron of all sorts," and in 1882 we only exported 936,949 tons of the same; that is to say, that in 1872-3 we supplied 69 per cent. of the railway iron bought by the world, while in 1882-3, having lowered our price per ton by more than half, we only supplied 33 per cent. of the annual purchases. Can anything be of more vital importance to England than to know, and to understand, this terribly backward movement of one of our most important industries,—an industry which occupied, at the date of the last census, 10, is said, as much as 1½ per cent. of the population of England and Wales?

During the same period, in which, at the cost above stated, we had increased the weight of our iron exports by 27 per cent., those of Sweden increased by 37, those of Belgium by 52, and those of the German Empire by 69 per cent. The Swedish bar iron commands a price higher than that of English bar iron by 30 per cent., owing to the superior excellence of the metal. German railway bar iron, on the other hand, is sold, or was sold, for the average

of 1882, at 12 per cent. below English rates. Thus on the one hand a better article than we supply keeps its own price at the top of the market, while on the other hand, in meeting the demand for cheap goods we are beaten by German and Belgian manufacturers.

For iron used in the building trade, as to which the returns of the Board of Trade furnish no specific information, there can be little doubt that our home manufacture is suffering in a similar manner. The total export of cast, wrought, and manufactured iron of all sorts, with the exception of old iron for re-manufacture; pig and puddled iron; bar, angle, bolt, and rod iron; railroad iron; wire, hoops, sheets, and boiler plates, and tinmed plates, was 269,607 tons in 1872. In 1882 the export had risen to 328,262 tons, or by about 22 per cent. in the ten years; but we received 223,000l. less for the smaller than we had done for the larger quantity. Here, however, comes in the unpleasant story of the use of Belgian iron for the municipal buildings of Glasgow. It is of no use to lap ourselves in a fool's paradise, expecting better times. Whether times get better or get worse, the iron trade of the world seems to be slipping from our hand.

It is idle to shut our eyes to facts like these. It is idle to cite them merely to complain. What is imperative for us to do is to grasp and arrange the facts, to look them in the face, and then to ascertain the causes of a decline, not only positive, but relative, in the remuneration of English labour. We have taken the one great industry, the condition of which has been forced on our attention this week by the disagreeable news from China. But the iron trade does not stand alone. Taken one by one, something of the same kind is occurring in each of our main industries. And what it mainly concerns those who have any voice in the administration of our affairs to understand is, that it is not a mere participation in a general wave of depression of prices of which we have to complain. That there are waves of elevation and of depression, and that the industry of the United Kingdom is affected in sympathy with these waves, is a fact which it would be idle to contradict, and which it may not prove too difficult to explain. It is not that which alarms us. The grave cause of anxiety is not the general but the relative movement. That the price of English iron should fall when that of German or Belgian iron falls, and rise when the latter rises, is natural enough. What is not natural, or, at all events, is not tolerable, if it can be prevented, is, that the English prices should fall more rapidly in the general fall, and should rise more slowly in the general rise, than German and Belgian prices. To this all the statistics that we have been able to collect point with a fatal unanimity. And, as before said, this applies not to iron alone.

The coal-mining activity of the United States, and of the twelve principal exporting and importing states of Europe, has increased, during the last decade, at more than double the rate of the coal industry of the United Kingdom. Our coal exports in 1872 formed less than 11 per cent. of our output. In 1882 they had risen to 14½ per cent. of our output, showing that the rate at which we were ministering to foreign industry, by the supply of the food of the steam engine, was increasing more rapidly, by one-third, than the rate of increase of our own industry. At the same time, taking coal imports (of which at present we have none), the mean increase in the consumption of the countries above stated during the decade was no less than 90 per cent. It may be true that, when the balance is held fair, any sign of increased wealth in other countries, if they are our customers, may signify increase in our own wealth. But this is on the supposition that there is a free and unchecked trade between the two parties. The fact that while our own coal output, including exports, has increased by 26 per cent., the coal consumption of the thirteen countries stated has increased by 55 per cent., goes to show that our neighbours are twice as industrious, or twice as happy in the growth of their great coal-fired industries as ourselves. For the moment we attempt no more than to call the attention of our readers to unquestioned facts. What they mean, how they occurred, whether they tend, and what is to be done to meet them, are questions, the importance of which is only too likely to be accentuated by the sharp commentary of hunger during the coming winter.

## ST. JOHN'S CHURCH, CLERKENWELL.

A LARGE pile of scaffolding along the eastern side of St. John's-square attracts attention to a building which, with an unpretentious exterior and placed back some yards from the general route, commonly escapes observation. The restoration in red brick of the western front at this juncture is, by a singular chance, nearly synchronous with a notable event with which the early history of St. John's, Clerkenwell, is closely associated. For on Sunday, the 1st of March last, the two honourable and learned Societies of the Temple celebrated the seven-hundredth anniversary of the consecration by Heraclius, Patriarch of Jerusalem, of their Church of St. Mary. Nine days later, being then on a visit in England to preach a crusade, Heraclius went through a similar ceremony for the Knights of St. John in Clerkenwell. Their house in this quarter (whose rural aspect was marked by such names as Coppice and Wilderness rows) is said to have been provided for them by Jordan de Brisset. That opulent baron also established a Benedictine convent, *Ecclesia Beate Maria de fonte Clericorum*, not 300 yards distant, by Clerkenwell-green, where St. James's Church, covering the site of the nuns' chapel, forms a prominent landmark as it rises above the valley of the Fleet.\* He is reputed to have exchanged with the prioress twenty acres in his lordship of Willingham, in the county of Kent, for ten acres situated between Red Lion and St. John streets, St. John's Gate and Aylesbury-street. Pennant, it should be noticed, writes,—“The same Jordan Bristet, not satisfied with the former great endowment [St. John's], gave to one Robert, a priest, fourteen acres of land almost adjoining to the first, to build on them a religious house. He accordingly founded one to the honour of God and the assumption of our Lady, which he filled with Black Nuns of the order of St. Benedict.” Whichever preceded the other, it is clear that St. John's should date from after 1100. For the military side of the Hospitallers of St. John,—whose first religious house was built for pilgrims at Jerusalem in 1048 by some Amalfi merchants trading to the Levant,—was not founded until after the Crusaders had captured the Holy Sepulchre from the Saracens in 1099. Nor did they retain Jerusalem for more than two years subsequently to the dedication, in 1185, of this their church to St. John the Baptist. Having settled successively at Acre, Limisso, and Rhodes (1310-1522), they in 1530 received Malta from the Emperor Charles V.

The Hospitallers of St. John, who conformed to the rules of St. Augustine, owned in Christendom upwards of 19,000 manors, severally attached to eight Grand Priorities in several nations, or languages (to use their own term); their priory in England counting as the sixth in rank. Amongst their London manors were those in the Hackney Marshes and at St. John's Wood. Having succeeded, temp. Edward II., to the forfeited possessions of the Templars, their lord prior ranked as *Primas Baro Anglie*. Enjoying a signal share of royal favour, they escaped the hostility which schemed for their great rivals' overthrow.† Here Alexander of Scotland was knighted by King John; and hither, to pass his honeymoon with Eleanor, came that prince whose tomb at Westminster is inscribed “*Edvardus Primas Scottorum malleus hic est, 1308. Pactum serva.*” After the burning of their property by Wat Tyler's communists,—the conflagration lasting seven days,—the priory was rebuilt even more magnificently than before. Kings Henry IV. and V. would visit the prior for days together; and Richard III. made at St. John's his public disavowal of any intention to marry his niece, Elizabeth of York. The story goes that Prior Weston, who had been adjudged a pension of 1,000l. a year,—a goodly sum in his day,—died of a broken heart on Ascension Day, May 7th, 1540, when the priory, whose revenues Dugdale estimates at 2,386l. 12s. 8d. per annum, was finally dissolved. The buildings survived for a brief while longer as a storehouse for Henry VIII's war-ammunition, together with his tents and other equipments for the chase; they also afforded a home for his daughter, afterwards Queen Mary. But the nave, aisles, and transepts, with the beautifully-ornamented central bell-tower, which Stow so

\* See Agass's map for a quaint picture of the well at the former church's western end.

† See Milman's “*Latin Christianity*” for vindictory arguments against the unrighteous condemnation of the Templars by Pope Clement V. and Philip the Fair.



greatly admired, were blown down with gunpowder by the sacrilegious hand of Somerset, who coveted the materials for his projected waterside palace on the Strand. Cardinal Pole restored what was left of the choir, with its side-chapels, and set up Sir Thomas Tresham, of Rushton, as prior (1557). But the restoration was shortlived, for in 1559 the English religious order was finally abolished by Queen Elizabeth. The property had passed from John (Dudley) Lord Lisle to one Ralph Freeman, temp. James I.; then from William (Cecil), second Earl of Exeter, to his daughter, Diana, who married for her first husband Henry (Vere) Earl of Oxford, and for her second Robert (Bruce) second Earl of Elgin. For his active participation in the Restoration Lord Elgin was created, on the 18th of March, 1664, Earl of Ailesbury in the English peerage. Lord Ailesbury occupied the house which stands to the north in Hallar's two views of the priory church, from the west and from the east (1661). His successor lived here until 1706; the choir serving then for a private chapel. This church then became a Presbyterian meeting-house, and as such was sacked by the mob during the Sacheverell riots. Bishop Burnet, who lived opposite, in the square, mentions its pillage. It was then bought, together with what was left of the Preceptory buildings, by one Simon Michell, who built Aylesbury-street, Red Lion-street, and other thoroughfares round about. Having restored the church, and built a new roof and western porch, he sold the building to the Fifty New Churches Commissioners for 3,000*l.*, less 50*l.*, in consideration of a vault in the crypt (1729). The church was accordingly re-opened for divine service on Thursday, the 27th day of December of that year. Albemarle-street, to the south, takes its name from Christopher (Monck) second Duke of Albemarle, who was first husband to Elizabeth, daughter of Henry (Cavendish) Duke of Newcastle. Newcastle House lay between St. James's Church and the House of Detention. In Albemarle-street lived James Carr, architect of St. James's Church, and here two other celebrated architects served their articles: Edmund Aiken and Samuel Ware. The names of Aylesbury-place and Bishop's-court speak for themselves.

Since we have already published\* accounts, with illustrations, of the crypt and its Early English and Transitional architecture, it will suffice here to supplement what we then wrote. The new street from Bloomsbury to Shoreditch has destroyed much of St. John's-square, including Burnet's House, and Ledbury-place that had been built over his garden. Many remains of the priory buildings were found underground. From these and other foundations beneath the existing houses it is clear that the northern Preceptory wall lay along the corresponding side of the square. An opening that was made on the 12th November, 1851, between Nos. 19 and 20, eastern side, by the northern postern, revealed a wall 7 ft. in thickness, faced with squared stone on the northern (outer) side, and of chalk rubble within. Across the southern end of Jerusalem-passage adjoining stood the northern postern. Its internal dimensions were: 17 ft. 10 in. long; at south end 10 ft. 1 in., and at the north end 10 ft. 9 in. wide. This was further enclosed next to the square by a gate 10 ft. 7 in. high, and at the Aylesbury-street end by another gate 3 ft. 6 in. thick. From the Minutes of the Commissioners of Paving it appears that on the 19th of May, 1780, leave was given to one Gabriel Gregory to pull down this relic, second only in importance to the St. John's Gate. That gate stood nearly in the middle of the northern wall, of which at that date there yet existed a portion some 67 ft. long westwards. Other remains of the wall, and an old domed well, are laid bare by excavations lately made eastwards of the gate. The late Mr. Pettit Griffith undertook, in 1845-6, a general repair of St. John's Gate. It found a friend in Mr. Wickens, who purchased the freehold in 1865. He cleared away a modern staircase in the western portion, and repaired the caken newel staircase in the north-western tower. In a view of the Gate from the north, in Pennant's book, will be seen a doorway opening to the foot of this staircase. That was the door of Edward Cave's printing-office, in Johnson's time. The printing-office was the room on the first floor, beyond the ante-room, immediately above. The continual accretion of the ground around had given the door a strangely sunk

appearance, so it was accordingly raised by about 2 ft. This door, which preserves its contemporary carved spandrels, should be compared for height with its fellow opposite, now filled in with stone and brick, in the north-eastern tower. The original ground-floor level of the gate is discernible in the walls of the cellar beneath the ambulance store-room; the lower exterior plinth is now but a few inches above the pavement. One defect, dwelt upon by Mr. Griffith, is in course of being made good at the hands of Sir Edmund Lechmere, Bart., who has acquired the property for the Ambulance Association, and the re-establishment of St. John of Jerusalem. Stone mullions of three-lights and cusped have just been fitted into the two windows of the large room over the archway. This room, too, is being decorated, and entirely repaired with new flooring, ceiling, and panelling. In the "Cave" coffee-room of the tavern, in the south-eastern tower, are collected a valuable set of views, &c., of old Clerkenwell. Whilst we may feel somewhat sceptical about the armchair on a dais beneath his bust before the door, it is refreshing to find that this and other efforts are made to keep alive Dr. Johnson's memory in a building which, as he told Boswell, he for the first time beheld with reverence, and where he indubitably toiled when well-nigh friendless and unknown in London.

#### THE CUSTOM OF LONDON IN REGARD TO THE EASEMENT OF LIGHT.

It is probable that many of the younger generation of architects are unaware that there at one time existed in the cities of London and York a particular custom in regard to the law of light. It was that the owner of an ancient house, or of a house with ancient foundations, might build up this ancient house to whatever height he pleased, or might erect new walls on the ancient foundations as high as he liked, even though by so doing he obstructed his neighbour's ancient lights. To this effect was the custom of London certified by the Recorder of the City in the year 1757, in the case of *Plummer v. Bentham* (1 Burrows, 248), when he was called to the bar of the Court of King's Bench for that purpose. A comical incident of the case is found in a note to the report, which states that the Recorder, not having been called on to do this for many years, "a consultation was had in the City concerning the sort of gown which it was proper for the Recorder to put on: in which consultation it was determined that it ought to be the purple cloth robe, faced with black velvet, and not his scarlet gown, his black silk one, nor the Common Bar gown." But, leaving this little bit of civic etiquette, the case of *Winstanley v. Lee* (2 Swanston, 333), in 1818, may be noticed as one in which the custom was pleaded, with the result that the person so doing was held to have the right to darken his neighbour's ancient lights. The practical effect of the custom was very clearly stated in the judgment. "Persons," said the judge, "bought subject to that custom; each party, therefore, knows that without a writing, by the custom his neighbour may build to the obstruction of his light; or, on the other hand, that he is safe in acquiescence, because, unless he has given a writing, his privilege remains." There existed, in fact, under the custom what may be termed freedom of building, and it is very doubtful if under it the benefits were not greater to all parties than under the present law, which restricts the right of building. A very eminent judge, the late Lord Cranworth, stated, in the well-known case of *Yates v. Jack*, that "the advantages derived from the custom probably exceeded its evils," and that "serious inconvenience may be felt by the abolition of the alleged custom."

The abolition of the custom by the Legislature was unquestionably done somewhat heedlessly. No debate occurred when the Prescription Act was being passed into law, and it was passed solely in consequence of the report of the Real Property Commission of 1829. But the subject of the easement of light in its many important bearings was never considered by that Commission. If any one will refer to the evidence taken, he will find that only one answer, and that not an important one, touches the easement of light. It is, therefore, astonishing that the Legislature should, with so light a heart, have abolished the customs of London and York.

It may be asked, of what value now is the fact that this custom once existed? The answer is plain, that it forms an interesting and not-to-be-forgotten phase in the history of building law. Next, that it is of practical value in considering whether any and what changes are required in the existing law of light. There are many who are of opinion that the present law is by no means satisfactory in its results, and the position of these is strengthened by the fact of the former existence of the custom which has been mentioned, and that it was abolished by the Legislature after little or no consideration.

#### A HISTORY OF NORFOLK.

This is a new departure in the writing of county history\* and not without its advantages. We are far from saying that Mr. Rye has followed a more excellent way than Nichols and Ormerod and Surtees and Whitaker, but on the footpath he has made for himself he is likely to have more companions than they. The grand old folios and quartos must still be consulted for descent of property, family pedigrees, and antiquarian details, but the ordinary reader who wants to get sufficient information, at once general and accurate, about the county in which his lot is cast, may very well content himself with Mr. Rye's readable and reliable octavo.

The author, in his desire to be popular, is now and then unnecessarily familiar in his style. We do not look for stately periods, still less for dignified dulness, but a footnote like the following rather grates upon the ear,—"I can't stand the idea that this way (i.e., the so-called 'Peddar's way') was simply to lead to an unimportant chapel like St. Edmund's at Hunstanton," and, we think, that "the bibulous propensities" of Yarmouth watermen might well have been left without a chronicle. But these are small blemishes upon a work done honestly and pleasantly.

Mr. Rye begins at the beginning, while modestly confessing that he knows next to nothing about the aborigines of Norfolk. He believes the county to have been invaded and peopled by Danes at an early period and long before the arrival of the Romans, basing his belief upon certain place-names, Danish in origin, which were Latinised at a later period. Be that as it may, the Roman has left behind him such tangible proofs of his occupation as to throw the "Noble Dane" altogether into the background. Caister-by-Norwich has something more than its name to attest its origin.

The solid walls, enclosing thirty-five acres, show that it was an important military centre, little, if at all, inferior to Sarum or Caerleon. The county being naturally favourable to road-making, there are abundant evidences of the skill of the Romans in this their characteristic work. Less evident are the traces of Saxon occupation. There are, indeed, the well-known font in Burnham Deepdale, and the towers of Tasburgh and South Lopham churches, and an arch in St. Julian's, Norwich, which may be cited as examples of Saxon architecture, but in a land of churches, what are they?

With the Norman Conquest we reach solid ground. The Domesday Book divides the whole county into fifteen great estates, the largest proprietors being Roger Bigod, Richard de Warren, William de Beaufort, and the king. Of these great nobles the representation in the direct male line soon died out, and Mr. Rye takes occasion to be deservedly severe upon the foolish pride of those who sought (and still seek) their earliest ancestor among the companions of the Conqueror. He shows the obscurity of the Howard family anterior to the Judge who lived in 1293, and believes the name is indicative of a humble calling,—the Heyward or guardian of the farmstead (?) at night. Townshend, again, was, 450 years ago, a very ordinary denizen of the village of Rainham; and Bulwer represents Bullward, the useful individual who looked after the manor-bull.

But if the Norman lords have not left male heirs behind them, they have bequeathed to us some grand examples of their castle-building skill. Of these, the most important is, of course, Norwich Castle, once known as Blanchflower, which underwent reconstruction at the hands of one of the Bigods. The same process has lately been repeated, but happily the Norman work has been carefully reproduced, and the great square tower, which bears the

\* Popular County Histories. A History of Norfolk, By Walter Rye. London: Elliot & Spock, 1885.

\* See *Builder* for 7th of October, 1884, and 1st of July, 1876.



name of Bigod, is still the grandest feature of the pile. Of other castles within the county, the most conspicuous were Castle Acre,—still, in position, a considerable fortress,—and Swanton Morley, of which scarcely a vestige remains. Of a later date is Oxburgh, which Edmund Bedingfield built in the reign of Edward IV., and then came Caister Castle by Yarmouth, and Baconsthorpe, which belong to the fifteenth century. Norfolk does not rank high as a county in respect of its fortified buildings, but it takes a foremost place in religious, and especially in monastic, foundations. No less than eighty-two of the latter may be reckoned within the county, and some of them, notably Walsingham, Thetford, and, of course, Norwich, had a reputation far outside it. Mr. Rye vexes himself with that oft-repeated question,—why Norfolk, of all counties in England, should have so extremely large a number of churches? As population cannot account for the fact we must ascribe it to piety; but as the latter seems to have languished in later days we have often the melancholy spectacle of a magnificent church falling into decay, or, perhaps, curtailed of its original glorious dimensions. As it sometimes happens that two churches are to be found in one churchyard, it must be admitted that the parishioners may have some cause to complain of their heavy burden being also unnecessary. It seems that there are no less than 730 parishes and churches in Norfolk, with its 2,024 square miles, while Yorkshire, with treble the area, has 117 fewer ecclesiastical edifices.

Mr. Rye not only traces the history of the county, but has a good deal to say,—and very interesting much of it is,—about such matters as the old peasant life, the gentler life and the town life, and he gives a list of all the churches in the county which are specially worthy of examination, with the points in each which are most remarkable. The utility of such a list to the architectural student is obvious. It is difficult to select from what is in fact a selection, but, outside Norwich, the most interesting churches would seem to be South Burlingham, with its stone pulpit with sounding-board, bough-glass, and frame, stone reading-desk, and wooden rood-screen; Fakenham, with excellent flint and stone panelling; Swaffham, striking in situation and proportion; and Walpole St. Peter, which Rickman pronounced to be a thoroughly satisfactory Perpendicular church. At Ramworth and Barton Turf there are magnificent rood-screens, and the fonts at Hautbois and Great Plumstead are especially curious.

Mr. Rye is at his best when he takes his readers a tour through the county he knows and loves so well; and the following extract is a good sample of the pleasant way in which he imparts his stores of valuable information:—

"The attraction of this district" (i.e., the Wash) "is not in the scenery, which is flat and level as the sea itself, but in its magnificent churches. Nowhere else in England can be found in so small a district five such churches as Walsoken, Wiggenhall, Walpole St. Peter, West Walton, and Terrington St. Clements'. It is difficult to give even a guess how a purely agricultural district like this should have been able to find funds to erect such churches or to sustain them when erected. Any one of them would be the pride and glory of many a county town, and it is hard to say which of the five is the finest. . . . A pilgrimage down south, over the bleak sandy downs,—the 'rabbit and rye' country, as it used to be called,—should be made to see Grimes Graves, near Brandon, earthworks extending over more than twenty acres, about which so much has been written. . . . Further down the river is Thetford, also planted on both sides of the river, once the capital and cathedral town of East Anglia. It has been guessed to be *Silomagus*, and certainly many traces of Roman occupation have been found here. But the great Castle Mound, steep and high, with its grass-grown sides, so difficult even in times of peace to climb up, is the chief object of interest in the town. . . ." But here we must stop. Mr. Rye is a companion one is loth to lose, and a more trustworthy guide it would be hard to find. Yet what has been in his case a successful essay might very easily turn out a disastrous failure in the hands of one less thoroughly imbued with his subject.

**Surveyors' Institution.**—At the meeting of this Institution on Monday evening last, the President (Mr. E. L'Anson) in the chair, Mr. E. Smyth, Professional Associate, read a paper on "The Copyhold Emfranchisement Bill, 1884 5."

## FUNERAL CUSTOMS OF THE MODERN GREEKS.

A CORRESPONDENT sends us the following notes upon this subject, which may be of some interest as reflecting light on ancient Greek funeral customs and representations of them in art:—

"The sudden illness and death in a hotel at Athens this year of a young Corfiote law-student of the University, an intimate acquaintance of the friend with whom I was living, was the means of bringing under my notice a number of Greek customs in laying out their dead and at funerals, authentic record of which I think may be interesting. The tenacity with which the people of modern Greece still cling to certain usages of classical times became in this case the more apparent, as my friend, through ignorance of them, would fain have dispensed with them, and in various instances, urged by manifest reasons of haste and inconvenience, attempted, without success, to act in contravention of them.

1. The dead body was first washed with vinegar and water. For vinegar wine is often substituted, both in the islands and on continental Greece. In Corfu the Jews and many Christians have retained the custom of placing a cauldron of boiling water outside the house where the dead person lies, into which the passers by throw rose-leaves. With this concoction of rose-leaves they wash the corpse, as the goddess is said to have embalmed with oil of roses the body of her beloved Hector,\* or, as the ancients used wine, oil, and perfumes to prepare the bodies of their dead, to fit them like athletes for the exercises of another world.

2. A piece of linen was then taken, untouched by the needle, having the same width as the body and twice its length. It was doubled, and a hole, large enough for the head to pass through, was cut out of the middle. This rude scapular-like garment was put over the dead body, so that the head alone remained visible. This vesture is called the *qûsar*. The ancients also clothed their dead in white.

3. The body was then dressed in an entirely new suit of clothes, but the greatest importance is attached to the shoes being new.

4. Under the head was placed a pillow filled with lemon leaves. This custom appears to prevail in Crete and at Smyrna, and may have been brought into Corfu by Cretan emigrants or refugees, of whom it is known there has been a great number. In spite of all my inquiries, I can find no satisfactory reason for this custom; but I can certify that within the last few months a deputy from Corfu and a physician, both living at Athens, were very much concerned about getting these lemon leaves for the laying out of their respective brothers, the neighbours thinking it a bad omen if the leaves were gathered in their gardens for the purpose.

5. In the mouth was placed a bunch of violets, and around the temples a chaplet of flowers, as the ancient Greeks crowned their dead with garlands,—like victors, or as entering on the pleasures of a new world. These flowers, used only for the unmarried, must be white, and of the orange or the jasmine, either fresh or dried according to the season.

6. A small coin was then placed in the palm of the hand (both hands and feet were tied with certain bands sold for the purpose, which are unloosed at the edge of the grave, when the coffin is about to be closed), a relic of the fee paid the ferryman for the passage. In Athens a sot is dropped for the purpose into the coffin. In the islands and in country places it is the custom to put an earthenware token called a *penalphi*, in the mouth of the deceased to protect the body from evil influences. Some say this custom is of Pythagorean origin. The Greeks say that this coin has to be given to St. Peter at the gates of heaven. Nothing could induce this particular to be omitted.

7. In removing the corpse from the house great care was taken that the feet should go first. An inadvertent change made by my friend immediately attracted notice, and the feet of the dead body, like those of Patroclus stretched in the tent of Achilles, were placed towards the door. This was the custom among the ancient Greeks and Romans, in order to signify that the

\* Ut fuerit Homerus fuisse Hectoris cadaver a Venere oleo rose perunctum, canibus volucribus arcendis quorum ratiis miserum exponit furor Trenebulæ Thetidis. — *Æt. 10. 46.*

deceased should never enter by it again. As the body passed out of the house, the neighbours and those who were in the hotel threw down vessels of water which were broken on the door-step, in order, as they said, to avert any return of such ill-luck to the neighbourhood. Moreover, a Greek priest had to be engaged for three successive days to come and sprinkle the room in which the youth died with holy water, and fumigate it with incense, and repeat certain prayers, as for that period after death his spirit was supposed to haunt its precincts.

8. After the embalmment at the cemetery while the body was left for the night in the mortuary chapel, it was placed accidentally with the head towards the west; but the woman in charge quickly interposed, and insisted on having it placed with the head to the east, exclaiming in a questioning tone of mingled surprise and pain, 'Surely, he is not condemned!'

9. After the burial, women are hired to keep a light burning over the grave, in a kind of lantern made for the purpose, for a period of three years; that is, until the body is considered to be decomposed. So much importance is attributed to the speedy decomposition of a corpse, that, to further it, the bottom of modern Greek coffins is left open by means of cross-bars or lattice-work. Only the other day the Athenian grave-digger declared that the dryness or dampness of the situation had nothing to do with the length of time required for this decomposition; and he triumphantly pointed to various sites in the cemetery where some bodies are rapidly decomposed and others not, winding up by the assertion that those whose bodies he finds still entire after the allotted period must have been deprived of suffrages by the living, or must have been either blasphemers or perjurers.

10. Every Saturday the poor of Athens bring to the graves of their deceased relations food, such as they enjoyed in life, bread, pîlaf, &c.; just as the ancients placed in the graves of the dead all that would be required for the actions of a life continued beyond the grave,—food, lamps, articles of toilet, arms, &c., as the wheat stone for sharpening the sword-blade after death, found in a pre-historic tomb by Schliemann.

11. I say nothing of the *μολοδῳγίαι*, murmured or sung by the women who accompanied the funeral as professional mourners, nor of the peculiar customs of the Greek clergy, as, for instance, to mix water and clay on a spade offered them for the purpose as the coffin is lowered into the grave, which is then thrown in with the words,—'Dust thou art, and unto dust thou shalt return.'

12. As usual, no vehicle conveyed the body to the place of interment. This custom was that most prevalent among the ancient Greeks, and the various attempts made in recent times to introduce the hearse into modern Athens have failed."

## ARCHITECTURAL ASSOCIATION.

THE third meeting of this Association for the present session was held on the 20th inst., at Conduit-street, Mr. C. R. Pink (President) in the chair.

The following gentlemen were elected members, viz.:—Messrs. Tom Turner, Louis Jacob, Edward Linnell, Frank Peck, Arthur Bolton, F. R. Wilkinson, H. McBride Boden, William Grace, H. S. Daniels, G. T. Oliver, J. Willcocks, B. Wadmore, R. H. Goodacre, and F. R. Bacon.

It was announced that a visit would be made on Saturday, December 5th, to the Wandsworth Workhouse, notice to be duly given in the papers.

Mr. Cole A. Adams stated that the members and intending members of the Colour Class were invited to a gathering at Mr. Crace's, 38, Wigmore-street, on Tuesday, December 1st, at 8.30 p.m. Names of those intending to be present should be sent to Mr. Adams not later than November 30th. Mr. Sydney Vacher had kindly offered a copy of his work on "Italian Ornament" as an extra prize to the student who wins the class prize, conditionally upon his having contributed sketches for three separate subjects, and having attended three class meetings.

Mr. Adams also stated that some time since the family of the late Mr. Page had kindly presented his drawings to the Association through the medium of Mr. Robins, and that



the Misses Page had now given the Pugin Medal gained by their brother. Mr. Robins had also presented a volume to the Association. Votes of thanks were passed to the several donors. Mr. Lawrence Harvey then read a paper entitled, "The Connexion between Dress and the Art of Composing, illustrated by various Examples taken from the late Prof. Semper's 'Lessons on Style.'"

In the course of his lecture, Mr. Harvey observed that Michelangelo, Leonardo da Vinci, Sir Christopher Wren, and Sir Thomas Chambers were all men of considerable general information, and whose thoughts were not limited within the narrow bounds of a special trade or art or profession. Michelangelo was a sculptor, a painter, a poet, and the most learned mathematician of his time. Leonardo da Vinci was also an able mathematician, and Wren was a learned physicist and mathematician long before he attempted architecture. His (the lecturer's) own master, Professor Semper, who was admittedly the greatest architect Germany had ever had, designed and built many kinds of buildings,—warehouses, villas, mansions, palaces, theatres, hospitals, churches, synagogues, museums, town-halls, schools, observatories, and the best-planned railway station in Europe. Semper began to study architecture when he was twenty-two years old. Before that age he had applied his mind ardently to Classic literature, with such success that he was one of the most learned Greek and Latin scholars of Germany. He also applied himself quite as ardently to the study of mathematics. Now he (the lecturer) did not mean to say that it was possible for every young architect to emulate the achievements of the giants whom he had named, for if the students of the present day only studied what it was strictly essential for them to know, in order to enable them to do credit to their profession, they would find more than enough to fill a brain of ordinary capacity. Unless they were content to be, in matters of construction, the inferiors of the builder's foreman, they would have to know thoroughly the sciences which dealt with matter,—chemistry, physics, mechanics, geometry,—so that to every point which the foreman adduces as a mere matter of experience they might be able to add the reason why. By earnestly pursuing a solid course of studies in this way young architects would soon remove from the public mind the impression that architects were mere draughtsmen, and dangerous and expensive luxuries, and would come to be esteemed as learned and practical advisers in all matters of building, without whose assistance any building. Having said this, the lecturer observed that he did not think his audience would find much danger in allowing him to present to them some general considerations on all the arts, the object of which was to show that the arts were all united by general principles which governed them all. Asking the question, "What is art?" he gave Semper's definition as follows:—

"Man is born intellectual, that is, with an instinctive wish to comprehend the world in which he lives, and a dissatisfaction with things as they are, and a desire for improvement and perfection. The impossibility of satisfying these his highest instincts gives him pain. Still, the satisfaction of this instinct is as necessary to the preservation of his mind as the satisfaction of hunger to that of his body. From this aspiration to improvement and perfection three human manifestations have sprung: science, by which we endeavour to discover the essence of things, an inquiry which fills us with hope and affords thereby temporary relief to our thirsting souls; but which always ends by being baffled. Religion, by which we imagine forth a state of perfection beyond the tomb and endure the present as of no account. Art, by which we create for ourselves a small world, perfect within its limits, in the contemplation of which we forget reality. Art is therefore a shadow of nature. It follows the laws which man suspects govern nature's products. These laws are rhythmus or regularity, suggested by the regular recurrence of days, seasons, and tides. Then by consideration of regularly-formed objects, such as a part of a flower, we get the idea of symmetry. The vegetable world gives us the notion of proportion, the animal world that of direction, for most animals have a head and a tail. Regularity, symmetry, proportion, and direction,—as have the fundamental elements of form, both in nature and in art. But they do not in general reign equally in the same object. Sometimes it may be regularity which predominates, sometimes it may be direction, and this gives us the notion of bias or character. Regularity is the characteristic of snow-crystals, and direction is the characteristic of fishes. Similarly in art, necklaces, dances, and music, depend for their beauty on the regular recurrence of objects, motions, and sounds. Symmetry is the special characteristic of frames, windows, doors, and altar-pieces. Proportion predominates in towers and direction in ships. Ornamentation, dancing, and music are exclusively subjective arts; they are the only pure arts, for their sole purpose is to excite emotions, convey to us feelings of sorrow, fear, or confidence, and so on; but painting and sculpture are, by themselves, not arts at all, but only a means of recording certain facts. The initial purpose of architecture was the construction of man's shelter; but

architecture, painting, and sculpture, as well as language itself, became arts only when they aimed at the same results as the natural arts of ornamentation and music."

That definition of art left us very free to select our own course, and all we had to do as artists was to question, for our guidance, both nature and the works of man. Any object, however unimportant in itself, could be raised in dignity by being framed, for the frame cut off the object from its surroundings. The idea of framing was not limited to pictures. Clothes, considered as objects of art, were amongst the earliest of frames conceived to give dignity to our persons. Semper traced to clothing and personal ornaments the origin of the laws which rule the arts. Every work of art resembled a necklace in that it was formed of jewels and string, and the more clearly one perceived this the purer was his artistic taste. Closely allied to the strings of necklaces are the seams of garments, which were the means of connecting different pieces of material together. The modern Europeans endeavoured to make their stitches fine enough to be unnoticeable, an object they failed to accomplish, even with the help of the latest machinery. The inhabitants of Asia, and also the Red Indians, were much wiser than ourselves in that respect; instead of attempting the impossible feat of hiding their seams, they showed them up and made them a means of decoration. In architecture we followed the example of the Red Indians, and emphasised our seams by mouldings. The base and the capital of a column were only ornamental seams, and so were the joints of the stones in what we called rusticated work. To refer to another personal ornament, the earring. The pendant of the typical ear-ring was in the shape of a plummet; its characteristic value as an ornament was that it preserved its plumb-like direction whatever the position of the head, and served as a foil to its attitude. Now, when a building suited a landscape, it would be found to fulfil the same function as the ear-ring. A flat or only slightly undulating country appeared to the beholder monotonous and uninteresting, but erect a tower to supply the missing vertical line, and immediately the whole scene was animated; the very flatness of the plains became by contrast an interesting feature. But the principle of decoration represented by the ear-ring was not limited to vertical lines. A horizontal line might be the foil required. Such was the case in a mountainous country. All ear-rings were not of the type of ornamental pendants; in fact, such ear-rings were only suited to persons of quiet, dignified demeanour. If a lively young girl were to wear such earrings, instead of marking a vertical line they would beat about her head at every nod like two bell-hammers. For such a lively person the ear-rings could not be made too light, both in reality and appearance, but then, although called ear-rings, they would belong to an entirely different class of ornament, viz., to the fluttering ornaments, the purpose of which was to emphasise the motion of the wearer. To this class belonged the plumes and horsetails of the warriors' helmets, which told of the swiftness of the onslaugth. The ribbons of the dancer floated about at every step she took, and increased the beholder's impression of her liveness and agility. To this class of ornament belonged also the drapery of the ancients, thanks to which their sculptors could give animation to their statues; for by the flow of the drapery it could be seen at once whether the sculptured hero was rushing forwards or stepping backwards. To the fluttering ornaments belonged the hair when let loose to the winds, as in the representation of the frenzied Menades on some Greek vases. To the fluttering ornaments belonged also the tail of the comet, expressive of that celestial body's rush through space. The characteristic feature of all these ornaments, when fluttering, was want of symmetry in the direction of the motion which they follow and emphasise. In dress, symmetry suggests quiet placidity and also dignity, but want of symmetry implied motion. To take another example, a piece of stuff such as a carpet or a sawl. To prevent its unravelling the ends of the threads were tied together in knots and formed a fringe at both ends of the stuff. We found, therefore, that woven surfaces neither began nor finished abruptly, but were necessarily preceded and followed by some of their elementary component parts. The frame, the necklace, the seam, the feather, and the fringe having now been examined in connexion with numerous examples taken from music, painting, and

literature, in conclusion, the lecturer said that he hoped that the considerations which he had placed before the meeting would excite the attention of the members to the lessons that could be gathered from other arts,—lessons which could not fail to be of service to them in their own work.

The Chairman, in opening the discussion, said they would be at one with Mr. Harvey in his opening remarks as to the advantages of a wider culture for the profession. Perhaps, at the first blush, the rigid application of Semper's theories might appear difficult of acceptance. It should be remembered, however, that Semper did not formulate his theories in haste, and, therefore, it would require a deep and careful study of the wide field of arts and sciences, as well as of history and literature, before a distinct "yes" or "no" could be given. There was hardly anything which Semper had not pressed into his service in illustration of his theories. It reminded one at once of the modern theories of evolution in natural history, which required careful study before the bearings of the question could be appreciated. The movement in architecture was only part of a general movement throughout the country, the Gothic revival being part of the general revival of romanticism; while the later development in the Queen Anne style, and in other more common-place things, might be linked to the works of George Eliot and other writers. In the time of Elizabeth the movement in architecture was only a small part of the great movement known as the new learning, and a perusal of Lord Bacon's essay on building would show how much he had been impressed. The more they studied Semper's formula of style, the more would they be struck with the fact that it was particularly good.

Mr. Hugh Stannus said there were three reasons which would instigate a man to speak after a paper of this kind. The first would be that he disagreed with every word the lecturer had said; the second, that from private study he might be able to throw collateral light upon it; while the third reason would be to invite the lecturer to extend his observations still further. It was for this third reason that he had got up. He would therefore content himself by proposing a vote of thanks to Mr. Harvey, and asking him to explain the formula of Semper's "Definition of Style."

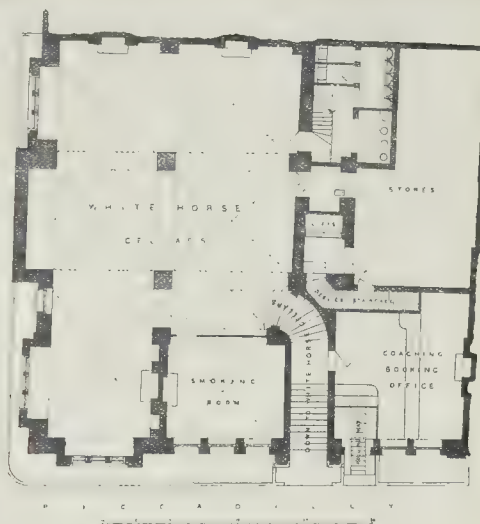
Mr. F. R. Farrow seconded the resolution, but said he believed that Semper had mistaken cause for effect. To say that clothing was the foundation on which art was built was going a little too far. The reason why Semper had found in all art, ornamentation taken from the ornaments of clothing, was because clothing had never been looked upon by mankind as an art. Therefore, men in working out the ornamentation of their clothing, had not deemed it necessary to conform to rules and canons of art, but had worked on their own intuitive knowledge as the artists themselves had worked. There seemed to be three great fundamental principles on which the arts were founded and developed to a greater or less extent, viz., rhythm, proportion, and government. The first was exemplified in the sonata, which presented a contrast of the strong and the weak. Proportion, again, was the fundamental principle of all architecture; while government was the principle exemplified to the greatest degree in sculpture and painting.

Mr. G. H. Blagrove said he had been both instructed and amused by Mr. Harvey's paper, and had hit upon two points which might be of some practical interest. Mr. Harvey had referred to the caryatides at the Erechtheum, instancing that kind of treatment with approval. He would like to ask whether the use of the human figure, like to ask whether the use of the human figure, as a column, was in accord with the principles of Professor Semper, as it had been condemned by all our best architectural authorities? As to decorative painting, Mr. Harvey had said that the picture was made for the frame in the decoration of walls and ceilings. Now, as this Association was directing its attention more to colour decoration, he would like to remark that in several of the best ceilings in the Classic style produced in this country, some of the excellent work of the Brothers Adam had been marred by putting dark paintings into lozenge or other shaped panels. In wall or ceiling decoration the picture should be lighter than the frame.

The vote of thanks was then put, and cordially received.

Mr. Harvey, in replying, said that he had not





Hatchett's Hotel and White Horse Cellars.—Plan.

meant to represent Professor Semper's theories in their entirety, but had endeavoured to take out of his book a few things which might interest his hearers, and set them thinking. He had not intended that they should be swallowed like gospel, but wished merely to wake their attention. Too many of the profession were taken up with bricks and mortar, therefore he desired to see whether he could present to them something different to what they were accustomed to, and which might at the same time prove useful. It was almost an impossibility to make an abridgment of Semper's theories. Mr. Harvey concluded by explaining the formula of Semper's "Definition of Style."

### Illustrations.

#### HATCHETT'S HOTEL AND WHITE HORSE CELLARS, PICCADILLY.

THE view we publish this week of Hatchett's Hotel and White Horse Cellars was exhibited in this year's Royal Academy, and the small scale plan gives the basement and mezzanine floors devoted to the Coaching Booking-office and the White Horse Cellars. These are used for luncheons and dinners, &c., and include a bar and a smoking-room. Of this portion of the building, and of the hotel, we gave a general description, December 27th, 1884.

The buildings at the corner of Dover-street, now replaced by the above, were three comparatively modern houses knocked into one, and were, on sanitary grounds alone, totally unfit for use as a hotel. Some curious relics have, however, been preserved, viz., in the "Cellars" an old signboard, found during the demolition, depicting a somewhat impossible white Arabian; when found it had its face to the wall, and was covered with a thick coating of tar, the reverse side having been made the groundwork of a modern inscription. In the smoking-room adjoining, there is an oil-painted board, wherein may be more or less deciphered the following words:—

LIFTS  
es and Waggon  
ford, Dorchester,  
mouth, Falmouth  
er places adjacent  
TH, BRISTOL.  
ZES, flying Waggon.  
BATH AND BRISTOL.  
Machines every day by  
Dog March Fisher and  
Windsor and Faton machine  
every Day by R. Grisewood  
The Reading Working  
Steam-drill and Fagon  
machines by Wheatley.

PASSENGERS Regularly Booked for the above Carria.

There may also be seen the original muffin-toaster, game-hook, and smoke-jack, and part of an old oak drain found under the foundations of the inn, and exhibited last year at the Health Exhibition, and as a matter of fact the site was filled with diseased cesspools.

The hotel and 'the cellars' are for many reasons worth a visit,—a magnificent *table d'hôte* room extending the whole length of the Piccadilly front; a somewhat novel and effective treatment of electric light; some very choice foreign and other marble; and, leaving for a moment professional matters, an excellent cuisine and cellar.

The architects were Messrs. W. S. Weatherley and F. E. Jones, and the contractor Mr. John Grover.

#### CHOIR SCREEN, ENKHUIZEN.

This screen, from the Wester-Kerk at Enkhuiizen (North Holland), dating from about the middle of the sixteenth century, is probably by the same artist, Jan Terwen, of Amsterdam, who made the stalls at Dortrecht. It is a good example of Renaissance work of its class, and the rails are remarkably well treated.

#### DUTCH SPIRES.

PERHAPS the term "spire" ought hardly to be applied to these conglomerations of incongruous stories piled one on another, but it is difficult to know what else to call them, and they preserve the spire-like outline sufficiently to give an excuse for the name. From the standpoint of pure taste they are most faulty, in fact, almost barbarous in some of their detail; but they are redeemed by that quality of character without which the most correct architecture makes but a dull picture.

#### RESIDENCE AT WEETWOOD, NEAR LEEDS.

THE house the subject of illustration has been built by Mr. George Wm. Brown upon a portion of his estate at Weetwood for Mr. J. Rawlinson Ford, Leeds. Although situated upon the site of an old disused quarry, the house is well elevated above the Meanwood valley, and commands extensive views of the surrounding country. The irregularity of the grounds round the house caused by the old quarry workings, instead of detracting from the general appearance, has, contrariwise, been made the means of adding to the picturesque effect of the place.

The buildings erected for Mr. Ford comprise the house, stable buildings, and groom's cottage, together with a gardener's lodge built adjoining the Weetwood-lane.

The total cost of these buildings, including fittings, but exclusive of value of land, when completed, will represent an outlay of between 5,000l. and 6,000l.

The work has been executed in stone, that for the walling being obtained from the Potter-

newton quarries, near Leeds; and that used for the dressings from the quarry on the site. The roofs are covered with green slates from the Buttermere quarries.

The house, although upon the whole plainly fitted up, possesses some features of interest. The staircase is separated from the hall on both floors by means of wood arcading, with Jacobean pilasters, three central arches, and the spandrels filled in with pierced arabesque strapwork ornament.

The dining-room has the walls wainscoted up to the height of the frieze in yellow pine panelling, which will be painted an orange-russet colour. The frieze will afterwards be decorated with Tynecastle tapestry.

The drawing-room is provided with an angle-nook in an arched recess, provided with comfortable settees on each side. The walls of the room are portioned out into bays, divided by fluted wooden pilasters against the walls with carved Ionic capitals, and the ceiling is elaborate in character of seventeenth-century design.

The floors of the principal apartments on the ground-floor are laid with narrow oak boards, wax polished. The conservatory and vestibule and porch floors are finished with ceramic and marble mosaic pavements, provided by Messrs. Pattison, of Manchester. Messrs. Wilcock & Co., of Barmantofts, provide a glazed faience dado round the vestibule.

The three principal reception-rooms are fitted up with roomy and comfortable window-seats round the bays, with hot-water pipes taken underneath, screened off from view by panels in the framework, filled in with Cairo lattice-work.

The heating of the building is effected mainly by means of open fire-places, the designs of the chimney-pieces throughout the house having been specially made by the architect. The chimney-pieces, with overmantel framework of the drawing and dining rooms, are being made by Messrs. Howard & Sons, of Berners-street, London; the remainder by local firms. The hall will be warmed by a German majolica stove.

The stained and painted glass window of the staircase will be supplied from the atelier of Messrs. Shrigley & Hunt, of John-o'-Groat's Gate, Lancaster.

The whole of the work is being carried out under the designs and under the superintendence of Mr. William H. Thorp, A.R.E.B.A., of Leeds.

#### SUBJECTS IN STAINED GLASS.

This week we give two more specimens of stained glass designed by Mr. E. Burne Jones, A.R.A., and executed by Messrs. Morris & Co.

#### COMPETITIONS.

*Grammar School, Cheltenham.*—We are informed that Mr. Joseph Clarke, F.S.A., has been appointed professional assessor in this competition.

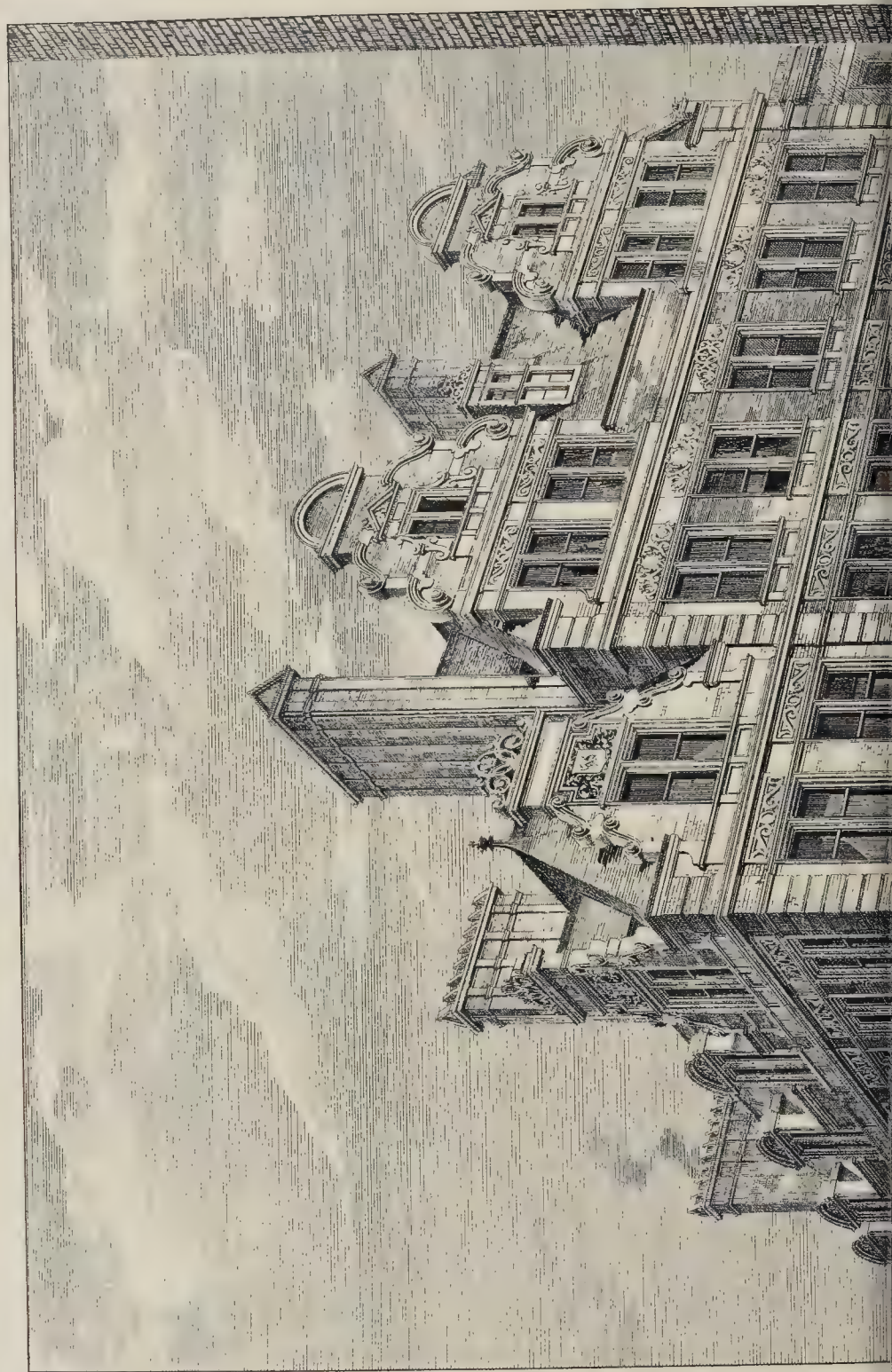
*Villa Competition, Feltham.*—The advertiser of this competition writes to us, in reference to remarks that have appeared in our columns, to the effect that many of the competitors were very late in furnishing him with directions for the return of their plans, that some had not yet done so, and that in any case 200 sets of drawings could not be packed and sent off all at once. From the writer's letter we believe that he means quite fairly to all the competitors.

*Sandringham.*—A new east window, completed on the birthday of the Prince of Wales, has recently been fixed in Sandringham Church. The stonework was designed, in the style of the fifteenth century, by Mr. Arthur Blomfield, architect. The window is filled, by Messrs. Clayton & Bell, with stained glass of elaborate design, representing the Crucifixion, the subject embracing the entire area of the glass. The same artists have also recently produced a window in the church at Trumpington, near Cambridge, in memory of the Right Hon. Henry Fawcett, M.P., the late Postmaster-General. The design comprises figures of Fortitude, Charity, and Truth, the whole being treated very richly in colour. At the base runs the following inscription:—"In Memory of Henry Fawcett, born Aug. 26, 1833; died Nov. 6, 1884."

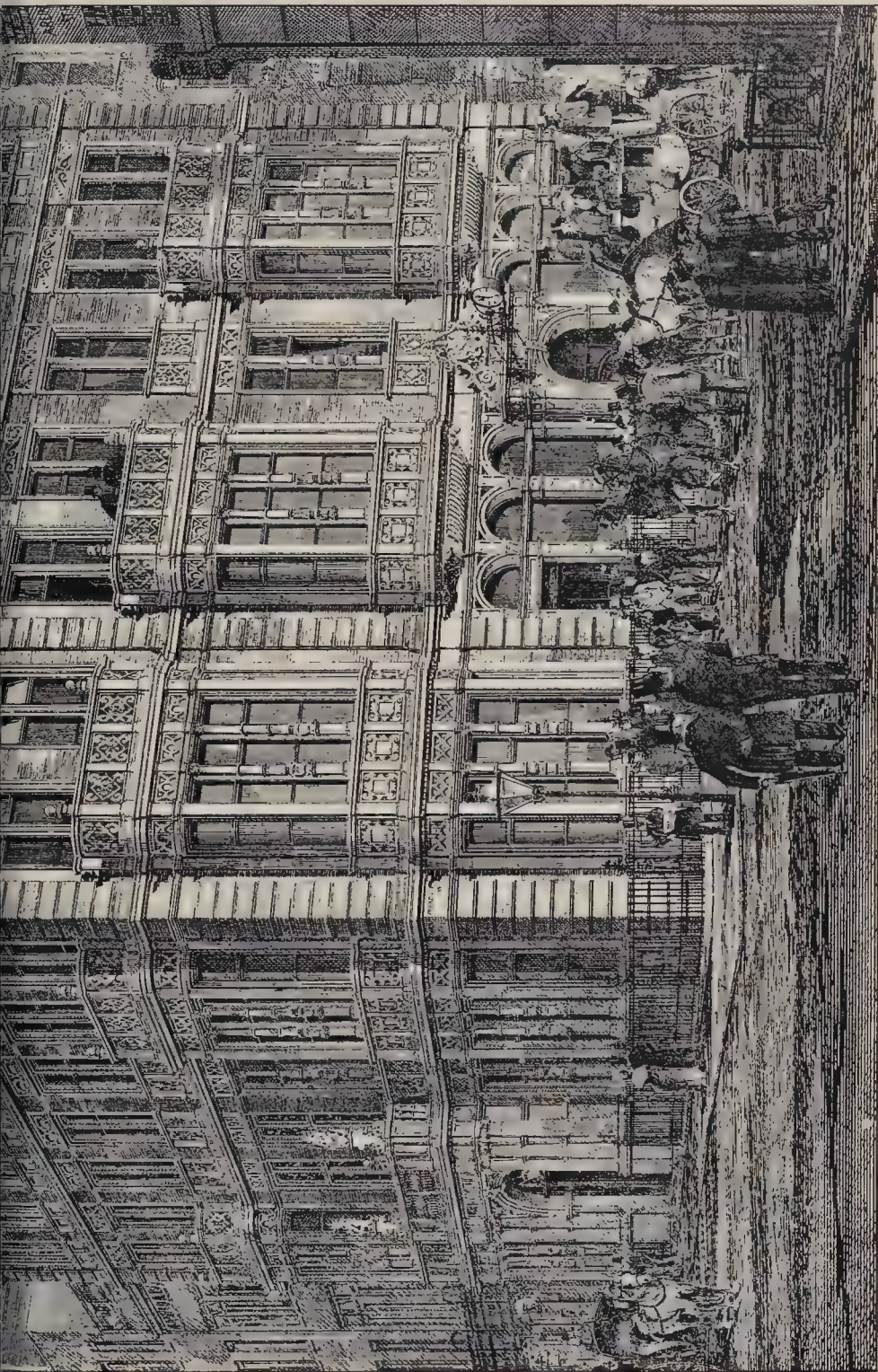




THE BUILDER, NOVEMBER 26, 1885.







Engraved by J. O. Johnson, del. and sculp.

HATCHETT'S HOTEL AND THE WHITE-HORSE CELLARS, PICCADILLY.—MESSRS. W. S. WEATHERLEY AND F. E. JONES, ARCHITECTS





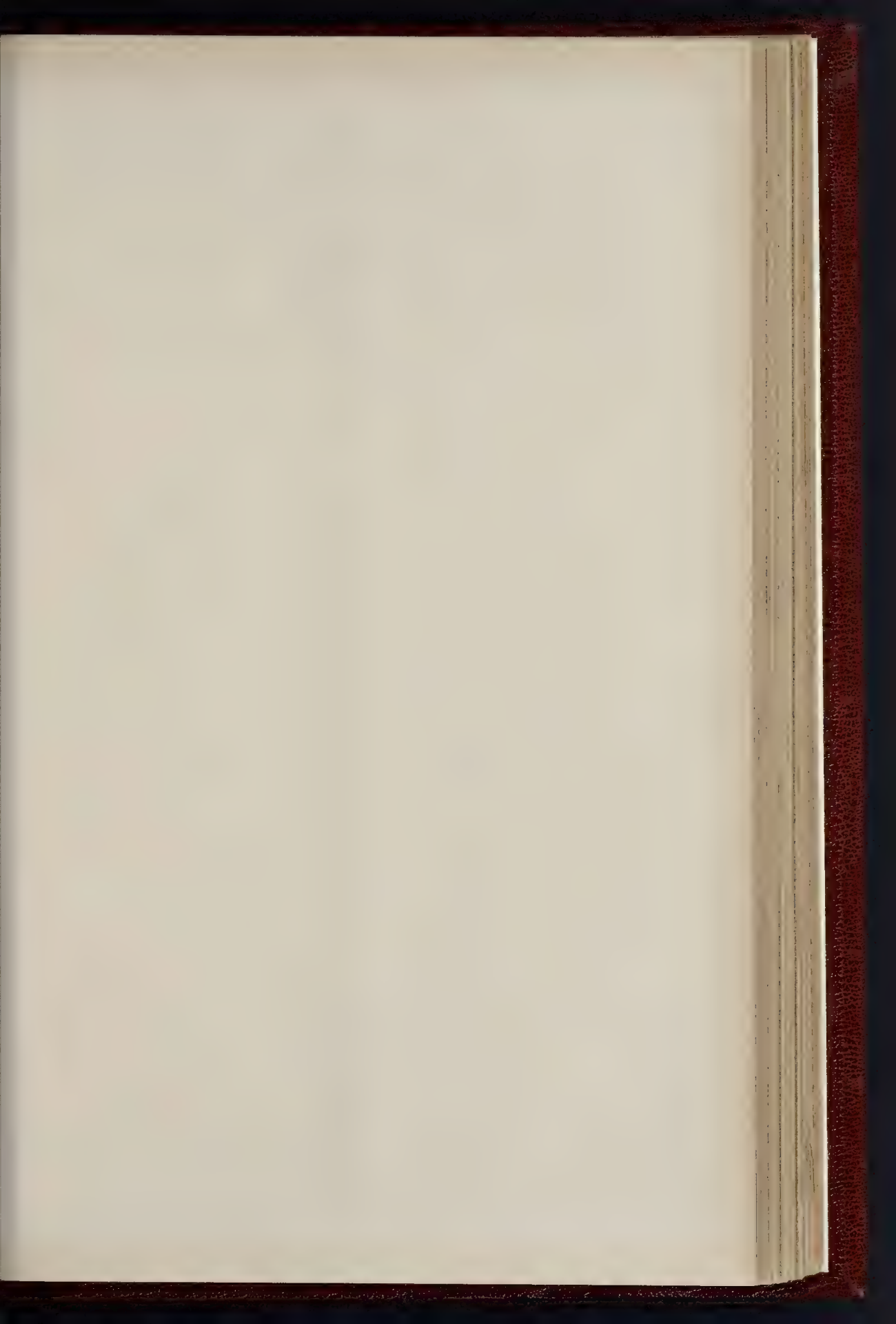
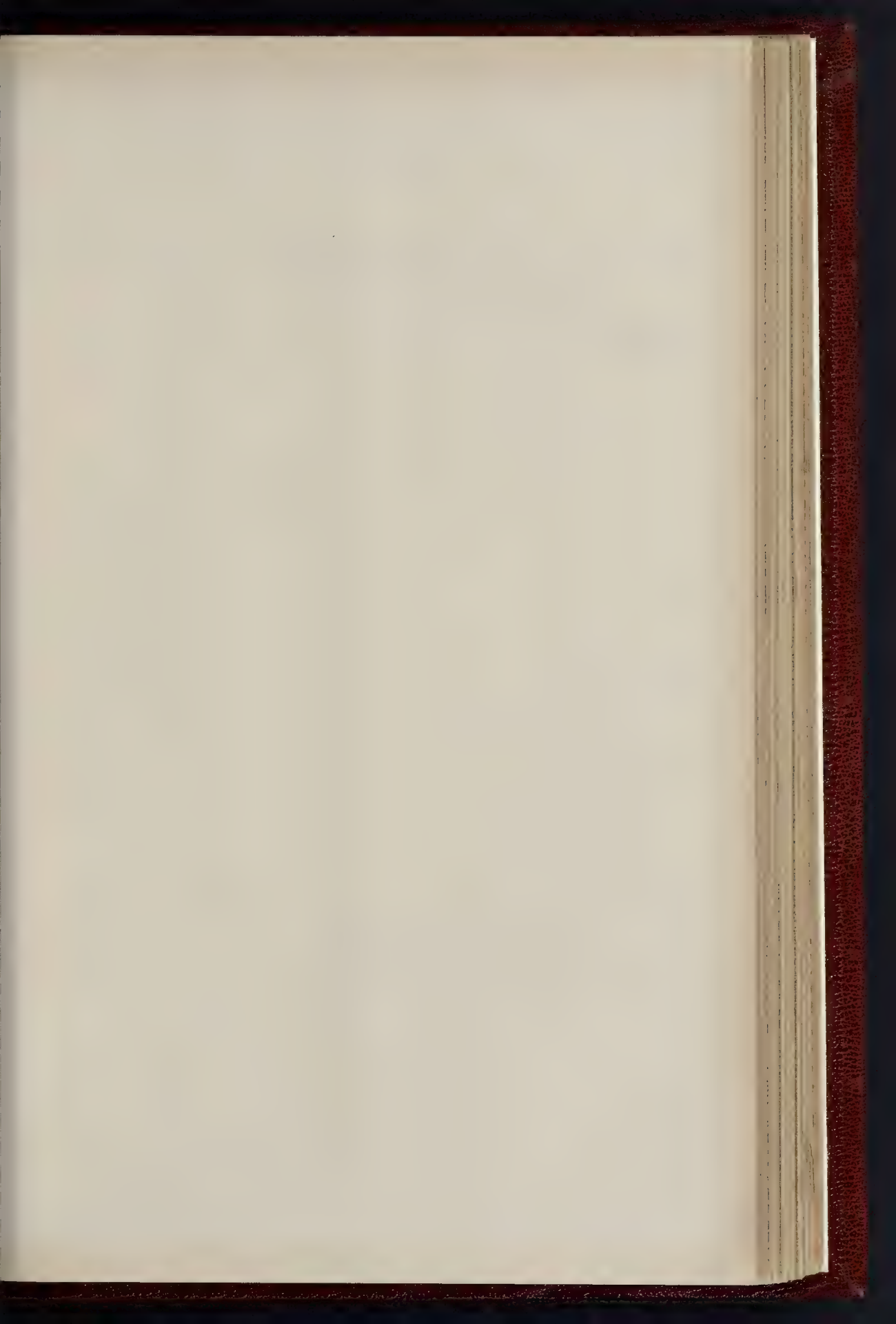


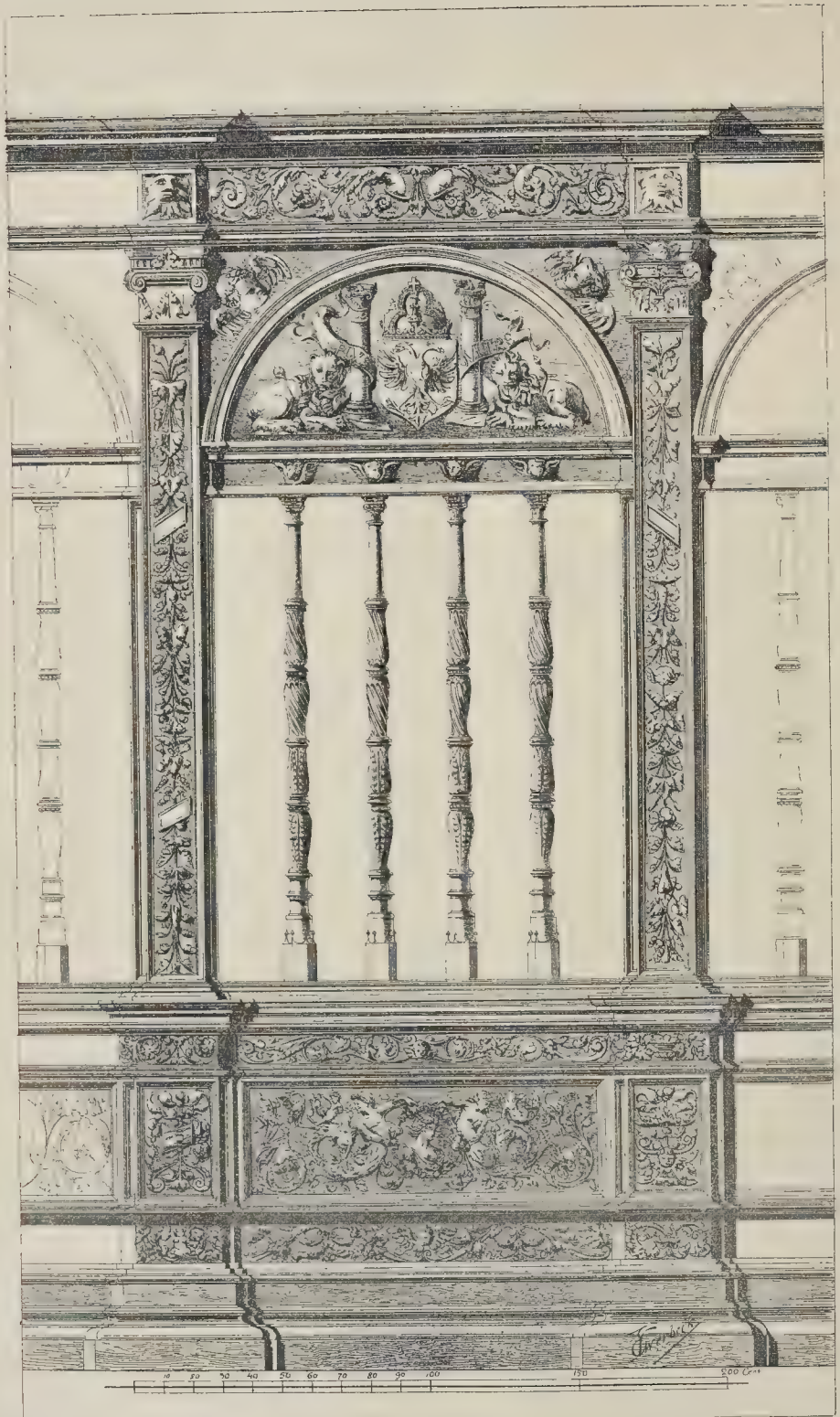


PHOTO SPRAGUE & CO LONDON

ST MARY MAGDALEN WASHING CHRIST'S FEET  
WINDOW IN ROCHDALE CHURCH —DESIGNED BY MR E. BURNE JONES, A.R.A.  
EXECUTED BY MESSRS MORRIS & CO







F. K. H. 1885. Photo. by F. K. H. 1885. F. K. H. 1885. F. K. H. 1885.

CHOIR SCREEN, ENKHUIZEN, HOLLAND.





"NEW CHURCH," HAARLEM.



LEYDEN TOWN HALL.

DUTCH SPIRES.





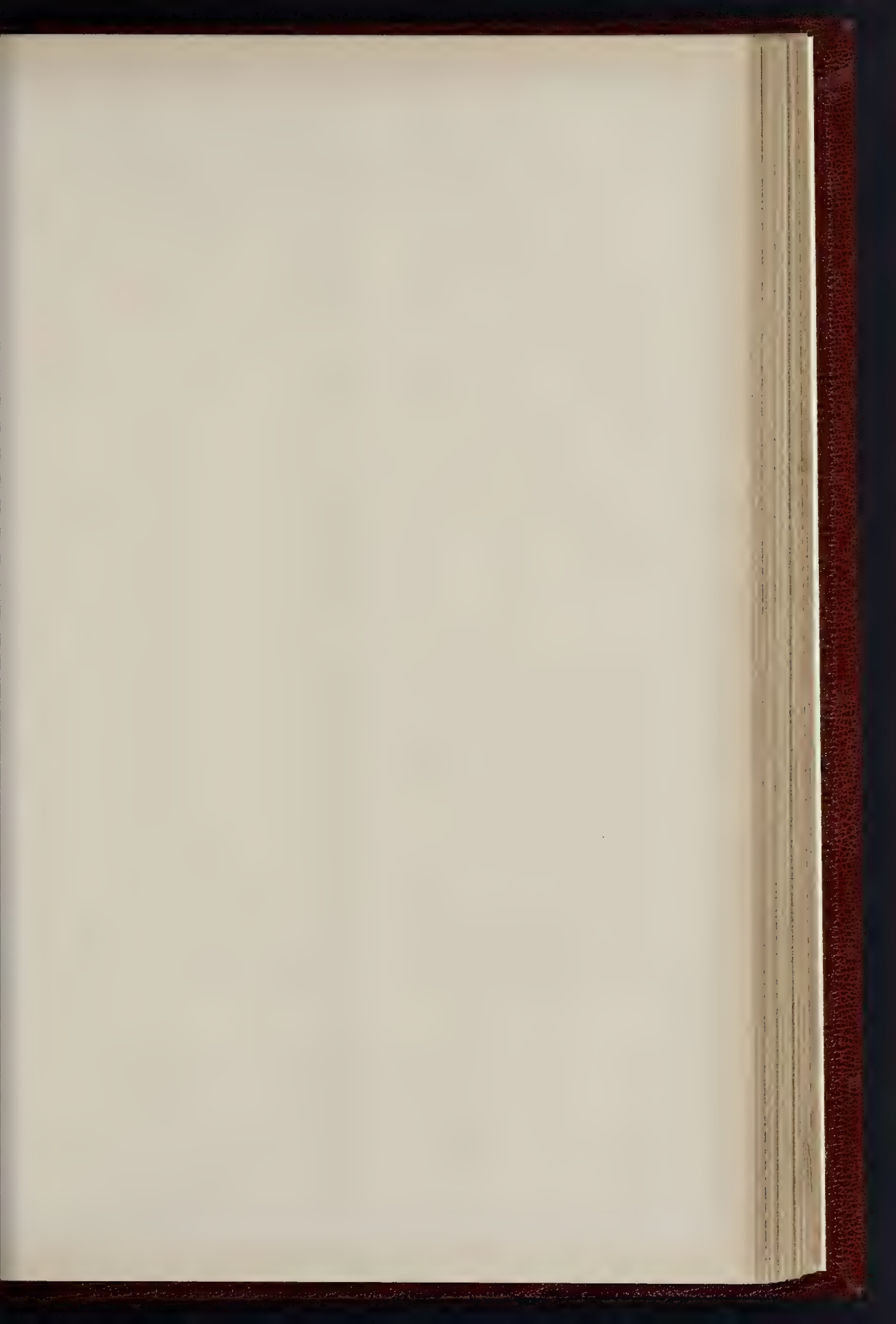


THE PHOTO SPRAGUE & CO. LONDON

THE RESURRECTION.  
WINDOW IN HOPTON CHURCH, DESIGNED BY MR. E. BURNE JONES, A.R.A.  
EXECUTED BY MESSRS. MORRIS & CO



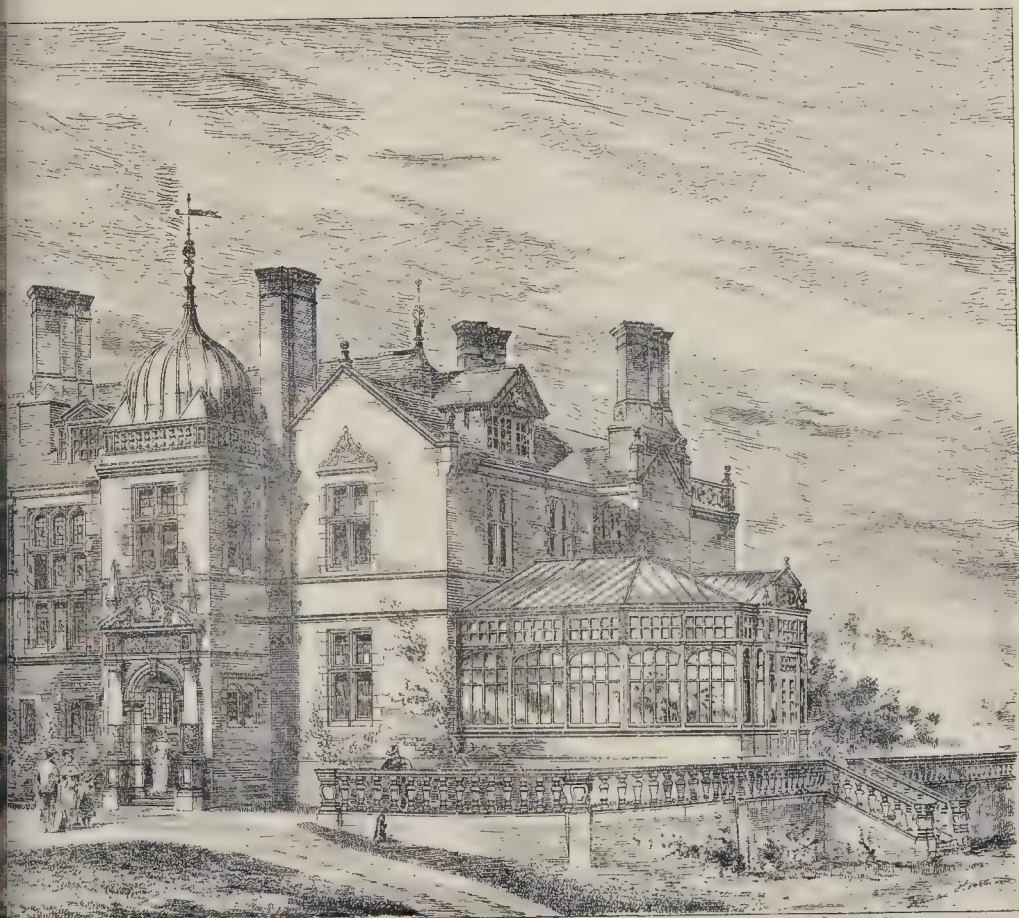






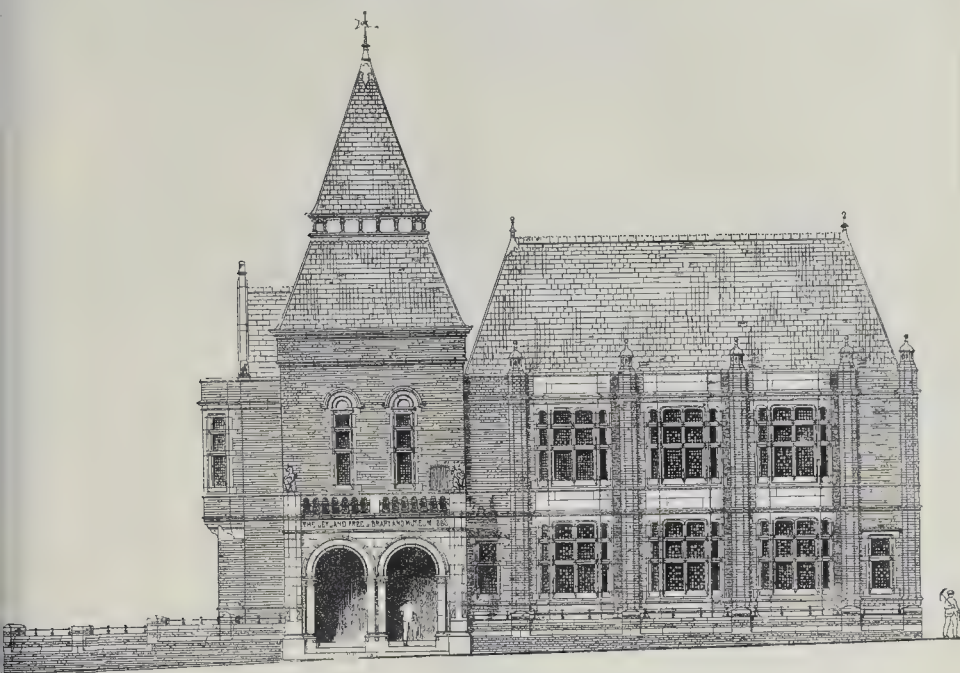
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Scale of Feet 0 10 20 30 40 50 60

Hindley Free Library—Elevation of Principal Front.



Hindley Free Library—Plan of Ground Floor.

## THE LEYLAND FREE LIBRARY AND MUSEUM AT HINDLEY.

This building, of which the foundation walls are being put in, is intended to form part of the improvement of Hindley, near Wigan, now being carried out from the fund left by the late Mr. Leyland for that purpose.

It contains, on the ground-floor, the lending library and newsroom, 51 ft. by 25 ft. 6 in., with cloak-rooms and lavatories adjoining; and a stone staircase which leads to the committee-room on the first floor, 23 ft. by 16 ft., with oriel window at the end; and the reference library and museum, of similar dimensions to the library below.

The basement will be utilised as a working-man's club, with billiard and smoke rooms. At the rear is placed the keeper's house, with living room, scullery, and two bedrooms, and heating-chamber, coal cellar, &c., below.

The building will be of red pressed bricks and Parbold stone, with green Welsh slates covering the roofs. The bays and windows in the library and staircase have stone mullions and transoms, with lead-light glazing.

The work is being executed by Mr. Preston of Wigan, from the plans and under the direction of Messrs. Thomas Worthington, F.R.I.B.A., and John G. Elgood, A.R.I.B.A., architects, of Manchester.

**Liverpool Architectural Society.**—The second meeting of the junior debating club connected with this society was held in the rooms, No. 9, Cook-street, on the evening of Monday, the 23rd inst., Mr. James B. Hinks in the chair. The subject for the evening was a paper by Mr. J. S. A. Mercer, entitled "Architectural Pupilage."

**Builders' Benevolent Institution.**—The three applicants for annuities on the list were duly elected on Thursday last, no poll being necessary. The names of the candidates are John R. Bieley (fourth application), William Thornton (third application), and Jane Elizabeth Ebbs (first application).

## FROM THE MARBLE QUARRIES AT CARRARA.

The following extract from a private letter of a visitor to Carrara, which has been forwarded to us, may be of interest:—"I am in the centre of the marble-producing district of Italy, and surrounded on all sides by the raw material of the sculptor's art. Countless busy chisels are engaged in producing every description of work, from the stately effigy of a Medieval bishop, 10 ft. high, confronting me in a studio opposite my house and destined to adorn the Duomo at Florence, down to funeral vases and headstones, marble chimney-pieces and table-tops, and even marble washing-tubs, as advertised by a local sculptor in large letters!

I need hardly say that ordinary marble is the commonest of all materials here,—that walls are built and roads made of it. Some 6,000 men are employed daily in the marble works of Carrara alone. One single firm, whose representative is now here, has brought down from the quarries 125,000 blocks of marble within the last year, varying in size from immense masses requiring twenty oxen to draw them in the primitive wagons of this country, down to such as may be transported by a couple of oxen. It is a sight worth seeing to behold one of these huge blocks come thundering down the mountains after a blast, followed by a perfect hailstorm of smaller fragments. Having at length found a resting-place, it is squared up with chisel and hammer and transported to the mill, the ship's side, or the studio. But a small proportion, however, of the marble here quarried is fit for the statuary, and this, the pure white marble, is obtained from three or four quarries only. The great bulk is more or less streaked or veined with black and grey. The pure white marble is even here very valuable, and it is possible for the most practised expert to be deceived,—the mass so snowy white to the eye may conceal some disfiguring streak or stain within its core. A year or two ago a block, apparently of the purest description and of unusual size, was obtained. It was housed where it fell to protect it from the weather, and its owner demanded for it no less a sum than 1,000*l.*, actually refusing an offer of 800*l.* At length an advantageous opportunity presented itself for disposing of it in two pieces. It was sawn in twain, and, lo! a black vein was found to run throughout its entire length.

The majority of the quarrymen are rough fellows. Hardly a 'Festa' passes without a case or two of stabbing, and ugly tales are told of gendarmes being struck down by a fragment that did not fall accidentally from the mountain's side.

Some short time since I saw a statement in one of the leading London papers to the effect that the marble workers of Carrara never drank wine. The statement, like many others, is only partially true. I admit that they are strictly temperate on ordinary working days, subsisting on bread, fruit, and water, with, perhaps, the addition of a little sausage or macaroni, but when the 'Festa' comes round they make up for previous abstinence."

## BRITISH ARCHAEOLOGICAL ASSOCIATION.

THE first meeting of the new session was held on the 18th inst., Mr. Cecil Brent, F.S.A., being in the chair.

Mr. Harris described a Saxon font now in South Hayling Church. It was found in 1827 in a neighbouring well, but was probably originally in a church now submerged. It is covered with interlaced ornament and strapwork.

Some interesting communications from the Rev. G. Butterworth were brought before the meeting by Mr. de Gray Birch, F.S.A., relative to the discovery of an ancient Saxon chapel at Deerhurst, at a short distance from the well-known Saxon parish church. The outline of the walls has been traced and the building found to have a small nave and chancel of very early work. A dedication stone of the altar to the Holy Trinity has been found, and Mr. Birch pointed out the resemblance to the inscription in the Ashmolean Museum recording the dedication of a church at Deerhurst by Earl Odda in 1056, a copy of which was produced.

Mr. Loftus Brook, F.S.A., reported the discovery of a stone with Saxon interlaced work

at Moulton Church, Northants, of which Sir Henry Dryden sent a squeeze. It has been found beneath one of the piers of the south aisle during the restoration of the church by Mr. Law, who will have the stone carefully preserved.

Mr. C. H. Compton exhibited some curious terra-cotta lamps and other objects found at Heliopolis, and afterwards read a paper on the Church of St. Michael Coslany, Norwich, a building possessing one of the best examples of flint inlaid work to be found in the county. There are several interesting brasses, the figures being clad in peculiar costume of the sixteenth century, rubbings of which were exhibited.

A paper was then read by Mr. de Gray Birch on the art of the Roman pavements at Bignor. The lecturer referred to the similarity of the design common to Roman pavements, and traced some remarkable coincidences, giving details of the designs. The arrangement of the villa, which is of the largest size, has but certain points of resemblance to other villas, and as evidence of the great diversity of design in such buildings, those found in Gloucestershire, for example, were referred to. Out of the sixteen examples there is great difference of arrangement to be noted. The present decaying condition of the pavements was pointed out, and the hope expressed that something should be done for their preservation.

A discussion, in which Messrs. Wright, Brock, and others, took part, ensued as to the best way of effecting this, so as to keep the pavements in their present position.

## ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

LAST week a Midland District meeting of this Association was held in Stratford-on-Avon, and there was a good attendance of members. The members assembled at the Town Hall shortly after 11 a.m., and then were conveyed in branks to the waterworks at Snitterfield, now in course of construction, and were conducted over the works by Mr. E. Pritchard, the engineer (Past President).

The party afterwards similarly inspected the Sewage Disposal Works, under the guidance of Mr. Pritchard, and then returned to the Town Hall for luncheon on the invitation of the Mayor (Mr. A. Hodgson, C.M.G.). Amongst those present were:—Sir Robert Rawlinson, C.B., Chief Engineering Inspector of the Local Government Board, and hon. member; Mr. R. Vawser, President (Manchester), Messrs. W. H. White (Oxford), E. Pritchard (Birmingham); F. Ashmead (Bristol), J. Lobley (Hanley), J. Cartwright (Bury), T. Coulthurst (Derby), T. C. Mead (Hornaby), T. Walker (Croydon), J. Gammage (Dudley), G. W. Sadler (Cheltenham), G. Eastlake Thoms (Wolverhampton), E. Purnell (Coventry), J. Mawson (Crompton), R. Godfrey (King's Norton), J. T. Eayres (West Bromwich), A. W. Pritchard (Birmingham), T. T. Allen (Stratford-on-Avon), R. Read (Gloucester), J. Hayne (Buxton), J. Parker (Hereford), J. Mitchell (Hyde), W. H. Gray (Tewkesbury), A. Comber (Kidderminster), J. Mann (Sevenoaks), J. Parkinson (Tarton), W. A. Davis (Aston), J. E. Wilcox (Stratford-on-Avon), A. T. Davis (Stratford-on-Avon), E. J. Purnell, jun. (Kenilworth), — Fiddians (Stourbridge), G. H. Fosbrooke (Medical Officer of Health), F. Ball (Stratford-on-Avon) and G. Law (Kidderminster), contractors, and the following members of the Stratford-on-Avon Town Council:—Aldermen R. Gibbs, E. Gibbs, Bird, Cox, Newton, and Colbourne, and Councillor Flower. After luncheon, the members of the Association adjourned to the Council Chamber of the Town Hall for the purpose of hearing papers read by members on the water and sewage works.

The first paper read was by Mr. J. E. Wilcox, Assoc.-M. Inst. C.E., the resident engineer of the waterworks, on "Stratford-on-Avon Water Supply," and dealt with the preliminary proceedings of the Stratford-on-Avon Town Council in endeavouring to obtain a supply of water for the town, and described in detail the scheme adopted and the works now being carried out, including reservoir, conduit, filter-beds, method of distribution, and cost.

Mr. A. T. Davis, Assoc.-M. Inst. C.E., the Borough Surveyor, read the second paper, on "Stratford-on-Avon Sewerage and Sewage Disposal," dealing with the sewers and drains

now in use, the existence in the town of middens, and the method of flushing and ventilating the sewers, &c. Of sewage disposal, the author commended the scheme adopted, and described the machinery used for lifting the sewage and the mode of treating it upon the land by a combined system of irrigation and filtration, together with details of cost.

In the discussion which followed, Sir Robert Rawlinson took part.

## THE EXTINCTION OF FIRES.

At the meeting of the Society of Arts on Wednesday evening last, Captain Douglas Galton in the chair, Professor Silvanus P. Thompson read a paper on "Apparatus for the Automatic Extinction of Fires." The lecturer, in introducing the subject, enumerated the fires which had taken place in London and the provinces during the present year. In a single season, he said, England had to pay at least 2,000,000*l.* as her fire bill, and she had paid it complacently year by year, with all unreckoned incidental losses, and congratulated herself that the majority of the losses were covered by insurance, as if that made the smallest difference in the long run to the community at large, who practically had to pay for the loss, in the form of higher rates for insurance, and therefore less margins of profit on all manufactures, and even agriculture. Our fire brigades were none the less efficient than before, our engines no less powerful or prompt, our firemen no less heroic. Yet they were powerless to cope with the greatest difficulty of the cases, for the delay by a few minutes which elapsed before the fire brigade arrived was the critical moment, and was the fatal flaw in our system. Nothing but a self-acting or automatic system which would operate at the right moment, and at the very spot without the intervention of any human hand, would meet the case. Modern automatic appliances for the prevention and extinction of fire might be grouped under the heads of automatic sprinklers, automatic fire-door, automatic alarms, and miscellaneous appliances. Foremost and most important of modern appliances stood the automatic sprinkler, which was a species of self-acting valve connected with a system of water pipes placed in the ceiling of a room, which on the outbreak of a fire, opened and distributed water in a shower of spray exactly at the place where the fire broke out. The automatic sprinkler was also usually arranged so that whenever it was called into operation by the heat it sounded an alarm-bell, and summoned aid to the spot. The saving effected in New England alone during the past eight years by the introduction of sprinklers was calculated to amount to about 300,000*l.*, and their use was extending every day. Careful inquiry showed that the introduction of sprinklers reduced the risk of conflagration by fire to less than a twentieth part. This was to say, the loss in England during the past summer and autumn by large fires,—2,000,000*l.*—might have been reduced to 100,000*l.* if sprinklers been fitted in all the establishments which suffered. The earliest suggestion for the automatic distribution of water in a building appeared to have been made in 1806 by John Carey, of London, who took out a patent for "the extinguishment of fires in gentlemen's apartments and warehouses" by means of reservoirs connected by pipes with a rain-water tank, valves weighted to open but held back by a combustible cord being placed near the ceiling so as to burn and turn on the water. Professor Thompson then went on to describe a number of more modern sprinklers which dated from 1870, mostly of American origin, only two being purely of British invention. He argued that sprinklers were generally introduced on the ground of insurance would be reduced to one-twentieth the present rate, which would amply compensate owners for the expense of having the sprinklers fitted.

In the course of the discussion which followed, it was pointed out that in order to ensure the success of the sprinklers the water companies must be reformed.

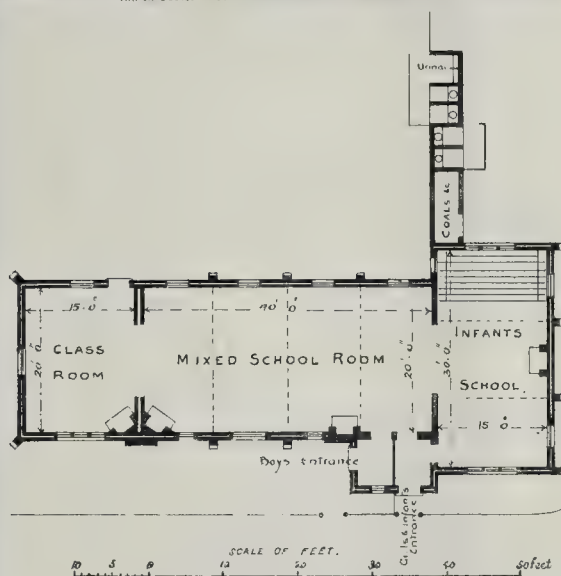
**Falkirk.**—A Munich stained-glass window representing the "Women at the Sepulchre" has just been erected in the Episcopal Church, Falkirk, in memory of Mr. Findlay Anderson. The artists are Messrs. Mayer & Co., of Munich.

\* See Builder, p. 712, ante.





NATIONAL SCHOOL, HYDE, NEAR FORDINGBRIDGE, HANTS.



National School, Hyde, near Fordingbridge.

# NATIONAL SCHOOL, HYDE, NEAR FORDINGBRIDGE, HANTS.

This building, which is now nearing completion, has been erected by Mr. Charles Mitchell, of Woodfalls, Salisbury, whose tender amounted to £4887, which sum was raised by voluntary contributions. The amount of the funds at disposal necessitated the greatest economy in design.

The walls are faced with local red bricks, and all external walls are built hollow with cast-iron ties. Robinson's patent cement has been used as a dado. The ceilings are plastered to underside of rafters, and all woodwork internally is stained and varnished. Boyd's patent hygienic ventilating school grates have been adopted. The main rooms are connected by means of large sliding-doors, so that they can be adapted for public entertainments.

The architect is Mr. Robert J. Beale, R.I.B.A., of London.

**Liverpool.**—A church will shortly be commenced for the Convent of the Good Shepherd, Ford, Liverpool. It will be built from the designs of Messrs. Pugin & Pugin, of London.

## PROPOSED NEW CHARTER FOR THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

SIR,—In a letter from the Manchester Society of Architects, reprinted in the number of the "Proceedings" just issued by the Royal Institute of British Architects containing the Draft Charter, after urging the non-metropolitan Fellows of the Institute to attend on the 30th inst., and vote for the New Charter, it is observed that "it cannot be expected that metropolitan Fellows will themselves vote for the proposed reforms if they find that the parties for whose benefit they are to be made are so indifferent as not to attend."

If you can allow me space for one or two observations which this remark has suggested I shall be very glad.

It is clearly a misconception that the proposed reforms are intended exclusively for the benefit of any one party or parties.

If they take place, and the expected results follow, they will benefit the whole Institute and every member.

Fellows may cease to enjoy certain exclusive privileges, and yet as the senior members of a more active, more energetic, more representa-

tive society than before, they may find themselves in a higher position. It is not with a view to extend in any given direction only, but with a view to possible extension in any direction, that the new and elastic Charter has been drafted. This being so, it appeals to all the Fellows, metropolitan or not, on a higher ground than that of personal interest; and though the country Fellows will be cordially welcomed at the meeting, and will be sorely missed if they do not attend, I, for one, believe that the body of London architects, especially those who have given personal attention to the matter, are possessed by a conviction that the time for action has come, and that they will vote for the measure from a conviction that they are doing the best thing for the profession and the Institute.

Rather more than ten years ago I had the honour to be a member of a committee, which inquired carefully, and came to a series of conclusions, as to measures which would render the Institute more efficient; but half of them could not be carried out because of the provisions of the Charter, and our report was not adopted on the ground that it recommended a revised Charter.

Since then certain improvements, which were possible within the limits of the Charter, have, on the recommendation of another committee, taken place, and I cordially recognise their value, and especially the great importance of the compulsory examination for Associates. But these changes were but limited. Members, both metropolitan and non-metropolitan, have repeatedly urged other changes, which cannot be even considered, because of the provisions of the Charter. We now see reason to hope that this obstacle will disappear, and that a charter so framed as to permit of changes as they become desirable will be obtained. Such an object ought to unite the suffrages of all.

When at a later date individual modifications of our procedure are taken into consideration, I have little doubt but that they will be dealt with considerably, patiently, and fairly by men to whom the profession of architecture is at once a distinction and a livelihood.

More clashing of interests, prejudices, and opinions may, of course, be expected then than now, but there is little cause to apprehend that business men, having but one object in view, will fail to arrive at the readiest and best method of attaining that object.

T. ROGER SMITH.

University College, London.

SIR,—The Institute sent out, some time since, the draft of the proposed new Charter, and invited each member to criticise. I took their advice, and from a careful perusal have come to the conclusion that the Institute is about to ask the Queen in Council to grant a new Charter to enable by-laws to be made. I can see nothing more in it. By-laws, by-laws, is the key-note. Why should not the by-laws and the new Charter be considered and passed concurrently? We have most excellent, as well as most recent, precedent for it. Extension of the franchise and redistribution were passed concurrently, and in what respect does our case differ, except in numbers? The fair assumption is that the by-laws will harmonise with the Charter; but they may not. Then a majority is to decide. That majority may be a small one,—possibly one person. Why not define the majority, and make it two-thirds?

Our professional brothers in Liverpool suggest an amalgamation of all provincial associations with branches throughout the country and head-quarters in London, as a means of raising our professional status. As that is one of the points for which I have recently striven, I hope it will be embodied in the new Charter. Nothing can be more advantageous.

Voting by proxy to members residing in the country, or having their residences distant from London, is a just demand; otherwise distance becomes equivalent to disfranchisement.

The following extracts and remarks on the draft printed in red may possibly justify my summary and conclusions, viz.:—

|                                                                                                                |                                                       |
|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| Paragraph 1, line 4, "Until the by-laws to be prepared before Charter is in accordance with this our Charter." | By-laws should be prepared before Charter is granted. |
| Line 7, "Shall be administered by the Council."                                                                | Shall be administered by the proposed new Council.    |
| Line 8, "With this our Charter."                                                                               | And the by-laws.                                      |



Paragraph 2, line 1, "There shall be five classes."

Paragraph 3, line 3, "Conditions as by-laws may from time to time prescribe."

Line 4, "Expiration of five years."

Paragraph 4, line 1, "Honorary Fellows may be persons."

Paragraph 5, line 1, "Associates shall be persons engaged in the study or practice."

Line 2, "The age of 21 years."

Paragraph 7, line 4, "Archaeologists, or for artistic, scientific, or literary acquirements."

Paragraph 8, "Examinations shall be held."

Paragraph 12, lines 1 and 2, "To decide conclusively respecting each person proposed as a candidate for admission as Fellow."

Paragraph 17, line 5, "Resolution of a general meeting henceforth bevested in and exercisable by the Council."

Paragraphs Nos. 23, 24, 25, 26, and 27.

Paragraph 34, line 1, "The Council shall have full power."

Line 3, "The Royal Institution, including the examinations herein."

There shall be six classes. Students of the Inns of Court are members of the Inn.

As may be prescribed by the by-laws to be afterwards prepared.

Expiration of seven years.

Honorary Fellows may (inter alia) be persons eminent by arts, science, or literature.

Associates shall be persons who have been for, at least, three years engaged in the study or practice.

The age of 24 years.

Archaeologists or distinguished for artistic, scientific, or literary acquirements.

And graduates or students shall be present who have attained the age of at least 18 years.

To decide conclusively and without appeal respecting the admission of each person proposed as a candidate for the office of Fellow.

Majority two-thirds.

Should not a certain number of Associates be on the Council?

The Council constituted as above shall have full power.

Sanction of general meeting. Sec. 37, and read with this.

T. E. KNIGHTLEY.

#### ON CIRCULAR HOSPITAL WARDS.

SIR,—I am glad to find that my amicable controversy with Mr. Snell may prove of some little service.

In his letter (p. 734) he distinctly states that his main contention is really the increased cost of building, and still more "the increased annual charges for nursing and maintenance, when the wards of a hospital are designed to contain twenty in place of thirty beds."

In fact, towards the close of his letter, where he suggests an official inquiry, he writes as though the whole extravagance of 105,000l. . . . per thousand patients had been incurred in each case of "the many hospitals built during the last twenty-five years with wards varying in accommodation from fourteen to twenty patients. . . ."

It thus seems that Mr. Snell's paper (p. 443) was not so much concerned with the minor detail of the shape, as with the much wider question of the size of the ward. It was a powerful contribution to Miss Nightingale's proposal that wards should be constructed for as large a number of patients as one day nurse and one night nurse could supervise.

The circular form of ward came in for rebuke, chiefly because, in his opinion, it could not well accommodate as many as thirty patients.

One other point that carries weight with him is the amount of sunlight.

I at once grant him that when the sun is shining straight against the long wall of a parallelogram ward more sunlight enters the ward than in the case of a circular ward of the same dimensions.

The advantage of sunlight in a ward, so far as the comfort and well-being of the patients is concerned, depends not upon the maximum quantity that may possibly be received, when the sun happens to shine at one particular time, but upon the average amount received during the day. This average amount is indubitably greater in the case of the circular ward, which presents windows directly to the sun whenever it shines. Mr. Snell speaks, too, of the construction of the feet of the beds as a distinct disadvantage in the case of hospitals attached to medical schools. I have had six years of experience of clinical teaching in such hospitals, both where the number of students following the teacher was ten or twelve, and where it exceeded fifty.

In neither case does the constriction seem to me to be of any moment; and when, as in Edinburgh University, our largest medical school, the clinical professor has the larger number to teach, the greater space in the centre of the circular ward would afford a very distinct advantage.

As regards the Antwerp hospital, Captain Falton's remarks at the discussion (p. 600) bear

out the very positive statements of those who have visited the hospital recently, that twenty-four beds are placed in the wards which Mr. Snell's book \* shows were designed for twenty. On page 7 of his pamphlet,† speaking of a circular ward 61 ft. in diameter, Professor Marshall says:—"Such a ward would afford 8 ft. of wall-space for each of twenty-four beds."

Mr. Waddington's calculations (p. 700) show that our circular wards here, 60 ft. in diameter, are not costing more than the parallelogram ones they replace, which could only accommodate twenty beds.

The logical conclusion of the whole matter is surely this, that it is quite legitimate to continue the experiment of circular wards in the case of small hospitals, and in the case of hospitals designed with wards not accommodating more than twenty-four beds. Of course these hospitals are built in opposition to Miss Nightingale's proposal, but, in accordance with the custom followed in the great majority of recently-erected hospitals.

While the cost of building is about equal, the increased annual charges for nursing and maintenance are exactly the same in circular and parallelogram wards.

If practical experience confirms the many theoretical advantages the circular form seems to promise, we may in the future see the system applied to larger wards than those now built; and Mr. Snell may yet have the pleasure of seeing "the main contention" of his powerful paper bear really good fruit, in the erection of circular wards for thirty beds.

JOHN BROWN, F.R.C.S., Eng.

#### SAXON CHURCH AT DEERHURST.

SIR,—Permit me to point out that the probable date of this very interesting relic is somewhat clearly apparent. We know, at Deerhurst, of a monastery, a parish church, an older chapel, and two inscriptions. How are the dates of these items to be synchronised? They run thus:

1. A mutilated inscription ascribed to 685 [Jarrow dedication], 816 [Chelsea Council], these being assumed limitations.
2. A monastic foundation before 804, which was destroyed by Danes.
3. Its re-dedication before 950.
4. The construction of a regal Court or King's Chamber (*aula regis*) 1056, by Duke Oddo (Ashmolean inscription), called a chapel.
5. Alienation of the monastery to St. Denis, 1056-69.
6. Recorded by William of Malmesbury as in ruins, 1125.
7. Its secularisation in 1250.

Shortly, then, the difficulty is this: (a) If the recently-found altar-inscription, dating from 685-816, belongs to the site of the ruined chapel, the latter cannot be the same building constructed by Duke Oddo in 1056. (b) If Duke Oddo did construct a fresh building, *de novo*, would it require two dedicatory inscriptions? Viewing these points, I infer that the recently-discovered chapel is older than any suggestion yet made; of the very early date implied (this slab or tiles arranged like the well-known fragment of the Roman building at Leicester). I should call it an alto-Roman or Byzantine structure, rather than Saxon. Why, after four or six centuries' interval, should Saxon builders revive a Roman style if such art had died out in the interval? If it had not died out, why call it Saxon?

Nov. 21, 1885. A. HALL.

#### A CAUTION TO SPECULATIVE BUILDERS.

At the Greenwich Police Court, on the 19th inst., Thomas Hutchins, a builder, was summoned by Mr. James Tolley, District Surveyor for Sydenham, for not using mortar composed of fresh-burned lime and clean sharp sand or grit, without earthy matter, in the proportions of one of lime to three of sand and grit, in the erection of houses on the south side of Perry Vale, Forest-hill. Samples of the mortar were produced by the District Surveyor, and a portion of the earthy matter used in compounding the same. Defendant called his foreman, and two surveyors to give evidence of the general solidity of the work, but admitted that mould had been used. The defendant stated that, being short of sand, he did have in four loads of top-soil, but that he had cut out the work complained of, and underpinned it solidly in cement.

Mr. Marsham considered the mortar not to be in accordance with the by-laws, and fined the full penalty of 3*l.* and 1*l.* for each day after notice from the District Surveyor.

\* Hospital Construction and Management. J. and A. Churchill.

† On a Circular System of Hospital Wards. Emith, Rider, & Co.

See Builder, p. 713, ante.

#### PROVINCIAL NEWS.

**Ottershaw.**—The Rev. Baron Hitchens, vicar of Ottershaw, and Lord Brabazon, having decided to provide a place of recreation for the above village, held a bazaar in July last for the purpose of getting in funds for the erection of a working-men's club. About 500*l.* was realised after paying expenses, with which to commence the building, the plans of which were prepared by Messrs. Byrne & Wilmot, architects, Windsor, and designed to suit the rural character of the neighbourhood. It having been found impossible to secure the site originally selected, a delay has been caused in carrying out the building, as well as a slight modification in the plans to suit the new site. The cost will be about 900*l.* Mr. Hine, builder, of Thorpe has been selected to carry out the work.

**Saltire.**—As a memorial to the late Sir Titus Salt, and in recognition of his benefaction to Saltire, the Governors of the Salt School have decided to build a new Science and Art School, costing about 6,000*l.* The building will be completely finished by May 15th, of which day will be opened an important exhibition on the lines of the late International Inventions Exhibition. For this purpose the present buildings and a field of six acres will be utilised, the whole being named the "Palace of Delight," in allusion to the ideal institution delineated in Mr. Walter Besant's "All Sorts and Conditions of Men." Accommodation will be provided for over 10,000 people. The probable outlay will be over 15,000*l.* Amongst other exhibits will be the South Kensington Collection and the Prince of Wales's Indian Collection. The grounds already alluded to will be planted and illuminated with the electric light, having fountains similar to those at the Invention Exhibition, illuminated with coloured electric lights. In view of the variable climate, a enormous tent, of the American description, will be put up in the grounds, capable of holding several thousand people. The arrangements and supervision of the lighting and other electrical work, including the contract for the installation and maintenance of the electric light in the buildings and grounds, have been entrusted to Messrs. Woodhouse & Rawson, of London.

#### CHURCH-BUILDING NEWS.

**Orpington.**—The tender of Messrs. John King (Limited) for heating the parish church at Orpington, Kent, with their "small tube apparatus," has been accepted, and the work will be proceeded with, under the direction and superintendence of Mr. St. Pierre Harris, architect.

**Abergorlech (Carmarthenshire).**—The church in this little mountain village probably enjoys till lately the distinction of being the smallest church in the United Kingdom, being only 25 ft. in length and 16 ft. in breadth. It has now been recast entirely, and a 16 ft. by 13 ft. chancel and north vestry added, the total accommodation being raised from fifty-four to eighty. New windows, floors, doors, roofs, and bell-turret have been provided. The wrought-ironwork has been supplied by Messrs. Brawn & Co., of Birmingham; the encaustic tile pavement by Webb's Worcester Tileries Company; and the stone carving has been executed by Mr. Heald, of Cardiff. The general contractor was Mr. Edwin Giles, of Carmarthen, and the architect, Mr. E. H. Lingen Barker, of London, Hereford, and Swansea.

**Blyth.**—The Priory Church of SS. Mary and Martin, Blyth, has lately been re-opened, after restoration, under the superintendence of Mr. C. Hodgson Fowler, architect, Durham. In the course of the work many interesting discoveries were made. The church has its roof screen still remaining, six of the panels retaining figures of saints. Portions of a nave screen have also been found, and further marks of screen work dividing the north aisle into chapels; this is to be again used as a chapel, and the old altar has been put there, while a handsome oak panelled altar has been placed in the parish choir. All screen marks and remains of ancient work, such as a piscina in the south aisle, mural decorations, and many ancient crosses and slabs which have been discovered, have been scrupulously preserved by the architect with loving care, to tell their own tale. The old pew work, dating from 1656, being very good of its kind, has been utilised for wall panelling and for additional benches to the handsome oak



which have been provided. It was found necessary to rebuild several of the buttresses, to almost entirely renew the parish nave, while one of handsome oak, ribbed and paneled, has been erected over the parish porch at the cost of Trinity College, Cambridge, the patrons of the living. The roof of the south porch has also been rebuilt. The wood-work is all oak and the roofs are covered with lead. The church has been re-floored with red blocks, and the chancel in stone and plaster; the building has been fitted with Lindy's hot-air apparatus. Further repairs to the tower are needed, and, altogether, the cost of the restoration will be about 3,000. The contractor for the execution of the works is Mr. T. Woolstan, of Stamford.

**Eppingham.**—The chancel of the parish church of St. Lawrence, Eppingham, has been re-opened, after restoration. The church, consisting of nave, chancel, and transept, with organ-gallery to the west, adjoining the tower, is of considerable antiquity. The south transept is the most recent portion of the building, evidently dating to the twelfth century. The tower is comparatively new, and conspicuous for its want of sympathy with the general structure, having been rebuilt in brickwork after the fall of the original tower and spire, in 1577. The chancel still appears from its construction and the manner in which its walls are united to the east ends of the nave, to have been erected some time after the latter. The floor of the chancel has been paved with Minton's tiles, with no steps rising gradually from the nave to the altar-floor. The east wall, where unsound, has been taken down and rebuilt, and a new window inserted therein. The roof has been raised about 3 ft., and in doing this some traces of a decorative character were discovered on the walls, but the colours were too far gone for the object to be traced. The old oak rafters have been restored and lined with oak boarding, and the intersections. The reredos consists of a canopy in the central full-length figure of our Lord, supported on either side by the four Marys. All these figures are sculptured in alabaster. The whole of the work has been done from the designs and under the supervision of the architect, Mr. William J. Shearn, of Dorking, Mr. Mark Putney being the contractor.

**Andlem.**—The parish church of Andlem has been re-opened, after restoration. The works have been carried out, we are informed by a verbal paper, under the vigilant care of a committee, with the vicar at its head. The Midland Tinsmithery Company, of Birmingham, have executed the works from the designs and under the superintendence of Messrs. Lynam and Hickman, Stoke-upon-Trent, architects. The total cost has been about 2,300, and the accommodation is for about 500 persons. The parquetry of the floor of the sanctuary was provided by Messrs. Howard, and the decorations in colour the chancel and on the pulpit are the work of Mr. C. Powell, both of London.

**Kentish Town.**—The new church for the districts of St. Benet and All Saints, Kentish Town, was consecrated by the Bishop of London on the 31st of October. The nave only is completed at present, with a temporary chancel. The west end has an octagonal baptistery raised on steps, with the windows filled with stained glass, and the arcade formed round the entrance-doors give a complete finish to the west end. The church is well situated at the crown of the hill at the top of the old Margaret-road, with the new parsonage adjoining it. The church when complete will cost 1,000; the contract for the nave was 200.

The architect is Mr. Joseph Peacock, and the builders are Messrs. Kilby & Gayford. The site was given by the Fellows of St. John's College, Cambridge, on whose estate it is built.

**Westbury.**—The parish church of Westbury has been re-opened, after having been repaired. The church is of great antiquity, but although it is fairly large proportions, the plan is only that of a much smaller building, namely, a nave and chancel, the latter having the peculiarity of not being in a line with the nave, but being inclined considerably to the north. All the windows and doors are of the middle of the fourteenth century, and are of great beauty, the windows having some very characteristic tracery, peculiar to the county of Kent; but the walls

have been found to be of much greater antiquity than even the windows inserted in them at the latter period named. The labels have carved terminations done by a sculptor of great ability, for the faces represented are so lifelike as to justify the belief that they are portraits. An abbot is represented on one of these, probably the Abbot of St. Augustine's Priory, Canterbury, to which the church formerly belonged. The chancel arch has corbels supported by two full-length figures in crouched attitudes, carved in a very effective way. The sedilia in the chancel is well known to Kentish antiquaries for its elegant design. This and all the other portions of the ancient work have been carefully preserved. The monuments, too, remain in their old places, and, beyond being cleaned, remain as they were. The new works, which have been considerable, have been confined to the upholding of the fabric and to hand it down strengthened. The foundations have been strengthened, the exhalations from interments have been stopped by the whole of the interior being laid with concrete, and the cold draughts from the decayed roof have been prevented by boarding and felt. The roofs were found to be of open timber, fourteenth-century work, but hidden by plaster ceilings. The latter have been removed, and the ancient roofs are now again visible. The works have been designed and superintended by Mr. E. P. Loftus Brock, F.S.A., architect, of London, and executed by Mr. Wilson, of Canterbury, the cost having been defrayed by subscriptions collected by the Rector, the Rev. J. H. Hughes-Hallett, and some friends. Many gifts have been presented, notably the stained-glass windows on the south side by Mr. Scott, of London, the work having been done by Mr. A. Gibbs. —*Kentish Observer*.

#### RECENT PATENTS. ABSTRACTS OF SPECIFICATIONS.

8,108, Buildings. W. M. Hawkins.

The parts of any structure built of blocks are tied together by rods passing through the blocks. The rods may be fastened by nuts, cotters, or by being bent over the ends. For use in ordinary walls, the holes for the binding-rods are at one-fourth the length of the bricks from the end, and the bricks are so laid that the rods may be obtained from the foundation to the top of the wall. The same invention is also adapted for hollow blocks, as for flues and water-channels. It may also be used for tiled ceilings, and in the construction of arches, sea-walls, and forts.

9,602, Portable Shear-legs. T. Thompson.

Two of the legs have wheels for transportation, which, however, can be readily unshipped by means of a lever. A rope is fixed to the two outside legs, while the main or third leg has an arrangement by means of which, when it is desired to bring them together, the lower extremities are drawn in by means of a cord passed round the pulleys, and worked by the winch, which is used for hoisting loads.

13,314, Glazing. W. & W. R. Lester.

The glass is secured upon a wooden sash-bar by a strip of lead held by a lath or bar, composed of sheet metal, bent into a channel form, screwed to the sash-bar. Between the centre and edge of the sash-bar water grooves are cut. These grooves may be extended towards the centre, and thus form a single central groove. The lead strip and the lath admit of slight variations for different circumstances.

13,824, Mosaics and Mosaic Tablets. E. Grab.

Honeycombed moulds or beds to receive the tesserae or reticulated frames are made of plaster of Paris, paper pulp, or of metal. To form the moulds the design is drawn full size on a suitable material, such as soap, wood, clay, or gypsum, and is then engraved to a depth depending on the thickness of the tesserae; the walls of the cells of the finished moulds appearing as recesses. When the moulds are not intended permanently to form a portion of the completed article, a sheet of paper or linen is caused to adhere to the coloured tesserae for the purpose of removing them and placing them in the position they are destined to occupy; a cement is then employed to fix them. When it is desired to reproduce ancient Roman mosaics, the original is tinted, and sheets of wet blotting-paper laid over it, by which a tinted impression is obtained. Plaster of Paris is then poured over the surface of the impression and, when set, is engraved so that a mould may be cast from it, as in the first case. Instead of the tesserae being coloured before being set, they may be put into the mould uncoloured. In this case the clay is mixed with a carbonaceous substance, and is burned after being set. Colour is applied to the now porous material, and it is then returned. Cheap mosaic patterns are produced by impressing and cutting plates of clay while plastic;

a pattern thus produced may be used as a matrix for casting moulds or beds similar to those before referred to. Translucent mosaic tablets are produced by pressing a mould made, as before described, into a freshly-rolled plate of glass while yet soft.

14,567, Roof Windows. G. Connell.

Roof windows are made of cast metal, either in one piece, or several bolted together. Dormer windows, with straight and curved fronts, suitable for any slope of roof, are made under this specification.

15,726, Facing Brick Walls. W. D. Cliff.

Glazed bricks, of half the usual width, are employed, in addition to those of the usual size. The object is to economise the facing bricks by enabling a thin facing to be used, but to still maintain a good bond with all the rest of the work. All the bricks on both faces of the wall are laid as stretchers, the bond being obtained by laying the courses of bricks of different widths.

#### NEW APPLICATIONS FOR PATENTS.

Nov. 13.—13,840, Hunter and Brown, Cement Concrete Blocks.—13,877, G. Bremner, Manufacture of Paint.—13,891, J. Freeman, Improved White Pigment.

Nov. 14.—13,595, Vaughan and Gooch, Attaching Door Knobs to Spindles.—13,598, Vaughan and Gooch, Locks and Latches.—13,599, T. Goldsmith, Improved Screw.—13,921, W. Ryan, Soldering Iron.—13,934, W. Lake, Manufacture of Lead Pipe.

Nov. 16.—13,945, J. Hill, Apparatus for Opening Fanlights and Casements.—13,958, T. Cleather and Others, Kitchen or Room Firegrate.—13,968, H. Thompson, Improvements in Grates and Stoves.—13,982, W. Richards, Production of Metallic Zinc.

Nov. 17.—14,023, T. Paxton, Attaching Door Knobs to Spindles.—14,029, Weber and Lennon, Counterbalancing Window Sashes.—14,042, W. Hulse, Planing Machines.—14,060, W. Cliff, Manufacture of Water-closets.—14,064, H. Mather, Manufacture of Cement and Lime.—14,065, E. Robbins, Improved Tesserae or Mosaic Material.

Nov. 18.—14,100, E. D'Eve, Cowl for Smoky Chimneys.—14,113, J. Honeyman, Improvements in Ventilators.—14,116, W. Rowe, Improvements in Water-closets.—14,127, M. Oppermann, Apparatus for Producing Window Glass.—14,128, J. Spence, Manufacture of Paint.—14,134, W. Wood, Apparatus for Soldering, Brazing, and Welding.

Nov. 19.—14,151, A. & C. Childs, Raising and Lowering Windows, Shutters, &c.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

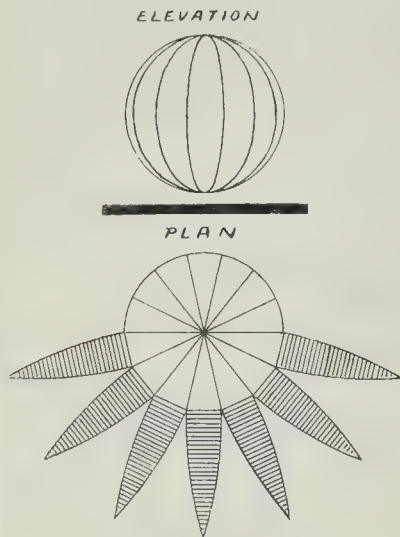
11,547, Radford & Litchfield, Sprigless Door-latch.—11,821, M. Bousfield, Perforated Fire-clay Bottom for Ranges and Stoves.—12,068, F. Armstrong, Inspection Openings for Drains.—12,383, A. Ponton, Manufacture of Artificial Stones and Concrete.—12,662, J. Greenwood, Automatic Disinfecting Apparatus.—12,704, H. Marle, Improvements in Set Squares.—13,086, E. Morris, Improvements in Sanitary Pans, &c.—13,130, J. Deeley, Water-closet and Urinal Pans or Basins.—13,220, J. Buzard, Fastenings for Trap Doors, &c.—13,239, J. Thomas, Fire and Burglar Alarm.—7,264, H. Vine, Improved Water-closet.—12,191, A. Clark, Improvements in Window-sash Holders.—12,539, W. Merryweather, Indicating the Occupation of Rooms or Closets.—12,725, H. Blythe, Bricks to avoid Side and End Straight Joints.—12,858, T. Robinson, Counter-blocks and Cutters for Wood-working Machinery.—12,884, C. Elliott, Tops for Chimneys, Ventilators, &c.—12,974, J. Cotsworth, Improved Sash Fastener.—13,045, E. Edwards, Improved Folding Ladder.—13,079, J. Tucker, Weather Bar for Doors and Windows.—13,115, J. Taylor and Others, Manufacture of White Lead.—13,159, J. Pointon, Anti-rolling and Anti-corrosive Paints and Compositions.—13,308, J. Donald, Paving Streets and Roads.—13,406, W. Richards, Improvements in Sliding Gasoliers.

#### COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

16,781, J. Walker, Improvements in Window-sash Fasteners.—1,003, S. Meacock, Indicating the Occupation of Rooms, Closets, &c.—1,214, P. Gray, Apparatus for Facilitating the Ascent of Factory and other Chimneys for Repairs, &c.—5,403, A. Rollason, Pipe Couplings and Connections.—12,285 and 12,286, D. Ferguson, Improvements in Water-meters.—12,351, H. Wiesen, Manufacture of Bricks.—1,408, T. Amor, Improvements in Water-closets.—1,589, A. Roberts, Apparatus for distributing Sand, &c.—12,458, E. Preston, Improvements in Spoke-shaves, Planes, and other similar Tools.—12,553, H. Haddon, Improved Water-meters.

**Obituary.**—Mr. Rawlinson Parkinson, District Surveyor of the Western Division of the City of London, and of the detached portion of Clerkenwell, near Muswell-hill, died on Saturday last, the 21st inst., in his seventy-fourth year. Mr. Parkinson was appointed to both districts in the year 1844, and was consequently one of the oldest District Surveyors in point of standing. Mr. Parkinson met with an accident a short time ago, from which he never recovered.



DEVELOPED GORES

Fig. 203.

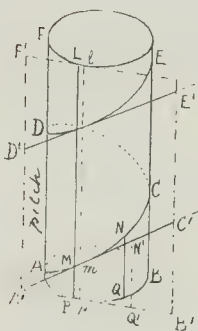


Fig. 205.

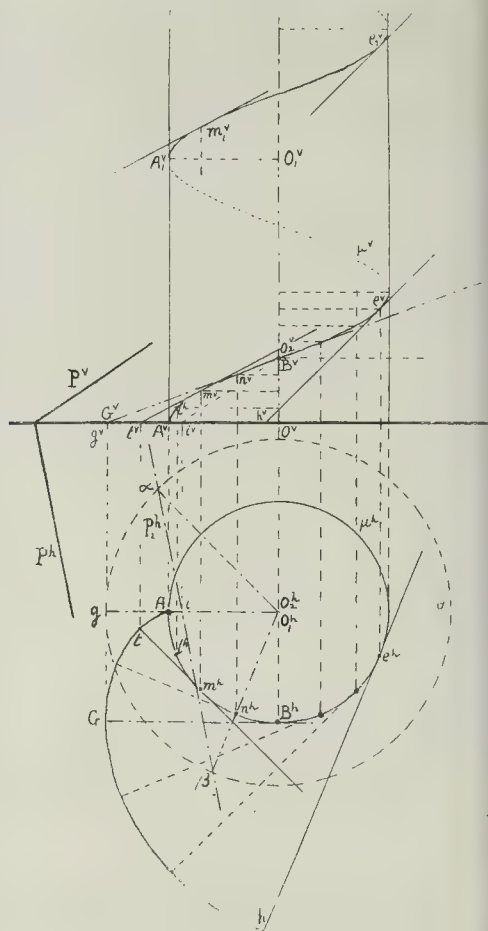


Fig. 206.

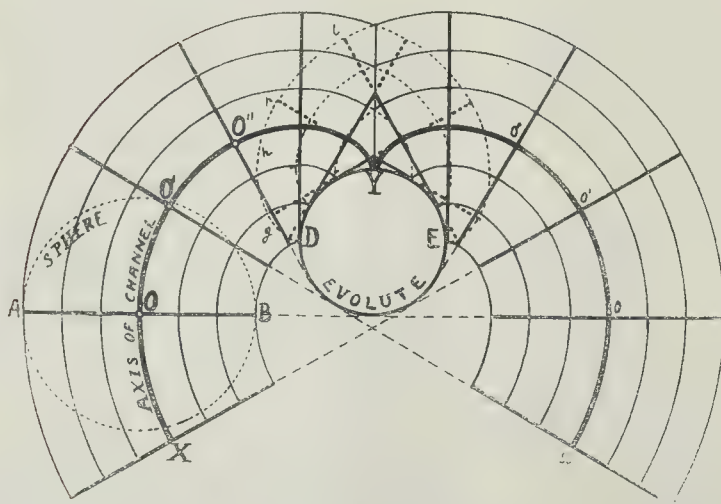


Fig. 201.

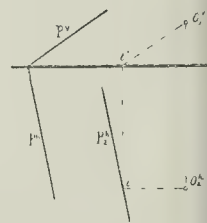


Fig. 207.



# The Student's Column.

## DESCRIPTIVE GEOMETRY.—PART II.

XXVI.

Continue our remarks on enveloping surfaces: a surface of revolution can also be considered as the enveloping face of a revolving cylinder. If we take (fig. 199) the meridian Y D F of the face to be the base of a right cylinder, we rotate that cylinder round the axis Z, it is evident that the cylinder will successively touch every meridian of the face of revolution. Upon this mode of operation, the staves of a cask are portions of cylinder, the rotation of which would generate a surface of the cask. In the same way, we also construct a near approach to a sphere developing the slices of the sphere (fig. 203) joined between two neighbouring meridians, if these slices were portions of a generating cylinder. This last development of the sphere, which is called in *gores*, is to be used when drawing the ribs or caissons of a cupola; whereas development in conic zones is more suitable for the formation of centres, moulds, and the like of spherical vaults.

**Channel Surfaces** (fig. 204).—Imagine a sphere in motion of fixed radius OA, the centre of which follows the spiral curve XOY, of which the circle seen in the figure is the evolute, an enveloping surface to that sphere will be a channel surface.

If we take two neighbouring positions of the sphere, such as those which have their centres O and O', we shall find that the two spheres will intersect one another along a circle the plane of which will be perpendicular to the plane of the chord OO'. But, when O' is infinitely near to O, the chord OO' coincides with the tangent to the spiral curve, and we conclude that the intersection of the neighbouring spheres is a main circle of the sphere the plane of which is normal to the curve. In our drawing the plane of that circle is projected on a straight line AB. We can, therefore, consider this channel surface as engendered by a circle AB, the centre of which moves along the spiral line XOY, and the plane of which remains always normal to that curve. In other words, the channel has a curvilinear axis, and all sections perpendicular to that axis will be circles of equal radius. A section of this kind is called a characteristic section of the channel. The characteristic section of the waste-pipes, even where there are bends and siphon traps, is a circular section; but the characteristic section of sewers is an egg-shaped curve, more pointed low than above.

In our drawing (fig. 204), as the axis of the channel happens to be the two branches of a spiral, with its point of retrogression in Y, the plane of the channel will be in two sheets separated by a sharp aris of retrogression.

To make this clear, consider that when the characteristic circle moves along to generate the channel, the plane of the characteristic will remain tangent to a cylinder of which the evolute of the spiral is the base (the student remembers that all normals to a curve are tangent to its evolute). As the plane of the characteristic moves along, it rolls, therefore, on the evolute cylinder, and at last the point B of the characteristic circle itself will come and touch the evolute in D; then, as the plane rolls a further, the point will describe a spiral curve, which p q t, inside the first part of the channel already formed. The two curves described by the point B are branches of a spiral with a point of retrogression in D; in the same way, every point of the characteristic circle will describe in space a horizontal spiral; then will such the evolute cylinder and recoil back in describing the other branch of the spiral. We can conclude, therefore, that the curve formed by all these successive points of contact with the evolute cylinder is a sharp aris of retrogression to the channel surface itself.

The aris of retrogression is formed by all the points of the characteristic circle coming in contact with the evolute cylinder from D to E, and can be obtained by cutting the circle out in paper and pasting it on the surface of the cylinder.

From this example we can see that aris of retrogression are not only found in developable surfaces but also in enveloping surfaces.

## THE HELIX AND THE DEVELOPABLE HELICOID.

We have already seen that a helix is a curve drawn on a cylinder which is transformed in a straight line when the cylinder is developed. Let A' C' (fig. 205) be the transformed helix A C, and let A' B' be the transformed base A B of the cylinder; we have for the different points of the line A' C' the following proportions  $M P : N Q :: A' C' : C' B'$  and, as the heights of the different points of the transformed helix are equal to their heights on the helix itself, we can conclude that there is a fixed proportion between the height of any point of the helix and the length of the base (we call base of the helix that portion of the base of the cylinder comprised between the starting-point of the helix and the plan of the point considered). For instance, if  $M P = \frac{3}{4} A P$ , then  $N Q = \frac{3}{4} A Q$  . . . and so on.

When the helix has gone completely round the cylinder, it reaches a point D exactly above its starting-point A; the height A D is called the pitch of the helix.

In fig. 205 we see that A' C' has the infinitely small element M m in common with the original helix; A' C' is, therefore, the tangent to the helix in the point M, and we conclude that the tangent to the helix in any given point is contained in the plane tangent to the cylinder in that point, and we conclude also that all tangents to a helix meet the plane of the base under the same angle which is equal to the angle C' A' B' formed by A' C' the transformed helix with A' B' the transformed base.

It follows, therefore, that to find the tangent to a helix in the point M, we need only construct in the tangent plane to the cylinder a rectangular triangle M P A', the side M P being the height of the point M above the base, and the side A' P being equal to the length of the base A B. The third side A M is the tangent required.

We see also by our figure that all the tangents to the helix form with the generators of the cylinder the same angle equal to L M A'.

In fig. 206 we have constructed the projections of a helix as follows (to distinguish some important points we have marked them in this figure by capitals). Let A' A'' be the pitch of the helix; we divide that height in sixteen parts, and we divide also the circumference of the base in sixteen parts; we draw verticals upon every division  $l^m m^m n^m$  . . . of the base, and where these verticals meet horizontals from every corresponding part of the pitch we have the joints  $l^m m^m n^m$  . . . of the elevation of the helix. The curve delineated on the elevation is called a sinusoid. The plan of the helix is, of course, the base of the cylinder.

The tangent to the helix in any point, m, will have its plan tangent to the base in  $m^m$ ; its foot t, or the point where the tangent penetrates the plane of the base, will be obtained by making  $m^m t$  equal to the length of the arc A m'; the elevation of the tangent will be the line t' m'.

From the above we can see that if we draw the tangents to a series of points, l m n . . . of the helix, the foot of these tangents will all be on the spiral A t G h . . . involute of the base.

The surface formed by the successive tangents to all the points of the helix is called the developable helicoid, and the spiral involute, A t G h . . . is the trace or section of the developable helicoid by the plane of the base.

Being given a helix (fig. 206), draw to this curve a tangent parallel to a plane, P, the traces of which, P<sup>h</sup> and P<sup>v</sup>, are given.

We have seen that all the tangents to a helix form the same angle with the vertical generators of the cylinder, and, therefore, we can say that every tangent is parallel to some generator of a cone of revolution, the generators of which form the same angle with the vertical axis.

The tangent BG will give, on the elevation, the inclination of the tangents. Now, if from a point, O<sub>g</sub>, on the axis we draw a line, O<sub>g</sub>g, parallel to BG, and make it revolve round the axis, the line O<sub>g</sub>g will describe the cone we have spoken of above; the base of that cone will be a circle of radius, O<sub>g</sub>g. If through the point O<sub>g</sub> we take a plane, P<sub>g</sub>, parallel to the plane P given, the plane P<sub>g</sub> will cut the cone along two generators, O<sub>g</sub>a and O<sub>g</sub>β; and these are the generators of the cone to which the required tangents must be parallel. The tangent mt is parallel to the generator O<sub>g</sub>a, and the tangent

sh is parallel to the generator O<sub>g</sub>β; these are the tangents required on one wind of the helix, but there are other tangents just above them in every other wind of the helix which also satisfy the question.

The reader might, perhaps, think that the tangent m'β on plan is the plan of a parallel to the generator O<sub>g</sub>a, but, on examining the elevation, he will find that the inclination of that tangent is in a contrary direction to the generator.

For those who may have forgotten how to produce through a given point, O<sub>g</sub>, a plane, P<sub>g</sub>, parallel to a given plane, P, we show the construction in fig. 207. O<sub>g</sub>β is made parallel to P<sup>v</sup> and through the point β we take P<sub>g</sub> parallel to P<sup>h</sup>.

The helicoid formed by the successive tangents to a helix is a developable surface comprising two sheets, and the helix is an aris of retrogression of that surface; for we have seen before that surfaces formed by the successive tangents to skew curves are developable, and that the directing curve forms the aris of retrogression of these surfaces.

This is the only developable helicoid; other helicoids, such as the soffit of winding-stairs, are not developable, and belong to the category of skew surfaces, the properties of which we shall study immediately after this.

## STAINED GLASS.

**Westminster.**—The aim of the design in the Siemens Memorial Window, which has just been put up in Westminster Abbey, is to set forth the Sanctity of Labour, illustrating the maxim, "Laborare est orare." The treatment of the work comprises a series of groups, representing respectively workers in Science, Art, and Manual Labour. In the left hand of the two lights, which, together with the sixfoil in the tracery, form the window, are composed three panels, in vertical order. In these appear the ironsmiths, chemists, and agriculturists. In the second light, groups in corresponding positions show astronomers, artists, and the professor and his scholars. Between these groups are, in all cases, angels bearing labels inscribed with the words giving the keynote of the conception, viz., "Laborare est orare." In the sixfoil at the head of the window is a representation of the sun as the source of light to us, surrounded by the words, "Dixit autem Deus, fiant luminaria in firmamento coeli," and by the various heavenly bodies from which light emanates or is reflected. This passage of the design has special reference to the researches of the eminent genius to whom the memorial is dedicated, and whose portrait occurs in the figure of the Professor with his pupils in the lowermost group in the right-hand light. At the base line of all is the following inscription:—"In Memory of Charles William Siemens, Knt., D.C.L., LL.D., F.R.S., Civil Engineer, born 4th April, 1823; died 19th November, 1883. Erected as a tribute of respect by his brother Engineers." The artistic treatment of the work may be described as generally in harmony with the architectural style of the Abbey. On the other hand, its entire freedom from close antiquarianism reconciles its effect with the significance of the subject-matter and the spirit of our own times. The window was designed and executed by Messrs. Clayton & Bell, under the direction of Mr. J. L. Pearson, R.A., architect.

**Bedford.**—A stained-glass window, erected as a memorial of the late Col. Fred. Burnaby in St. Peter's Church, Bedford, was unveiled by Lady Isabella Whitbread last week. The window consists of four lights and tracery, and is in the Decorated style of Gothic architecture. The subject, which is carried through the four main lights, illustrates the passage from Isaiah ii. 4, "They shall beat their swords into plowshares, and their spears into pruning-hooks." It is surmounted by architectural canopies, with bases of the same character. In the bases of the two centre lights the Burnaby family arms and the armorial bearings of the Royal Horse Guards are depicted, while in those of the side lights, angels holding inscribed scrolls are introduced. At the foot of the window is the following inscription:—"Erected by the Town and County of Bedford, in memory of Col. Burnaby, born in this parish. Fell at Abou Klea, Jan. 17, 1885." The window has been designed and executed by Messrs. A. L. Moore & Co., of 89, Southampton-row, London, at a cost of 250l.



RECENT SALES OF PROPERTY.  
ESTATE EXCHANGE REPORT.

|                                                                                                                       |        |
|-----------------------------------------------------------------------------------------------------------------------|--------|
| Nov. 13.                                                                                                              |        |
| Brighton—33, Market-street, freehold .....                                                                            | £1,560 |
| Nov. 14.                                                                                                              |        |
| By DOWSETT & WOODS.                                                                                                   |        |
| Hove, Brighton—50, Church-road, freehold .....                                                                        | 2,700  |
| Nov. 16.                                                                                                              |        |
| By C. W. DAVIES.                                                                                                      |        |
| Islington—18, 19, and 21, Goldsmith-place, 16 years ground-rent 9l. ....                                              | 405    |
| By TOWERS, WILLIAMSON, & ELLIS.                                                                                       |        |
| Kew—49 and 51, The Avenue, 92 years, ground-rent 12l. ....                                                            | 1,100  |
| Maida Vale—38, Sutherland-gardens, 73 years, ground-rent 10l. ....                                                    | 700    |
| By MURRELL & SCOBELL.                                                                                                 |        |
| Kingland—124, High-street, 64 years, ground-rent 7l. 13s. 6d. ....                                                    | 1,100  |
| By Mr. CHAMPNESS.                                                                                                     |        |
| Remford—Ground-rent, 30l. a year, reversion in 46 years .....                                                         | 740    |
| By G. A. WILKINSON.                                                                                                   |        |
| Clapton—6, Queen's Down-road, freehold .....                                                                          | 900    |
| High-road—Copyhold house and shop .....                                                                               | 1,165  |
| 179, 182 to 188 even, Clarence-road, copyhold .....                                                                   | 3,370  |
| 7 and 8, Queen's Down-road, freehold .....                                                                            | 1,520  |
| Nov. 17.                                                                                                              |        |
| By S. R. BUNT.                                                                                                        |        |
| West Smithfield—37, 39, and 41, St. John-street, and 39, 39, and 40, St. John's-lane, 9 years, ground-rent 123l. .... | 450    |
| By BEAN, BURNETT, & ELDRIDGE.                                                                                         |        |
| Fulham—17 to 23 odd, Chesselton-road, 85 years, ground-rent 32l. ....                                                 | 1,130  |
| Bedford Park—3, Hogarth-road, 59 years, ground-rent 13l. ....                                                         | 675    |
| Nov. 18.                                                                                                              |        |
| By JAMES SCOTT.                                                                                                       |        |
| Kensington—36, Palace Gardens-terrace, 67 years, ground-rent 16l. ....                                                | 1,800  |
| By FURBER, PAICE, & FURBER.                                                                                           |        |
| King's-cross—44 and 35, Argyle-square, 69 years, ground-rent 14l. ....                                                | 1,560  |
| By ALFRED WHITE.                                                                                                      |        |
| Edgeware-road—3, Hardington-street, and 6, 7, and 8, Chapel-place, 31 years, no ground-rent .....                     | 570    |
| Hyde Park—37, Connaught-square, 37 years, ground-rent 7l. 12s. ....                                                   | 860    |
| Harrow-road—21, Desborough-place, 72 years, ground-rent 12l. 13s. ....                                                | 500    |
| Shepherd's Bush—185, Goldhawk-road, 63 years, ground-rent 5l. 8s. ....                                                | 500    |
| By E. & S. SMITH.                                                                                                     |        |
| Clerkenwell—32, Granville-square, 68 years, ground-rent 9l. ....                                                      | 650    |
| Hackney 24, Down's Park-road, 75 years, ground-rent 6l. 6s. ....                                                      | 215    |
| By A. G. OLLBY.                                                                                                       |        |
| Marylebone—9 to 17 odd, Capland-street, 38 years, ground-rent 23l. ....                                               | 835    |
| 32, Capland-street, 38 years, ground-rent 10l. ....                                                                   | 450    |
| 11, Upper Boston-street, 23 years, ground-rent 5l. 8s. ....                                                           | 265    |
| Ground-rent 16l. 1s. 10m 23 years .....                                                                               | 205    |
| By W. A. BLACKMORE.                                                                                                   |        |
| Westminster—7, St. Ann's-street, and 1, St. Ann's-court, 42 years, no ground-rent .....                               | 265    |
| By C. P. WHITLEY.                                                                                                     |        |
| Chelsea—4 and 6, Radnor-street, 55 years, ground-rent 12l. 10s. ....                                                  | 700    |
| 3 and 4, Oakham-street, 23 years, ground-rent 7l. ....                                                                | 125    |
| By INMAN, SHARP, & HARRINGTON.                                                                                        |        |
| Finsbury Park—The New Sluice House Tavern, freehold .....                                                             | 3,450  |
| Soho, Church-street—The Coach and Horse, freehold .....                                                               | 2,650  |
| City-road—Ground-rents, 32l. 11s., reversion in 17 years .....                                                        | 1,485  |
| Kensington—Ground-rents 83l. 6s., reversion in 81 years .....                                                         | 2,340  |
| Pekham Grove—Ground-rents 6l., reversion in 82 years .....                                                            | 118    |
| Thornton Heath—Ground-rents 30l., reversion in 79 years .....                                                         | 700    |
| Ground-rents 63l. 4s., reversion in 79 years .....                                                                    | 1,360  |
| Gray's Inn-road—Freehold rental of 4l. 4s. 4d. per annum .....                                                        | 1,360  |
| Pekham—The Golden Anchor, and six houses, 73 years, ground-rent 30l. ....                                             | 1,250  |
| Battersea—The Beaufoy Arms, 60 years, ground-rent 38l. ....                                                           | 420    |
| Shadwell—The Albion, and two cottages, 52 years, ground-rent 63l. ....                                                | 1,310  |
| Nov. 19.                                                                                                              |        |
| By H. S. WOODOCK.                                                                                                     |        |
| Clapham—132, Larkhall-lane, and a ground-rent of 20l. 9s., 29 years, ground-rent 1s. ....                             | 270    |
| By BALL, NORRIS, & HADLEY.                                                                                            |        |
| Ramegate—12 and 13, Osborne Villas, 80 years, ground-rent 12l. ....                                                   | 420    |
| By NORRIS, TAYLOR, WATNEY, & CO.                                                                                      |        |
| Lincoln's Inn Fields—No. 44, freehold, area 6,000 feet .....                                                          | 12,700 |
| Camden-square—3, The Terrace, 77 years, ground-rent 0l. ....                                                          | 810    |
| By NEWBOLD & HARRINGTON.                                                                                              |        |
| Islington—21, Hardage-street, 46 years, ground-rent 8l. ....                                                          | 350    |
| 68, Moreton-road, 97 years, ground-rent 7l. ....                                                                      | 390    |
| Hornsey, Tottenham—The lease of the Laurels, term 18 years .....                                                      | 25     |
| Stoke Newington—81, Rectory-road, 90 years, ground-rent 7l. ....                                                      | 390    |
| 5, Alden-terrace, freehold .....                                                                                      | 750    |
| Islington—14 to 17, Madras-place, 10 years, ground-rent 68l. 12s. ....                                                | 130    |
| Nov. 20.                                                                                                              |        |
| By W. H. S. GILBERT & CO.                                                                                             |        |
| Notting Hill—6, Blechynden-street, 97 years, ground-rent, 7l. ....                                                    | 320    |

## MEETINGS.

|                                                                                                                                                                                                                                                              |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| MONDAY, NOVEMBER 30.                                                                                                                                                                                                                                         |  |
| Royal Institute of British Architects.—Special General Meeting to consider draft of proposed new Charter. Seven p.m.                                                                                                                                         |  |
| London Institution.—Mr. J. E. Hodgson, R.A., on "The Life and Works of Hogarth." 5 p.m.                                                                                                                                                                      |  |
| Architectural Section, Philosophical Society of Glasgow.—Mr. H. A. Mavor on "The Electric Light as Applied to Industrial and Domestic Purposes." 8 p.m.                                                                                                      |  |
| TUESDAY, DECEMBER 1.                                                                                                                                                                                                                                         |  |
| Institution of Civil Engineers.—Discussion on Mr. John Ince's paper on "High-Speed Motors" and on Mr. G. B. Kapp's paper on "Continuous-current Dynamo-Electric Machines, and their Engines." 8 p.m.                                                         |  |
| Society of Biblical Archaeology.—8 p.m.                                                                                                                                                                                                                      |  |
| WEDNESDAY, DECEMBER 2.                                                                                                                                                                                                                                       |  |
| Civil and Mechanical Engineers' Society.—Opening Address by the President (Mr. H. Michell Whitley). 7 p.m.                                                                                                                                                   |  |
| Society of Arts.—Mr. F. Edward Hulme on "Technical Art Teaching." 8 p.m.                                                                                                                                                                                     |  |
| British Archaeological Association.—(1) The Rev. Prebendary Seath "On a Monumental Stone with Greek hexameter lines at Brough." (2) Mr. Thomas Morgan "On the Recent Congress at Brighton." 8 p.m.                                                           |  |
| South Kensington Museum (Lecture Theatre).—Miss J. E. Harrison on "The Mythology of the Iliad as illustrated by Greek Vase Paintings." (V.) 5.15 p.m.                                                                                                        |  |
| Builders' Foremen and Clerks of Works' Institute.—Ordinary Meeting. 8.30 p.m.                                                                                                                                                                                |  |
| THURSDAY, DECEMBER 3.                                                                                                                                                                                                                                        |  |
| Society of Antiquaries.—(1) The Rev. H. M. Seath on "The Roman Villa at Yatton." (2) Mr. R. S. Ferguson on "A Roman inscribed Stone from Northumberland." 8.30 p.m.                                                                                          |  |
| Royal Archaeological Institute.—Mr. R. P. Pullen on "Excavations in Asia Minor." 4 p.m.                                                                                                                                                                      |  |
| Edinburgh Architectural Association.—Lord Deane of Guild Govans on "The Maintenance of the Health of the People and the Beauty of the City." 8.30 p.m.                                                                                                       |  |
| FRIDAY, DECEMBER 4.                                                                                                                                                                                                                                          |  |
| Architectural Association.—Mr. G. Blagrove on "The Ventilation of Private Dwellings." 7.30 p.m.                                                                                                                                                              |  |
| Institution of Civil Engineers (Students' Meeting).—(1) Mr. M. Fitzmaurice on "The Foundations of the Forth Bridge." (2) Mr. E. W. Moir on "The Building, Launching, and Sinking of the Queensferry Pneumatic Caissons at the Forth Bridge Works." 7.30 p.m. |  |
| University College.—Professor C. Newton, C.B., on "Greek Myths illustrated by Etruscan Vases and other Monuments." 11. 4 p.m.                                                                                                                                |  |
| SATURDAY, DECEMBER 5.                                                                                                                                                                                                                                        |  |
| Association of Public Sanitary Inspectors.—Mr. W. Middleweek on "The Dwellings, Habits, and Over-crowding of the Poor in the Metropolis." 6.30 p.m.                                                                                                          |  |

## Miscellaneous.

**A Cylindrical Jail.**—A new jail of a peculiar construction has just been completed at Omaha (United States). It is of iron, and cylindrical in form, the cells being arranged round it. The cylinder revolves round its axis in such a manner that only one cell is at the opening at any one time. It is three stories high, there being ten cells on each floor. Its weight is 45 tons, and this ponderous weight is hung from above, instead of turning on a track below. The great cylinder can be turned by a simple crank with little power, a man moving it readily with his hand. It is the intention to have a small water motor in the basement, and then by simply moving a lever the cylinder will be set rotating. It is suggested that, when there are prisoners who, it is feared, may be trying to cut out the cylinder can, by a motor, be easily kept moving slowly all night, so that prisoners do not remain long enough in one place to do any mischief, or even to crawl out if they had made a partial break. Prisoners would thus have little chance for escape from this new jail. A cage of iron bars completely surrounds the cylinder in which the cells are. The entrance on each floor is guarded by two doors. The officer standing outside does not have to unlock even the first door, but can swing the cylinder round until the cell appears in which is the desired prisoner, and then, by a simple movement, the inner door is opened, and the prisoner can step out of his cell. Then the officer can open the outer door, and let the man out; but the other prisoners are beyond any possible reach of the officer, and it is impossible for them to break out while he is taking a man out or putting another one in. He can control any number of men in the same way, and they cannot get within reach of him until he chooses to let them.—*Iron.*

**Rebuilding the Guildhall.**—The plans for the re-arrangement of the Guildhall have been considered by the sub-committee to whom the work was referred. It has been decided to commence operations next year, but before anything further can be done an additional grant of money will have to be obtained from the Court of Common Council to meet the outlay beyond the original estimate. As at present arranged, the plans will have been finally settled, and quantities and contracts obtained, to commence the work in August next year.—*City Press.*

**Edinburgh Architectural Association.**—The fortnightly meeting of this Association which held in the Professional Hall, George-street, last week. The President, Mr. Washington Brown occupied the chair. After the usual preliminary business had been disposed of, Mr. George Waterston, jun., read a paper on "Book Ornament," in which he pointed out matters, artistic and technical, which he thought worthy of intelligent study by all who would achieve success as designers. The paper was illustrated by a collection of specimens of typography, printer's ornament, and bookbinding, showing the characteristic styles of the various periods and nationalities from the fifteenth century to the end of the eighteenth century. The connection of the architects and artists in Italy, Germany, and France with the principles of the Renaissance period was shown, and study of their work recommended. The study of this work of modern designers and modern printers in colour, and black and white was also recommended, to the end that the possibilities of modern technical appliances and processes might be understood and taken advantage of for modern design. A vote of thanks to the lecturer concluded the proceedings.

**Royal School of Mines.**—In continuing his lectures in the Theatre of the Geologic Museum, Jermyn-street, Professor Warrington Smyth, F.R.S., dwelt at length upon the manner in which are frequently resorted to by the unscrupulous in issuing a prospectus describing the thickness of a lode from measurements taken perpendicularly through a lode which is obliquely, which is obviously unsatisfactory. He regarded with suspicion every mention of recovery in regard to mines. Much capital has been spent in fruitless attempts of this kind, and yet arguments of the most plausible nature may frequently be met with, which ultimately led to the re-opening of abandoned workings. He referred to a comparatively recent case in Cornwall, where 250,000 tons, was uselessly sunk that way. Speaking of the irregularity of deposition, where a series of faults have brought portions of the same bed to the surface several times, he commented upon the opportunities which such a case would offer to the adventurer who might easily have his statements confirmed by the unsuspecting inspector. Some years ago a great disappointment was experienced in Ireland, because a dislocation of this kind had not been observed, and the interested ones realised, in consequence, half their anticipations. A curious exception to the general rule observed in faults, has occurred at Radstock in the Somersetshire coal-field, where the beds have been forced up an inclined plane, probably by powerful lateral pressure. Generally, the occurrence of a fault leaves an interval without mineral; but, in this case, the bed is actually doubled. The method resorted to for ascertaining the direction in which to search for a displaced bed is to observe, while standing upon the other bed, whether the fault falls from out towards you; in the former case it must be sought for downwards, and in the latter upwards. The amount of displacement may be very considerable, sometimes amounting to 1,000 feet, and except the general character of the faults of the district, there is no recognised rule for obtaining it.

**Wandsworth.**—The new Unitarian Christian Church at East-hill, Wandsworth, has been dedicated. It stands on a site covering some 4,300 superficial feet. It is built in red brick with red brick mouldings and stone dressings, and is Early English in style. The plan is simple nave, without aisles. Internally the chapel is fitted in pitch-pine, and a dado of the same material lines the walls. The floor of wood blocks laid diagonally on concrete. Heating has been carried out by Messrs. Jones & Sons by a system of hot-water pipes, and careful provision has been made by Tobin tubes for inlet ventilation and a large power of extraction by louvers in the roof. The roof is covered with Broseley tiles of the mullerian tint. The seating is in pitch-pine, and has not been attached to the floor. There is still enough of the site left to allow of a schoolroom being erected hereafter, if such is found to be necessary. The building was designed by Messrs. J. Chatfield Clarke & Son, of Bishopsgate-street. The builders were Messrs. Searchfield & Son, of Clapham. The foreman of the works was Mr. E. Cole. The building includes a chapel to accommodate 350 persons, vestry, kitchen, offices, &c. For the present, school accommodation is provided for dividing off a space by curtains.



ENFIELD.—For re-erection of stores, &c., at Enfield for Messrs. End, Cooke, & Co. Mr. John Hudson, architect, Leman-street:—

|                                       |      |   |   |
|---------------------------------------|------|---|---|
| John Bentley, Waltham Abbey .....     | £787 | 0 | 0 |
| W. Watson, Ilford .....               | 749  | 0 | 0 |
| L. & W. D. Patman, Keffield .....     | 728  | 0 | 0 |
| A. Eaton & Co., Whitechapel .....     | 685  | 0 | 0 |
| Cousell Bros., Bethnal Green .....    | 685  | 0 | 0 |
| J. & H. Cooke, Mile End (accepted)... | £47  | 0 | 0 |



**HACKNEY.**—For the erection of villa at Wells-street, Hackney—  
 Kilby & Gayford ..... £685 0 0  
 Smith & Sons ..... 647 0 0  
 Hooper ..... 580 0 0  
 Faulkner ..... 568 0 0  
 Mower ..... 510 0 0  
 Beale ..... 495 0 0

**HAMPSTEAD.**—For completing two villas in the Derrington-road for Mr. H. Thornton. Quantities supplied—  
 Mathers, Brixton ..... £260 10 0  
 Cox, Balham ..... 740 0 0  
 Carter, Brompton ..... 750 0 0  
 Johnson, Greenwich ..... 684 10 0  
 W. Castle, Nunhead Green (accepted) ..... 683 10 0  
 R. Snell, Greenwich ..... 684 0 0

**HIGHGATE.**—For the erection of a Presbyterian Church of England Church at Highgate, for the Building Committee. Messrs. Potts, Sulman, & Hennings, architects, Furnival's Inn, E.C. Quantities by Messrs. Barber, Borsall, & Barber, Buckingham-street, Adelphi, W.C.—  
 Massey & Son ..... £2,050 0 0  
 Dove Bros. .... 7,720 0 0  
 J. Chessum ..... 7,610 0 0  
 Bowyer ..... 7,401 0 0  
 B. E. Nightingale ..... 7,327 0 0  
 L. H. & R. Roberts ..... 7,246 0 0  
 Mattock Bros. .... 7,178 0 0  
 J. Outhwaite & Son ..... 7,086 0 0  
 Thos. Wootter Smith & Son ..... 6,700 0 0

**KILBURN.**—For premises at Kilburn and West Hampstead. Mr. R. D. Hanson, architect—  
 Allen & Sons (accepted) ..... £1,229 0 0

**LAMBETH.**—For rebuilding the Windmill Tavern, High-street, Lambeth. Mr. F. J. Bedle, architect—  
 Holloway ..... £2,498 0 0  
 R. M. Priestley ..... 2,298 0 0  
 W. Smith ..... 2,274 0 0  
 W. & J. Crocker ..... 2,259 0 0  
 Spencer ..... 2,250 0 0  
 Jackson & Todd ..... 2,159 0 0

**LONDON.**—For additional basement at new offices, &c., Rolls Buildings, Fetter-lane, for the London Parcels Delivery Co., Limited. Mr. W. Seckham Witherington, architect, Mark-lane. Quantities by Mr. Edward J. Thomas, Mark-lane—  
 Patman & Fotheringham (accepted) ..... £1,034 0 0

**LONDON.**—For alterations to Marquis of Angleses, Devonshire-street, Lisson-grove. Mr. F. J. Bedle, architect—  
 Wilkinson Bros. .... £321 15 0  
 Jackson & Todd ..... 293 0 0

**MILE END.**—For the erection of new Casual Wards, &c., at the Mile End Old Town Workhouse, for the Guardians of the Hamlet of Mile End Old Town. Mr. J. M. Knight, architect. Quantities by Messrs. Storer & Sons—  
 Tozer ..... £6,215 15 0  
 Hack ..... 5,598 0 0  
 Staines & Son ..... 5,454 0 0  
 Mowlen & Co. .... 5,293 0 0  
 Godfrey & Son ..... 5,093 0 0  
 Braid ..... 4,960 0 0  
 Jerrard ..... 4,939 0 0  
 Johnson ..... 4,971 0 0  
 Hearle & Son ..... 4,873 0 0  
 J. R. Hunt ..... 4,858 0 0  
 Gentry ..... 4,853 0 0  
 H. B. Little ..... 4,760 0 0  
 Nightingale ..... 4,735 0 0  
 William Wood, Chislehurst ..... 4,599 0 0

**ORTOX (Kent).**—For the erection of hotel at Ortox. Mr. A. Stenning, architect, Cannon-street. Quantities by Mr. W. B. Brown, Henrietta-street, Covent Garden—  
 Joslyn ..... £2,393 0 0  
 Lawrence ..... 2,050 0 0  
 Loveland ..... 2,036 0 0  
 Crossley ..... 2,020 0 0  
 Nightingale ..... 1,979 0 0  
 Worsell ..... 1,945 0 0  
 Outhwaite ..... 1,844 0 0  
 Saby & Sons ..... 1,947 0 0  
 Dartnell ..... 1,777 0 0  
 Marsland, Chislehurst ..... 1,760 0 0

**PORLOCK (Somerset).**—For new villa residence for Mrs. Beckett. Mr. E. T. H. Wood, architect, Wellington. Quantities by Mr. B. W. Pope, Broad-street, Bristol—  
 Pearso & Son, Minchhead ..... £1,235 15 11  
 Durke, Ilfracombe ..... 1,195 0 0  
 Poole, Ilminster ..... 1,029 0 0  
 Morse, Taunton ..... 938 10 0

**SHADWELL.**—For reinstating warehouse after fire, Dennis-street, Shadwell, for Messrs. Apfel Bros.—  
 J. Howlett, Limehouse (accepted) ..... £180 0 0  
 [No competition.]

**STAINES.**—For new house, stables, and premises, for Mr. Willett, veterinary surgeon, High-street, Staines. Mr. Ralph Pitt, architect, Staines. No quantities—  
 Burchell, Bedford ..... 2725 0 0  
 Reavell, Staines ..... 699 0 0  
 Bone, Staines ..... 623 0 0  
 " (amended tender accepted) ..... 593 0 0

**WORTHING.**—For the erection of a house and shop in Chapel-road, Worthing, for Mr. W. Frost. Mr. Restia W. Moore, architect—  
 W. H. Newell ..... £230 0 0  
 A. G. Wright (accepted) ..... 775 0 0

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our Office, 46, Catherine-street, W.C., not later than four p.m. on THURSDAYS.

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F. Bros.—H. H. R. Brooklyn.—A. H.—F. G. D.—A. H. (tracing and MS. received).—J. B.—A. H.—H. H.—F. E. M. (the position is certainly an odd one, but your letter is not suitable for publication).—B. J. L. and M.—A. D. S.—J. P. (below our mark).—J. F. B. (will reply by letter).—G. B. P. (ditto).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

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WESTWOOD GROUND,  
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# The Builder.

Vol. XLIX. No. 2335.

SATURDAY, DECEMBER 5, 1885.

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### The Institute and its Charter.



As we predicted, there was an unusually large gathering of members and an unusually animated meeting at the Institute Rooms on Monday night, the attendance being augmented by the presence of a considerable number of provincial members who do not usually attend the meetings, and who came up especially to vote in support of the proposed new Charter and of the reformed by-laws, which, it is now understood by a kind of common consent, are to follow its adoption, and one object of which will be to give more direct opportunity to country members to take part in the management and policy of the Institute, by some system of voting by proxy or by letter. The Associate members, who are also led to expect an extension of their privileges as a result of the new Charter, also attended in considerable force. We do not imply, however, that either class of members were actuated in the main by a desire to look after their own interests merely; in fact, a distinct disclaimer of any such narrow view was made on their behalf in the course of the evening. This does not quite accord with the tone which some of the provincial members have employed in regard to the Institute and its Council lately, in papers read at meetings and in circulars sent round in their districts; but, on the whole, we believe there was a feeling that whatever movement rendered the Institute of Architects a more general and a more popular representative body must tend to strengthen its hands, and, by consequence, those of the profession generally, in regard to professional status and practice; and the main body of the Associate members, by the mouth of their chosen spokesman, Mr. Richards Julian, have shown themselves very loyal in spirit, and desirous to cordially support the Council in a general scheme of reform, without pressing too closely questions of detail. For all this, the adoption of the Charter was not carried, but only its relegation to a special committee for further consideration. This result was mainly due to the speech of Professor Kerr, who had, as we mentioned, given notice of a resolution objecting to the draft Charter generally, in order to secure its further consideration; and who may be congratulated, not only on having carried his point, but on having made a very witty and amusing speech, and imported a great deal of entertainment into what might otherwise have been a dull business discussion.

Without going into all the details of proceedings of a meeting which was nominally not a public one, we may take occasion to make one or two remarks on the subject of discussion. We do not think the result of the meeting is to be regretted; the matter in hand has to be settled definitely for some time to come; "a century" was the precise period named by two or three speakers, and apparently accepted by the meeting; after which period we suppose history may be expected to repeat itself. But we by no means concur in all the destructive criticism of Professor Kerr, amusing as it was to listen to, nor do we believe the provincial members would have been so much impressed by it as they apparently were, had they been aware of the learned Professor's peculiar aptitude for exhibiting the negative side of everything, which may be said to have been displayed, with more or less humour and effect, in regard to nearly every proposition that has been made in that room for a good many years back.

The reasons why a new Charter is proposed to be asked for were stated clearly, though at some unnecessary length, by Mr. Cole A. Adams, who moved the resolution "That this meeting do now proceed to consider the terms of the proposed Charter with a view to its adoption," and the real reasons resolve themselves into two. First, that when the original Charter was drawn up it was evidently contemplated that the Fellows would be the bulk of the Society, and the Associates only an additional but not numerous class; in short, it was a small affair then, of few members, and most of them men of some standing, and not young beginners. Under those circumstances it was natural enough that the Associate class should not have a vote. They were merely hangers on, not a part of the main body. At the present moment they are much the largest class numerically, and a large proportion of the revenue of the Institute comes out of their pockets. Accordingly, they demand power of voting equally with the Fellows, and it is apparently tacitly agreed that this power they ought to and are to have, with certain restrictions, as soon as the ground is cleared for fresh by-laws. That is the argument; upon which we have a word to say just now. Then it was pointed out by Mr. Adams that when the Charter laid down that members were to vote personally only—"members present,"—the Institute was practically a metropolitan body, most of the architects of repute then living in London; whereas now there were members all over the country, paying the same subscription as town members, yet having practically no power to take part in or influence the concerns or the action of the Institute by the expression of their opinions at the meetings.

This last argument seems to us unanswerable; indeed, we can only wonder that provincial members have gone on paying their subscriptions uncomplainingly, or, at all events, without open and seditious complaint, for so long. If the Institute is really to represent the architects of the nation, and not of London only, it is absolutely imperative that its by-laws should be so revised as to give the provincial members a practical power at the meetings, instead of a mere shadow of membership; and this revision the old Charter leaves no power for. In regard to the other matter, the demand of the Associates for voting power without restriction (for that is what they say they ought to have), there are one or two words to be said. We should like to know how many Associates there are who are in a position to become Fellows, and who have not availed themselves of that privilege, and with what possible reason these gentlemen can claim to be put practically in exactly the same position as Fellows, while only paying the Associates' subscription? That is exactly what it comes to. The Council have intimated their readiness to give the Associates votes on all points except the passing of by-laws and the election of Fellows; and though the Associates have expressed themselves generally as content to accept this for the present, more than one of them intimated at the meeting on Monday that they still claimed equal votes on these points also. The claim is absurd. A good many of the Associates are men acting as assistants to architects in practice; it is not likely that they are to be given the power to vote upon the election of their principals as Fellows. The claim is perfectly unreasonable, and if the Council of the Institute ever give way to what may be called popular clamour so far as to grant this demand they will be lowering the whole status of the Institute. Equally absurd was the protest of an Associate, printed along with other notices that were circulated at the meeting, against "the arrangements by which Associates have no voice in determining the terms of the proposed Charter, or of the By-laws which are to be framed under it." The Council have no power to grant them any voice in it, for the simple reason that the old Charter is in force until the new one comes into operation, and its terms leave the Council no power to grant such a demand, if they wished it ever so much. The notice ought not to have been printed at all. To these comments we must add another, and a disagreeable one to be obliged to make. Although, as we have said, the main body of the Associates, who made Mr. Julian their spokesman, have behaved in a loyal and temperate spirit, the conduct of some of the members of this class at the meeting, in



making noisy interruptions, and even hissing when a proposal was made that a certain matter should be "left in the hands of the Council," offered plain proof that there are some among that body who are totally unfit to have the degree of power conferred on them which they ask for, and that even to give them a vote in any of the business of the Institute is a very doubtful policy. One of the Associate members remarked to us some time ago, "I would much rather be without the power of voting myself, than see it conferred upon some of the members of the Associate class": a view of the matter which we commend to the serious consideration of the Fellows.

In regard to Professor Kerr's attack on the proposed form of Charter, his first charge was that the new Charter did not recite the claims of the art of architecture in the same "noble language" as the original one, viz., that it is "an art esteemed and encouraged in all enlightened nations as tending greatly to promote the convenience of citizens and the public improvement and embellishment of towns and cities." The simple and obvious fact is that such a grandiloquent setting forth of the objects and importance of architecture is out of place and out of date; every one admits it: it was included in the old Charter at a time when architecture was not honoured or thought of as it now is, and when some such reasoning might have been thought suitable or necessary as a justification of the then novel step of granting a Charter for the incorporation of a Society of Architects. No one wants to be told that now; and a statement of the kind would simply have been unnecessary verbiage. The real point of Professor Kerr's objections lay in his remarks in regard to the unnecessary detail of many of the clauses, which included matters which would be more properly left to be dealt with and settled under by-laws. In this we think he was quite right, and the recommitment of the Charter will give an opportunity, we hope, for considering and pruning it, and rendering it what, as Professor Kerr truly says, a Charter ought to be, a document settling broad principles and leaving details to by-laws. Circumstances are constantly changing, both in the profession itself and in its relation to the public, and a Charter should be so drawn as to be as permanent a document as possible, in order to remain undisturbed as long as possible, and take all minor changes under its provisions in the more elastic and manageable form of by-laws. So far we concur in his criticism, and we think it well that the meeting accepted it and agreed to reconsider the form of the Charter. This reconsideration is to be entrusted to the Council, assisted by some independent members, who, after much discussion, were finally selected by the meeting, or, at least, the list of names formally approved by them. The members selected were Professor Kerr, Mr. Papworth, Mr. Ridge, Mr. Gough, Mr. Aldridge (President of the Liverpool Architectural Society), Mr. Holden (President of the Manchester Society), from the class of Fellows; Mr. Julian and Mr. Pink from that of Associates; and Col. Prendergast as representing the Honorary Associates. There was an endeavour on the part of the meeting to carry a vote that this combined committee should have power to deal with new by-laws and present them to the meeting at the same time, but this was negated by a small majority, on the ground that if that were done we should only have the same result next time the draft Charter was submitted to a general meeting, that the meeting would be unable to get through the subject in an evening, and there would ensue another relegation to another committee.

The draft Charter as submitted last Monday, it may be observed, differs in some particulars, slight in words but important in bearing, from the draft printed in red, which was circulated a few months ago. The principal difference is that the expression, "the Institute" has been substituted for "the Council" in two or three places, the "rubric" draft having been, probably through oversight, framed far too much as if the Council were an irresponsible body. There is a clause in the present draft which

errs in this sense, clause 35, which specifies that "the exercise of all powers exercisable by the Council shall be subject to the control of general meetings, but so that any act not expressly prohibited by the terms of this our Charter or of the by-laws made thereunder done by the Council before any resolution of a general meeting shall not be invalidated by any such resolution." A more absurd and unmeaning clause it would be difficult to imagine, and if the Council really had the assistance of an experienced counsel in drawing up the terms of the Charter, it is difficult to understand what the legal mind was about when that clause came to be framed. It is absolutely contradictory in terms; worse than contradictory, it is immoral. It states in effect that the Council are subject to the control of the general meetings, that is to say, of the Institute at large; but if they are only sharp enough to steal a march on the general meeting, and pass any measure they wish, or take any step before consulting a general meeting, the latter loses its power to interfere! Perhaps that is intended as a bait to the Council, to keep them wide-awake. It would be difficult to find any other excuse for it. There is another proposition which seems absurd in a Charter, and that is the clause providing for the naming in the Charter of the first President, the First Vice-President, and the first Members of the Council. What has a Charter, in the first place, to do with the appointment of individuals to offices? Its function is to name what the offices are and define their powers, not to appoint the men to fill them; and, in addition to that consideration, this formal proposition to appoint the first President, Vice-President, and Council under the new Charter looks, as Professor Kerr happily remarked, very like "apostolical succession." Other matters in the draft form are obviously out of place in a Charter, but the appointing of the individual men who are to hold office is out of place even in a by-law.


In regard to other propositions which came in a desultory way before the meeting (the proceedings whereat were by no means very regular) was the proposal made, on the part of Mr. Aldridge, that the question should now be considered of amalgamating all provincial societies with the Royal Institute of Architects as one central body; and a proposition or resolution also stood in his name that a clause be inserted in the proposed Charter to give power to effect such an amalgamation whenever it may be deemed advisable. One special reason which he gave was that provincial architects did not see why they should belong to two societies,—could not conveniently do so in all cases,—and they felt it incumbent on them to support their local society first. No resolution was actually put, however, and no vote taken on this point, which was too large a matter to be considered at the moment. It may be well, perhaps (if it be possible so to do), to frame the terms of the Charter so as not to exclude the possibility of such a union; but there is something to be said on both sides in regard to the idea. It may be that not all the existing provincial societies are formed on lines which would suit the Institute principles. There is one society even in London which most certainly could not be accepted by or amalgamated with the Institute. The President of this same Society had a number of propositions down to a somewhat similar effect, including also provisions "that the draft charter be amended, and provision made for the reception of all *bona fide* architects"; and also, that "the Charter should provide for three classes of professional members,"—"(a) Associates whose only qualification shall be that they are architects, and honourable men; (b) members, who shall be the present class of Associates; (c) Fellows." As the present class of Associates are simply architects, the conclusion is that they are to be distinguished from class *a* as not being "honourable men." What is the hidden and sinister meaning of the reference to *bona fide* architects, we have been unable to make out, and the author of this remarkable set of propositions did not enlighten the meeting on the subject. A number of suggestions of verbal

alterations made by Mr. Edwin T. Hall, one of the younger Fellows of the Institute, though not formally brought forward at the meeting, have nearly all, we believe, been adopted, or are intended to be adopted, by the Council, and the emendations testify to Mr. Hall's businesslike tone of mind and careful consideration of the subject.

Now that the subject has been partly ventilated and sent to a new committee, we may express a hope that the said committee will not let the grass grow under its heels. The more restless spirits among the provincial architects who have demanded reforms have constantly brought it up against the Institute that it promises a great deal and performs nothing. The not passing of the Charter last Monday cannot be laid at the door of the Institute officials, as it was the whole house which passed the resolution to "re-commit the Bill." But, if action is not prompt with it, the patience of provincial members, who are at present rather eager on the subject and desirous to work with the Council, will be again exhausted, and we shall hear again the old complaint that the Institute never does anything, but only talks of doing it: a complaint which in times past has certainly not been made without foundation. There is an opportunity to give a great impulse to the usefulness and influence of the central associated body of architects; let it not be lost through any unnecessary delay and procrastination.

#### THE PROPORTION OF THE HUMAN FIGURE.\*

BY CHARLES ROBERTS, F.R.C.S.

 THE recovery of many antique statues, and their preservation in our museums, and the numerous reproductions of them in plaster, has rendered the study of human proportions on the lines of Classical and Renaissance times of little interest to us, as we find in these antiques models of perfection which are rarely met with in nature, and to which most of the old formulae may be applied, or from the measurement of which new ones may be constructed. Of the more recent and useful *memoria technica* of this kind is the triangular diagram (fig. 1) constructed by Gibson, the sculptor, the application of which is very simple when its details have been properly mastered.†

The principal objection to all these empiric and artistic methods of determining the proportion of the body is that they apply only to the adult or mature form of the body, and have been deduced from a too limited range of observation. The proportion between the head, the foot, or the hand, and the other parts of the body differ at different ages, and under different conditions of life. In the infant, for instance, the head forms a fourth, and not the seventh or eighth part of the stature, as in the adult; and similar irregularities occur in all other standards derived from portions of the body: hence the necessity and importance of establishing the proportions of the bodily frame for each sex, age, and condition of life, by some method which applies equally to all of these conditions,—in short, by actual measurement with instruments of great precision. This is the scientific method known by the name of anthropometry. This method consists of the accumulation of a large number of measurements of every measurable part of the body as it exists under the different conditions referred to, and eliciting the *mean* or typical form,—the central or common form of Reynolds,—by striking averages, and thus eliminating by "reiterated experience," the "blemishes and defects" which Reynolds tells us are associated with all the objects which nature exhibits to our view. By this means "we correct nature by herself, her imperfect state by her more perfect, and make out an abstract idea of form more perfect than any one original." The only difference between Reynolds's method and the scientific method is that Reynolds trusts to "an eye long used to

\* Continued from p. 743, ante.

† For a description of this diagram, see Bonomi's "Proportion of the Human Figure," p. 11.



the comparison of human forms" and the scientist to his instruments, to find out what a set of objects of the same kind have in common, and what each of them wants in particular. The scientific method fully confirms Reynolds's statement that there is one general form which belongs to the human kind at large, and several classes which might be characterised as the Apollo, the Gladiator, and the Hercules types, if we were not afraid to use such a high-sounding classification.\*

But the science of anthropometry does not embrace the whole of Reynolds's theory of proportion. There are subtle qualities about

subject. But since the publication of "The Origin of Species" few persons can be found who believe that the human body was developed on geometrical plans, however much it may seem to conform to them, and they must be abandoned. The theory of proportion propounded by Zeising, of Berlin, appears to me, as far as I have been able to examine it, to be deserving of more attention than it has received in this country, and it is the more interesting, as it is equally applicable to architecture and other objects of art and nature as to the human form. Zeising's rule of proportion may be rendered thus: "If the division of a whole, made up of unequal parts, appear pro-

portional, the smaller part must be in the same relation to the larger that the larger is to the whole; or, in other words, the whole must be to the larger part in the same ratio that the larger is to the lesser." The above simple diagrams (fig. 2) will illustrate the application of the rule of division of a line into proportional parts, and their subdivision into smaller parts with similar proportions. The divisions are effected under the geometrical rule of extreme and mean ratio.

We shall be better able to understand the law if we take one of Zeising's examples of its application to the human form. First, with respect to the entire body. The most natural

division of its application to the draped as well as the undraped human form. Ladies' dress reformers, and especially those who pretend to some anatomical knowledge, commit a grave error when they attempt to compare the rigid, rounded form of the nude antique statue, with the limp ever-changing forms of the draped figure, and argue therefrom the one should be accepted as the model for the other. No such general comparison is possible, and all that is possible or necessary is that Zeising's rule of proportion should be adhered to in the natural division and sub-division of the stature.

The set of figures (fig. 3) show the parts of the draped figure which correspond with

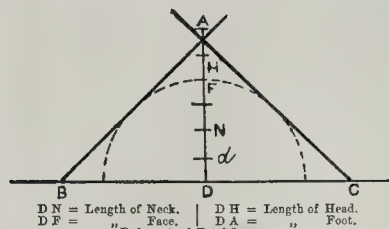


Fig. 1.

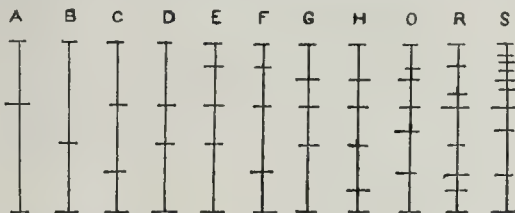


Fig. 2.

beautiful human forms which the measuring-rod and callipers cannot gauge, and which can be determined only by the eye and the conception which it excites in the mind. This is what I have already referred to as the quality so highly developed in the Greeks as the mental faculty of proportion. It was by a "glance of the eye," "the eye long used to the comparison of forms," that they were able to excel the Egyptian sculptors, and to supersede their mechanical methods, and it is no doubt the same faculty which determines the good or bad work of artists and sculptors of our own day. Many efforts have been made, both in Renaissance and modern times, to

formulate systems which would interpret this faculty of proportion chiefly on geometrical lines, like those of Story and Hay,† whose works are well known to all students of this

division of the body into two parts is to divide it through the umbilicus or waist, then the larger portion will be the lower part. Now, if we take the entire height, say, of the Apollo Belvidere as 1,000, the part below the navel is 618, and the upper part 382, and as 382 (the smaller part) is to 618 (the larger part), so is 618 (the larger part) to 1,000 (the whole); or, as 1,000 is to 618, so is 618 to 382. Again, the law applies to the head, if we make the division on a line with the eyebrows. The proportion for the whole head of the Apollo is 146 (the total stature being 1,000), and the face is represented by 90, and the part above the eyebrows by 56. The law shows that the entire arm bears the same proportion to the forearm (the division being at the elbow) that the forearm (the larger portion) does to the

upper arm. The whole limb is 438, the forearm and hand being 271, and the upper arm 167. The hand follows the same rule, if we make the division at the knuckles; the fingers are 39, and the remainder of the hand 24,—the total length being 63. In the lower extremity the same relative proportions exist (the division being at the knee), the whole limb being 382, the upper portion is 236, and the lower 146. Lastly, the foot being 90, the larger portion equals 56 and the smaller 34. Those who desire to know more of the application of this law of proportion must consult Zeising's interesting work,\* but as an example of its practical character I will give an illustration of its application to the draped as well as the undraped human form. Ladies' dress reformers, and especially those who pretend to some anatomical knowledge, commit a grave error when they attempt to compare the rigid, rounded form of the nude antique statue, with the limp ever-changing forms of the draped figure, and argue therefrom the one should be accepted as the model for the other. No such general comparison is possible, and all that is possible or necessary is that Zeising's rule of proportion should be adhered to in the natural division and sub-division of the stature.

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the proportional divisions on the antique statue,† and which require to be emphasised; namely, the waist (or rather the projection of the hips), the knees, the shoulders, and the top of the head. The waist (*pace* the dress reformer) marks the primary division, as in the above diagram (A), and in the statue and Figs. A' and F'. If this division is disregarded the proportions must be reversed, and the secondary division at the knees must be made the primary division (diagram B) and be emphasised either by a short skirt, as in

\* Neue Lehre von den Proportionen des Menschlichen Körpers, &c. Von Dr. A. Zeising. Leipzig: 1864.

† In designing these figures I used the statue as a lay-figure to hang modern drapery on, but the artist has improved on my plan and represented them as human figures. The waist of the statue is a little too small, and that of the next figure a little too large.

\* For further details of the scientific method of studying the proportions of the human figure I must refer the student to Quatrefol's "Anthropometrie," and my own "Anthropometry."

† Hay's theory is that a form is beautiful when the space which it encloses can be analysed into angles which bear proportions to each other analogous to those which subsist between the notes of music. The basis of harmony is, that when sounds mingle agreeably, the vibrations of which they are severally composed bear such relation to each other as is capable of a very simple numerical expression. Thus the octave is 2 to 1, the dominant 2 to 3, the mediant 4 to 5. All the harmonies are composed of whole numbers in relation to the unit, as 2, 3, 4, 5, &c. These harmonies again correspond to the points or nodes at which a string in vibration spontaneously divides itself. See the "Geometric Beauty of the Human Figure Defined," &c., by D. R. Hay.



young girls, or by tightening the long skirt about the knees, as was the fashion a few years ago, and as represented by Figs. B' and C'. It must be borne in mind, however, that the squeezing in of the waist by tight-lacing will not produce the proportional effect, as Zeising's law requires that the rounding of the hips must be in the position represented by the values 613 to 387, or very nearly in the proportion of three for the lower and two for the upper part of the body. Differences of stature in adults are chiefly dependent on the length of the lower limbs, and the reason why tall women generally look graceful and short ones often do not, is due to the fact that the primary division in the latter is too near the centre of the body; and this disproportion is often further increased by the wearing of tall hats, under the mistaken notion that it adds to the apparent stature of short persons, while, in truth, it removes the waist, or primary division, still nearer the centre of the figure. It is obvious, moreover, that tight-lacing, which is often resorted to (unconsciously, no doubt) by persons of short stature as a remedy for this defect, is no remedy at all, but renders a defect more conspicuous, which otherwise might not be noticed. Art is therefore in accord with science in discrediting tight-lacing. Tall persons have no need for it, and short ones are disfigured by it, and it is always injurious to health.

The literature relating to the proportions of the human figure is very voluminous, and I have collected references to no less than 190 works and essays, from the time of Pliny downwards. The subject is of as much importance from a physiological and sanitary as from an æsthetic point of view; but in this aspect it will be of little interest for the readers of this journal, and I must therefore omit any reference to it.

#### NOTES.

**T**HE three competition designs for the Liverpool Cathedral, by Messrs. James Brooks, Bodley & Garner, and W. Emerson respectively, were sent off from London, we believe, on Saturday. They will make, when exhibited together, as we have no doubt they will be, a fine show, and one which will reflect credit on the energy as well as the architectural ability of the competitors, who have all produced their drawings with a completeness and effect worthy of so great an occasion as the building of a cathedral for one of the largest and most influential cities in the kingdom. We have had the pleasure of seeing all the designs; but, in compliance with the wish of two at least of the competitors, we decline to say anything about them until they become public property by exhibition.

**T**HE recently-decided case of the Metropolitan Board of Works v. Nathan must not be regarded as laying down a precedent. The question there simply was whether an entrance-way from Emmett-street to some blocks of artisans' dwellings was a street within the meaning of the Metropolis Management and Building Act Amendment Act, 1882, section 8. As we understand the case, there were originally warehouses on the site of the dwellings, and such warehouses were approached by an entrance 10ft. in width, and had a yard beyond it. When the dwellings were erected there was a covered archway and a courtyard, which was said by the Board of Works to be a street. The judges, in deciding that this was not a street, took care not to give any definition of the word, explaining that what was a street was a question of fact. This courtyard was used for the sole purpose of entering these dwellings, and the public had no right there at all; therefore it may not be unreasonable to say that, at any rate, one of the elements of a street is that there shall be a public right of way therein. Of course a way may be a street which is a *cul-de-sac*, and therefore a public right of way through a roadway is not essential. From time to time difficulties of this kind must necessarily arise in regard to Acts of Parliament which are not very precise.

**T**HE Governors of the Charterhouse have given notice of their intention to introduce a Bill into Parliament to enable them to sell, exchange, and dispose of or grant building or other leases of the remaining portion of the Charterhouse, to remove buildings and to dispose of the materials, and to apply the proceeds of any sale or rents to confirm leases already granted. It is also proposed to repeal so much as may be necessary of the Act affecting the Hospital passed in the third year of the reign of King Charles I. and the Act 30 & 31 Vict., chap. 8. This is, in fact, the death-knell of one of the most interesting groups of buildings in London, the Charterhouse of the old Carthusian monks, of Sutton, of the Dukes of Norfolk, of Thackeray. It is proposed to remove the charity from London, and to drive a new street through the grounds from Charterhouse-square to Clerkenwell-road. Howard House, which was formerly the residence of the Dukes of Norfolk, and the fine dining-hall of the poor brethren, are proposed to be spared. The scheme has been for a long time in preparation, and the plea for the destruction of the Charterhouse is the insufficiency of the income of the Charity estate.

**W**ITHIN six months no fewer than twenty-seven workmen have lost their lives whilst engaged in constructing the new and extensive Croton aqueduct, at New York, which was commenced in May last. In spite of this, it is maintained that every precaution had been taken for the safety of the workmen. There have likewise been upwards of thirty-five other accidents, which, though more or less serious, have not resulted in actual loss of life. American critics regard this list of casualties as comparatively small, since they say there are not less than 10,000 men employed on the works daily. Our Yankee cousins are, however, in the habit of taking such calamities much more coolly than is usual on this side of the Atlantic.

**A** NEW YORK scientific journal gives an account of some experiments recently made as to the explosive character of carbon dust; a matter of no little importance with reference to those fatal explosions which are, unfortunately, but too common in all bituminous coal-mines. The explosive action which is known to be rendered possible by the admixture of ordinary coal gas with atmospheric air depends, as matter of proportion to some extent, on the chemical condition of the gas so mixed. Thus, according to German experiments, atmospheric air forms an explosive mixture with 6·7 per cent. of its volume of Munich gas, but is non-explosive with 6·25 per cent. of the same. With Karlsruhe gas, again, mixtures were unflammable up to 7·5 per cent. of gas. When, however, charcoal dust is mixed with gas and with atmospheric air, ignition takes place much more rapidly; and in certain proportions, the law of which it is most important clearly to ascertain, spontaneous combustion is said to occur. With a mixture of from 3·5 to 7 parts in volume per cent. the whole mass rapidly takes fire on contact with a flame; but when the proportion of gas and carbon dust is as low as 2·4 per cent. the mixture will not ignite. The point, however, of most interest for our own coal-miners is, not so much the inferior limit of combustible mixtures, in which the gas, which gives warning of its presence by the smell, may be more or less laden with coal-dust, as the phenomena,—if such are really established,—of spontaneous combustion under any ascertainable circumstances. That the admixture of carbon dust may render a much smaller volume of gas explosive when mixed with air than would otherwise be the case, may be regarded as highly probable. But that any, and if any what, admixture of the kind should generate spontaneous explosion is a contingency of which it is of the utmost importance to ascertain the possibility or impossibility.

**F**RENCH architecture has just lost its senior representative in the person of Théodore Labrousse, architect and honorary chief of the "Assistance Publique," winner of the Grand

Prix de Rome, Vice-President of the Société Centrale des Architectes, and officer of the Légion d'Honneur. He died in Paris on the 28th of November, in his eighty-seventh year. Th. Labrousse, to whom the Parisians owe the remarkable "Maison Municipale de Santé," in the Faubourg St. Denis, was the elder brother of the celebrated Henri Labrousse, the architect of the great hall of the Bibliothèque Nationale and of the Bibliothèque Ste. Genevieve, who died in 1879.

**T**HE Society of Painters in Water Colours held the private view of its winter exhibition last Saturday. The exhibition is not equal to some that we have seen there. Mr. A. Hunt contributes only two small sketches, one of which, however,—a study (169) for his drawing of "Warkworth," which has been seen on another occasion in the same room,—is a very fine example of the class of work to be properly called a "study or sketch." Mrs. A. Allingham is more sparing than usual of her work, and her figure studies are not as interesting as usual; but there are one or two beautiful little landscape studies with her name to them. Mr. Albert Goodwin contributes some most delicate and beautiful works, especially "Streatley, Thames" (54), which seems a glimmer and shimmer of real light, rather than the work of pigments; and his "Requiem" (174) is a beautiful little painted poem. His drawings are marked by his usual variety of style and effect. Mr. Eyre Walker is one of the best contributors of landscapes. Mr. Thorne Waite has some fine studies; Mr. Glindoni's "The Mathesis" (55) is a brilliant, though rather *clingant* piece of work. Among other contributors are Mr. Wilmot Pilsbury, Miss Clara Montalba, Mr. H. Marshall (some very fresh and true studies of river-side scenes); Mr. C. Gregory, who shows in "The Fringe of the Common" (20) and "In Quimperlé" (12), very fine and thorough work in two subjects of a very different class; Mr. T. J. Watson; Sir John Gilbert, and other well-known contributors; but there is rather a want of special interest in the exhibition, compared, that is to say, with others which have preceded it. A melancholy interest attaches to the screen of small drawings by "the late Mrs. Mary Forster Lofthouse," whose first contributions as a new member, Miss Forster, we were admiring in the same room only a very short time back.

**T**HE Dudley Gallery Exhibition of Cabinet Pictures in Oil is a better one than some we have seen there lately, and contains one noble work, Mr. Shaw's sea-piece, "Steyle Cove, Salcombe, South Devon" (24), a piece of roaring and foaming sea-water that is wonderfully real. "Wanted, a Governess" (28), by Mr. C. B. Yates, and "The Way of the World" (42), by Mr. Weekes, are among pictures with a point in them, the latter a study of geese criticising a donkey in a pound. "Cut off with a Shilling" (56), by Mr. E. Blair Leighton, is a good piece of painting, which tells, however, no story. "Spanish Head, Isle of Man" (81) is one of the best things Mr. Edwin Ellis has done. "Moonrise" (115), by Mr. Waterlow, is a remarkably luminous little work; Mr. Couldery's cats in "comfortable quarters" (204), look as if you might stroke their fur the wrong way with the usual results. There are other good works: also some unreasonably bad ones.

**T**HE Royal Institute of Painters in Oil (as it becomes in the winter) opened its doors as usual simultaneously with the Society of Water Colours. Among the notable works in the collection is Millet's "The Grand-daughter" (450), the title being a mere name for a painting of an interior with two figures, for which the spectator may make any story he pleases, but which is a work of unusual artistic interest in colour and composition. Mr. Stock's "Hesperus" (342) is an ideal study of the kind to which he has devoted himself; slight but very pleasing. There can hardly be said to be any remarkable works in the collection, which, as usual, is a large one numerically,



including a good deal of work of very moderate interest. Among paintings to be looked at are "The Chart," by Mr. Napier Hemry, a cabin interior (13); sundry landscapes by Mr. E. Hargitt, somewhat mannered but powerful; "Notre Dame, Paris," by Mr. T. R. Way (128), a moonlight study; "A Prisoner of State" (131), by Mr. Dendy Sadler; "The Complete Angler" (145), by Mr. E. Stott, an "impressionist" study of a rustic, too large in scale for the subject, but with much character; "The Caretaker" (172), by Mr. Coultery; "Songs without Words" (268), by Mr. A. S. Cope; "Old Cronies" (294), by Mr. Seymour Lucas; "The Jolly Miller" (391), by Mr. H. S. Marks; "A Relic of the Past" (436), by Mr. Hugh Carter; "A Moonlight Night, Venice" (477), by Mr. Arthur Severn, a very fine work; "A Difficulty" (528), by Mr. Arthur Hacker; "A Hunting We'll Go" (541), by Mr. Dendy Sadler, clever, but a vulgar rendering of a spirited old English ballad; "Two Thousand Feet above the Sea" (556), by Mr. Joseph Knight, a fine landscape, but too precisely like a great many others from the same hand; "Horatio Sparkins" (647), by Mr. F. Barnard, who has hit off the spirit of Dickens to a nicety; "Evening Shadows" (661), by Mr. C. E. Johnson; "Jealousy" (733), by Mr. Tom Lloyd; "Waterlilies" (747), by Mr. Aumonier; and "A Special Pleader" (782), by Mr. W. S. Stacey. We should like to know on what principle the illustrations appended to the catalogue are selected. A good many of the best works are omitted among them, and some very poor ones included.

THE agitation of a few months back, having for its object the amalgamation of the southern railways, seems to have borne fruit. Amongst the seventy or eighty Railway Bills awaiting the attention of the ensuing Parliament is an application for an Act to unite the London, Chatham, and Dover and the Brighton and South Coast lines, and thus a scheme which, at one time, appeared not unlikely to collapse will be partially carried out. Perhaps Sir Edward Watkin is as independent in railway as in national politics, for the South-Eastern is not committed to the amalgamation scheme, though powers will be applied for leaving it open for the united lines to co-operate with the South-Eastern and enter into working agreements in their joint interest. It has been notorious that a large proportion of the receipts of these lines has been swallowed up in legal and other expenses, due to competition, and the proposal should result in a substantial addition to the amount at the disposal of the directors. It is getting generally recognised that competition has many evils as well as advantages, and that in the case of railways, the former often preponderate. The *Times*,—while fearing that the absence of the South-Eastern from the compact may cause rivalry to continue,—hails the announcement with much satisfaction, as an earnest of more attention being paid to the accommodation and safety of passengers. We repeat the hope we expressed when the subject was first mooted, that the shareholders will be content with a portion of the amount this arrangement seems likely to save to them, and that their customers will thus be allowed to share in the benefit.

WE learn with great interest from the last issue of the *Philologische Wochenschrift* that Dr. Dörpfeld, in the course of his excavations in the Acropolis, has had the good fortune to light on the remains of a prehistoric palace, which so far as is at present made out, seems analogous to the one found at Tiryns by Dr. Schliemann, and fully described in his new work, of which a review recently appeared in the *Builder*. Dr. Dörpfeld's discovery comes therefore at a time when it will arouse the keenest interest. The remains lie in the space between the Erechtheum and the Parthenon. Full particulars will appear in the *Mittheilungen* of the German Institute at Athens. From the same paper we learn that Dr. Lampakis, founder of the Society for the Preservation of Christian

Antiquities in Athens, and director of archaeological matters for the district of Eretria and Chalkis, has made an important discovery of a large number of inscriptions and a life-size marble statue. Of what date these monuments are no report is as yet given.

AN exhibition has been collected at Messrs. Howell & James's of hand-woven stuffs and hand-sewn embroidery, representing Irish work and Irish patterns; the latter borrow more or less from the "Book of Kells" (of course the simpler designs only; the more elaborate ones from that source could hardly be produced in flax embroidery). The object is, we presume, to stimulate a demand for Irish work of this class, as has before been done in regard to Irish lace. The success of such an effort depends, of course, on whether there is any quality or special excellence in the work which cannot be attained elsewhere. The Irish lace, as we before said, has a style peculiar to itself, and so has this Irish flaxwork, and some of it is remarkably cheap in comparison with the artistic effect produced, and the thorough workmanship exhibited. Whether these qualities will create any demand for it, of course, we cannot say. We fear it is mainly a matter of fashion.

IN consequence of the decease of M. Perrin, of the Académie des Beaux Arts most to-day, the 5th of December, nominate a new honorary member. A committee, composed of MM. Gerôme, painter; Guillaume, sculptor; Garnier, architect; Chaplain, medallist; Ambrose Thomas, musician and composer; and the Duc d'Aumale, honorary member, was formed to draw up a list of candidates. This list was presented at the Academy on the 25th of last month, and on the first line bears the name of Baron Alphonse de Rothschild, who was chosen unanimously.

IN regard to the removal of the Norman turret at St. Alban's, of which we spoke last week, Sir E. Beckett has endeavoured to insinuate, through his usual medium, the *Times*, that it was not genuine Norman work; at least, that is the meaning which his words are apparently intended to convey to the general reader, though he steers clear of actually committing himself to the statement, which would be simply "saying the thing which is not." As to his remarks about the motives of our criticism, we, of course, take no notice of them, except to observe that we had imagined Sir E. Beckett was an old enough lawyer to know that it is not very wise to make statements which you cannot prove; and that to impute motives is the usual resource of a weak case.

#### LETTER FROM PARIS.

THE month of November has closed, at Paris, with a beneficent action. The business was to assist the Orphan Girls' Institution, in which Madame MacMahon is interested, and the greatest names in France, as well as the best-known artists, hastened to respond to the appeal of the Duchesse de Magenta. Accordingly, by the side of the works contributed by Hebert, Bouguereau, Baudry, Laurens, Chapu, Madame Lemaire, Lewis Brown, and Carolus Duran we have seen promenade and dispersed at a sale by auction the charming canvases signed by the Princesse Mathilde, the Baronne N. de Rothschild, and the Marquise d'Hervey St. Denis, and the sculptures modelled by the Duchesse d'Uzès, the Comtesse de Beaumont, and Sarah Bernhardt; a curious assemblage of illustrious names and diverse talents united in the same ennobling aim of charity.

This fashionable sale, which had a great succès de curiosité, commences the series of private exhibitions. On Monday there opened at the "Galerie Petit" one consisting of the works of an artist who was strongly attracted by the drama of misery, which he interpreted with poignant realism. We refer to Tassart, now nearly forgotten, and who suffocated himself out of existence about twelve years ago, like some of the unhappy ones whose sorrows he loved to depict. Then will follow, in the same gallery, the annual water-colour exhibition, at the same time that, at the Palais d'Industrie,

there will commence that of the lady artists' inaugurated about five years ago.

During the month there will also be settled two competitions, one for a statue to Rousseau, the second to give the Boulevard St. Germain a statue of Broca, the celebrated anthropologist. For the Rousseau statue, the competition is limited to three sculptors, MM. Berthès, Larche, and Steiner, whose sketches were judged the best in the general competition in August last. The decision as to the Broca competition will be given about the middle of this month.

In the matter of competitions we should mention the success gained by a young architect, M. Ancion, pupil of M. Pascal, who has obtained the prize in the Chaudesaigues competition. The subject given this year was a project for a monument to a great man, to be placed in his native town. The gainer of the prize, which is adjudged by the architectural section of the Institute, will receive for two years an income of 2,000 francs, which will enable him to finish his studies in Italy.

There is to be opened in the Louvre a photographic museum, under the control of the State. This may have the advantage of popularising, by photography, and bringing more before the public notice, the *chefs d'œuvre* of our national museum, though the idea of issuing photographs officially stamped by the State may seem questionable in some respects.

A recent addition to the Louvre is an important collection of Greek figures, found a few years ago at Myrina in Asia Minor, by two pupils of the École d'Athènes, MM. Bottier and Salomon Reinach. These figures will be exhibited on the first floor in a room in the Antiquities department.

After a long time with little of sculpturesque event, we have at last some important works in sculpture to record. In the first place, there is the monument to Delacroix, of which M. Dalou has just finished the model, which has been unanimously accepted by the subscription committee. M. Dalou was the very artist wanted to interpret the physiognomy, so full of originality, of Eugène Delacroix. His sketches show, harmoniously combined, the figures of Justice, Time, and the Genius of the Arts, grouped around a pyramid, which is surmounted by the bust of the great painter. This monument is to be put up in the garden of the Luxembourg, not far from the old Orangery, now transformed (as we have mentioned) into a museum, and the pedestal of which M. Crank is decorating with a large bas-relief representing France offering palms to Painting and Sculpture.

In this time of "statue-mania," when the effigies of so many mediocre or contestable talents encumber our streets and public places, it is pleasant to see homage rendered, late in the day as it may be, to genuine national celebrities. After Delacroix, Balzac will at last have also his statue. Let us hope that the subscription opened for that purpose will enable us soon to repair an unpardonable neglect towards one of the greatest literary reputations of our times.

We may mention also, as works in course of execution, the statue of Joan of Arc which M. Pezioux is executing for Rouen; the monument to Eustache de St. Pierre, of which M. Rodin is completing the design, and which will be erected at Calais; and, lastly, the monument to Admiral Courbet, of which we have seen a sketch by M. Falguère. We do not hesitate to say that in this work the inspiration of the artist is much better exhibited than in the group designed for the Arc d'Étoile, and which has been justly criticised. The general effect of the monument to be erected at Abbeville to the greatest of her children is very fine in a decorative point of view. In another part of Paris it is proposed shortly to place, at the extremity of the Ile des Cygnes, the reduced copy of Bartholde's statue of Liberty lighting the world. This statue, which, though a reduced copy, is not less than 7 metres in height, will send rays of electric light over Paris, like a lighthouse standing in the midst of the river.

At the Hôtel de Ville, where great preparations are being made for the intended fêtes, the decorators are at work in the *salons de réception*, while the Municipal Council are endeavouring to make up their minds in regard to artistic painting, properly so-called. These delays are deplorable, and very prejudicial to French artists; what, then, will it be if, under pretext of economy, the budget of Beaux Arts for the city is reduced in 1886 by a hundred thousand francs?



On the other hand, the administration proposes to decorate a Mairie in Paris, which has not much need of it, and two Mairies in the suburban district. At Paris, M. Besnard, whose very original talent has been especially signalled in the last two salons, will be commissioned to paint three large panels in the Mairie of the *premier arrondissement* (Place du Louvre). It is an excellent choice, although M. Besnard presumes a little sometimes on his facility of execution. Wishing to be a progressive artist, he yet cannot quite abandon his classic studies. Accordingly the Impressionists accuse him of being a mere excentric, and the Institut reproaches him with realistic tendencies.

*Extra muros*, M. Chartran is to decorate the "Salle de Mariages" in the Mairie of Saint-Denis, while M. Delabaye will undertake that of Montrouge. These works, relatively important, are in some sort "consolation stakes" granted to artists of merit who have not been successful in the recent municipal art-competitions. This indicates also a tendency on the part of our *Ediles* to depart a little from that hitherto invariable practice of public competition, which has not had all the good results expected from it.

As to the Hôtel de Ville, in default of modern painters the Administration are betaking themselves to ancient ones, and M. Haro, the well-known expert, is commissioned to restore eight very fine paintings by Hubert Robert, brought from the old Hôtel Beaumarchais, and which, placed in the Hôtel de Ville in 1816, escaped by some extraordinary chance the incendiaries of 1871. These paintings, representing landscapes adorned by statues and classic ruins in the taste of a former period, will form a piquant contrast with the modern landscapes which are to adorn the vestibules and the *escalier d'honneur*.

In our last we spoke of the architectural and archaeological interest attaching to the old tower of the Ducs de Bourgogne. We may now add that the Administration have asked for 200,000 francs from the Municipal Council to restore this tower, under the direction, as before stated, of an experienced architect, M. Houlard.

We expect that the same administrative solicitude will shortly be extended to the marvellous chapel of St. Julien le Pauvre, which it will be easy to save, at a little cost, from imminent ruin, if, as the "Société des Amis des Monuments Parisiens" request, it is made into a lapidary museum, an annex of the Carnavalet Museum.

Space is wanting to enumerate all the works of architecture actually in course of execution. The State is about to restore the *flèche* of Notre Dame, constructed in 1863 by Viollet-le-Duc. In regard to the "Gare St. Lazare," of which we have already spoken several times, the new constructions begin already to make a considerable show, especially at the angle of the Rue de Rome and the Rue St. Lazare, where a building with a façade of 120 metres has already passed its first story. Here the work will be finished in three months. On the side of the Rue Amsterdam, the necessary expropriations have caused some delay; but higher up, near the Rue de Berne and Rue de Vienna, the building of the annexes proceeds rapidly, and on twenty-four great stone pillars erected on the railway level, the workmen are getting into position the gigantic iron girders necessary for the enlargement of the Place de l'Europe. Here there is a building yard in full activity, but we want a good many more going like it to restore to Paris her normal industrial condition. On the other hand, the works at the National Library, in the portions bordering on the Rue de Richelieu, are nearly completed, and in a little while the public will be admitted into the new galleries opening on the Cour d'Honneur, the last vestige of the Hôtel de Nevers, built by Mansard, which it has been decided shall retain its ancient physiognomy.

Among the important works executed by the municipal authorities, we may also call attention to the construction, at the principal hospitals, La Pitié, St. Antoine, Beaujon, Laennec, and Necker, of special pavilions for important surgical operations. The question has also been raised of re-constructing, on a vast scale, the Church of St. Marie des Batignolles, which has become notoriously insufficient for a quarter which is growing daily

richer and more populous; but we only speak of this now to point out that, with the well-defined ideas of the Municipal Council upon the question of the separation of Church and State, their financial co-operation could not be counted upon. If, however, the new edifice is ere long made the subject of a public competition, the promoters will probably be able to collect among its rich congregation the considerable capital required for the operation.

On the 19th of December it is proposed to inaugurate, by a grand ball, at the Chamber of Commerce, the series of charitable *fêtes* organised by the commercial and industrial classes, for the benefit of the poor of Paris.

The edifice erected in 1860 by M. Bailly, the sympathetic president of the Société des Artistes Français, lends itself marvellously well to a *fête* of this kind, thanks to its luxurious rooms, and its monumental, original, and richly-decorated staircase,—thanks, above all, to its immense glazed court, recalling the ancient atrium, which will be transformed into the ball-room.

This first *fête* will be followed by another grand ball at the Bourse. The occasion should be seized to restore the paintings in grisaille of Abel de Pujol.\* Then there will be, in succession, a monster *fête* at the Hôtel de Ville, a historical concert at the Trocadéro, and a performance at the Opera, in the course of which the national drama will be represented in its successive transformations. It is also proposed to show an architectural restoration of the Pont Neuf as it was in the time of Louis XIII, with its stalls, its picturesque structures, and Tabarin's open-air theatre. The whole will be concluded with a historical procession. The programme is more full than really attractive; these Medieval shows will always have, whatever one may do, an appearance of masquerading which will hardly escape the sarcastic wit of the Parisians. A procession, however historical it may be, will be, to sightseers, but a reminiscence of the procession of the "banif gras," the disappearance of which they have regretted for fifteen years past. The only thing which will be of interest and really worthy to attract refined amateurs of artistic tastes will be the performance in which will appear in succession the antique drama with its choruses, the Medieval drama, and its mysteries, and that of the seventeenth century with its ballets and its *romans* in powdered wigs and pigtails.

That which concerns us most from our special point of view is the important restoration of the Pont Neuf as we see it in the old engravings of Abraham Bosse and Clastro. The presence on the committee for the *fêtes* of M. Hoffbauer, the eminent architect and learned collaborateur in "Paris à travers les âges," permits us to express a confident hope that the reproduction will be carried out with the fidelity indispensable to the success of the project.

If ever a director of a museum has had reason to be surprised, and very agreeably surprised too, it is beyond contradiction M. Darcel, the new director of the Cluny Museum, when the other morning he opened a mysterious and carefully-sealed roll, which an unknown hand had left with the concierge of the Museum. Under the thick envelope of grey paper was found a collection of extremely curious manuscripts enriched with precious miniatures of the fourteenth and fifteenth centuries. The joy of M. Darcel, at first somewhat mixed with scruples, is now complete, for the Procureur of the Republic has declared the donation valid. The manuscripts so singularly presented will, therefore, shortly be exhibited to the public, to whom such a stroke of good fortune comes but seldom.

We will not close this letter without mentioning the very interesting exhibition at the Hôtel de Ville, arranged under the care of the Direction Générale de l'Assistance Publique. From a strictly artistic point of view, one might certainly criticise the objects and furniture exhibited, but when one recollects that these objects and this furniture are the work of young children collected from the gutters, and deeply imbued with the corruption of a great city, one is led to hope for the future, and to believe that, thanks to the technical schools of the Administration Municipale, a school of educated and honest workmen may be formed, capable of preserving the traditional renown of French art industries.

\* This is the counterpart in Paris of our "Society for the Protection of Ancient Buildings," but we trust it is a more reasonable body in its action and principles.—Ed.

\* Paintings on the roof, in imitation of bas-reliefs.

# TESTS OF SEWAGE EFFLUENTS.

THE advocates of many of the chemical processes now employed, in various parts of the country, for the defecation of sewage are apt to speak, in more or less favourable terms, of the purity of the effluents which they produce. This purity, it should be remembered, in no case deserves the name on either chemical or microscopical grounds. No known existing process proposes the destruction of those germs which form the most dangerous concomitant of the sewage poison. As to the degree of chemical purity attained, the following abstract from the analyses given in the reports of the River Pollution Commissioners may enable the sanitary reformer to appreciate how far it has been carried out:—

| Place.         | Process.                     | Sewage, Effluent.            |                              |
|----------------|------------------------------|------------------------------|------------------------------|
|                |                              | Grains of Solids per Gallon. | Grains of Solids per Gallon. |
| Coventry ..    | .....                        | 58.80                        | 45.22                        |
| London ..      | A.B.C. ....                  | 69.73                        | 56.35                        |
| Leicester ..   | .....                        | 129.99                       | 89.13                        |
| Leamington ..  | .....                        | 163.51                       | 73.38                        |
| Stroud ..      | Sulphate of Alumina ..       | 64.05                        | 47.39                        |
| Bolton ..      | Menden and Collins ..        | .....                        | 81.85                        |
| Birmingham ..  | Lime ..                      | 117.60                       | 57.40                        |
| Wimbleton ..   | Hille's ..                   | 183.91                       | 67.00                        |
| Leeds ..       | Hasson's ..                  | .....                        | 45.92                        |
| .....          | Goodall's ..                 | .....                        | 50.47                        |
| Tottenham ..   | Campbell's ..                | .....                        | 58.96                        |
| Leicester ..   | Lime ..                      | 90.73                        | 71.89                        |
| Blackburn ..   | .....                        | 70.96                        | 55.52                        |
| Hertford ..    | Lime and Chloride of Lime .. | 28.42                        | 28.76                        |
| Northampton .. | Irrigation ..                | 119.78                       | 62.62                        |
| Barking ..     | .....                        | 78.75                        | 55.47                        |
| Banbury ..     | .....                        | 86.81                        | 56.98                        |
| Rugby ..       | .....                        | 45.62                        | 48.60                        |
| Bedford ..     | .....                        | 70.14                        | 53.76                        |
| Norwood ..     | .....                        | 86.73                        | 56.17                        |
| Croydon ..     | .....                        | 43.92                        | 31.50                        |
| Warwick ..     | .....                        | 51.03                        | 46.27                        |
| Worthing ..    | .....                        | 44.98                        | 41.98                        |
| Edinburgh ..   | .....                        | 71.12                        | 47.43                        |

It will be seen from the above that the average result of the various processes of which the details have been tabulated has been to remove about 30 grains, out of a total impurity of 85 grains, per gallon, from the effluent water. Fifty-five grains of matter thus remain in solution, the strength of which, in one or two cases is even more than was originally contained in the sewage. Both in solution and in suspension, no attempt has been made with the direct aim of either destroying the putrescent matter, or killing the germs which it contains. The 30 grains removed is simply precipitated, and that apparently by the mechanical action of the precipitants added. It is not disinfected, but the putrescent matter which it contains is stored up. The precipitants used, in so far as they are not dissolved on the effluent, are added to the precipitate. They amount to from 24 to upwards of 300 grains per gallon, according to the process. To the resulting deposit is added from 50 to 87 per cent. of water, forming a sludge. Thus an average precipitate of 30 grains per gallon will be swelled to from 300 to 1,800 grains per gallon of sludge, the water entangled in which has to be removed, either by mechanical means or by the application of heat. Such are the results as yet put on record as to the degree of purity obtained by the effluent from chemical treatment, and as to the bulk and character of the accompanying precipitate. It is possible that better instances may exist, but the above is a perfectly fair abstract of all the cases cited in the valuable work by Messrs. Robinson & Mellis, on "The Purification of water-carried Sewage."

## "Bad Drains and How to Test Them."

The author of this book, noticed in an article last week on the "Literature of Sanitation," complains that we have misrepresented him in quoting him as saying that it did not require a large amount of scientific knowledge to ensure a healthy dwelling, but that sound pipes and tight joints are the desiderata. He points out that his sentence was, "What is required is sound pipes, the area of them in proportion to the work they have to do, tight joints, and a knowledge of ventilation." The last is an important addition certainly; but "a knowledge of ventilation" is such an exceedingly vague sentence that it can hardly be regarded as an item in the list of practical necessities as given by the author.

**Erratum.**—In a letter on "Saxon Church at Deerhurst," p. 770, for "Alto-Roman" read "Celts-Roman."





THE DECORATIVE WORK OF THE  
EARLY GERMAN ENGRAVERS.

PART I.

THE PRECURSORS OF ALBERT DÜRER.



EFORE

we make use of their names in familiar converse with our readers, let us make a formal introduction of these artists, one particular branch of whose work we propose to discuss, and, if we may venture to say so, criticise.\*

The time is the latter half of the fifteenth, and the first half of the sixteenth century,—roughly speaking, from 1466 to 1550. Their country is Germany, north and south, together with the neighbouring small kingdoms. For their vocation they are, for the most part, painters; others are goldsmiths, and some one or two architects. The art they practised, and for their excellence in which they are chiefly known, the then newly-discovered one, engraving on wood or metal; their object being to obtain numerous facsimiles of the designs they made for their work. The subjects they engraved, scenes from holy writ, pictures of their every-day home life, and ornamental decoration. Their names,—one of which, at least, will be familiar; of others, even to the learned, nothing but the shadow remains,—the Master E.S., otherwise known as the Master of 1456, Martin Schongauer, Israhel van Meckenken, the Master M.Z.; these are the forerunners. Then Albrecht Dürer. Then the disciples, followers, and imitators: the group of little masters,—Albrecht Aldorfer, Hans Sebald Beham, Barthélemy Béham, Jakob Bink, the Master I.B., George Pencz, and Heinrich Aldegréver; Lukas van Leyden, Virgilius Solis, and the Master W.

A magnificent collection of their works was bequeathed to the University of Cambridge by Earl Fitzwilliam in 1806; to this have been added the Kerriek Collection, a collection from the University Library, and many purchases, the whole forming a collection which ranks only after the national ones of England and Germany. It has been duly ordered with wonderful and loving care by Professor Sidney Colvin, Slade Professor in the University. From this collection, with the permission of the Vice-Chancellor, and with the courteous help of the present director, Dr. Waldstein, and his able assistant, Mr. C. E. Wilson, we have culled the many examples of the works of the masters which have been reproduced, without which it would be impossible to discuss the subject. From Professor Colvin's twelve admirable papers on "Albert Dürer: his Teachers, his Rivals, and his Scholars," which appeared in *The Portfolio* for 1877, we have borrowed such slight historical references as were necessary to connect harmoniously the threads of discussion.

We propose to consider these masters solely in their capacity as inventors of ornamental designs; to note, so far as we are able, their work in, and influence on, decorative art. This special branch of their work has not, we believe, been

treated separately, but only incidentally, as in the learned papers just referred to.

The object of decoration is to break up uniform monotonous surfaces so as to obtain light and shade. This is effected by the arrangement of lines of varying breadth, more or less according to a pattern. At the same time, all objects present to the eye an arrangement, in some form or other, of lines,—the lines of configuration which are defined against the background, the lines of broken surfaces within itself, and the lines formed by the shadows falling on it, either from its own projections or from extraneous objects. The representative arts, drawing and painting, busy themselves

In the arrangement of these lines, suggestions as to form are, and should be frequently taken from nature. Man could not hope to produce out of his inner consciousness such wondrous arrangements of lines as nature sets before him; therefore, we find designs innumerable based on the form of the petal, and on the construction of natural flowers; witness the honeysuckle pattern; the fleur-de-lis; the ivy pattern, so much used by the Mediaeval illuminators; the acanthus; and a whole host of others. The leaf or flower is not copied, but its leading characteristics are adopted, and a design is made on that basis, adapted to the materials in which it is to be worked. This process is called conventionalising; and when natural forms are made to assist the decorator, if this process is ignored pure decoration becomes impossible. So far, then, as to the parts of the design. But nature helps us still further with suggestions as to its structure or arrangement on the surface. Natural growth is tangential, and nothing can be more beautiful,—that is, less jarring to the eye,—than lines running smoothly, without angular breaks, one from another; so we can discover no law of beauty for the arrangement of the waving lines of a design,



Fig. 3.

with the reproduction of the appearance of objects, and this can only be done by placing lines on the surface of the paper or canvas, arranged in the position of, and to represent the lines of contour and shadow which the object presents to the eye. The decorative arts, on the other hand, are concerned only with the pleasing and harmonious arrangement of lines used, not to represent other lines, but for their own sake, and for the effect they produce of themselves. Each, therefore, has its own well-defined limit: representative art to copy as faithfully as possible; decorative art to arrange lines without any attempt at copying. Directly decorative art begins to copy it ceases to be decorative, and becomes, according to the slightness of its copying, bad representative art.

better than one based on the principle which nature herself adopts. One principle more: the object of decoration is to break up a monotonous uniform surface. The evil to be cured should not re-appear in the cure. Very marked features themselves become monotonous when repeated, and to bear repetition is one of the tests of a good design; more especially monotonous is it if the repetition is of a prominent uncovered space. The best designs are those which cover the surface equally; that is, in which the light and shade are evenly balanced in all parts of the surface.

The transition from flat work to work in relief does not present any difficulties in the application of these principles. The line of demarcation between the representative art of the sculptor and the decorative art of the stone-

\* The initial letter, which we will call fig. 1, is from Van Meckenken's Alphabet, and the head-piece, fig. 2, is by Barthélemy Beham.



mason or metal worker, is as easily defined as before, the principles of decorative modelling being almost identical with the principles of decorative design. Example is better than precept, and the examples of the acanthus on Corinthian capitals and the Tudor rose are everywhere ready to hand. It must not, however, be forgotten that in drawing patterns for relief decorations, representative art has to be called in; the shadows caused by the modelling have to be indicated by the same means as the shadows caused by the dimpling of the petals; and it is sometimes difficult in such cases to arrive at the real intention of the designer. As a considerable portion of the work of these German masters was designed for execution in metal, this fact must not be lost sight of.

The first sign of any attention being given by the early engravers to decorative art is the grotesque alphabet devised (rather than designed) by the Master E.S., about the year 1466 (Bartsch, 106). The letters are curious compositions, and many of them are hard to decipher; they are about 4 in. in height, and are constructed out of the contortions of two or more animals. It is curious to note what a fascination the designing of these grotesque alphabets seems to possess even in the present day. If we remember right, Ernest Griset has produced similar initial letters without end. The notion evidently sprang from the quaint figures which the missal painters of the fourteenth and early part of the fifteenth centuries delighted in; but whereas in the missals the animals with their interlaced tails had nothing but the barest resemblance in outline to the beasts that perish, and were invariably coloured, like the rest of the ornamentation, quite flat, or with conventional shading only, the Master E.S. has worked his own sweet will, and assisted his menagerie into positions which often their anatomical construction would scarcely allow. A triumph of the infant art they undoubtedly are, but as decorative designs they have little or no value. The whole series has been reproduced by J. B. Obernetter, of Munich. The Cambridge collection possesses only one original example of the series, the letter Z, and this, curiously enough, has the mark of Martin Schongauer added.

The same remarks apply to an engraving by an anonymous master of the same period, which is undescribed by Bartsch and Passevant, but which is generally known as the "dence" of a pack of cards, the suit, however, not being indicated.

Among the works of Martin Schongauer there are only two noteworthy decorative designs; they are, however, so important in the history of the art, that we have reproduced both of them. Schongauer, although three of his brothers were goldsmiths, does not seem to have taken to that handicraft, but to have devoted himself exclusively to painting and engraving. It is curious that he did not make more designs for his brothers, because in the few specimens of pure decoration which have come down to us, he seems to have grasped without difficulty the fundamental principles of the art. So pronounced, indeed, was his recognition of these principles, that they were at once adopted and developed by his imitator, Israhel van Meckenem, of whom we shall next have to speak.

In the *rinceau d'ornements* (B. 108), the tangential flow of the lines, though occasionally somewhat crude, is very pronounced. The conventionalised foliage is exceedingly good, but the beauty of the design (fig. 3) is much marred by the introduction of the real live owl with a bird in its mouth.

The spray (B. 110) is, with the exception of the trunk from which it springs, a perfectly conventionalised form (fig. 4), there being no attempt at producing an imitation of the leaf from which the idea is taken. It is called by the authorities "a Gothic scroll," which conveys the idea that it is a copy of some fragment of architectural carving. It appears, however, to be an original study, suggested by a deeply serrated leaf, the conventionalising being carried out in the finest Gothic spirit. The manner in which the natural structure of the leaf is preserved is remarkable.

But the most famous designer of this period is Israhel van Meckenem, and there can be no doubt that of the many designs of Schongauer which he studied and copied, none can have had a more important influence upon him than the two we have reproduced. From the first he must have learned the true principle of

construction; from the second (his copy, which is extant, is reproduced below, B. 199), the principle of conventional form; and no artist before or after him has ever practised both so faithfully.

We come now to Van Meckenem's own work. Poor Israhel! he has been much belaboured by the critics. Next to Schongauer, he is the best known among those who shone before they



Fig. 4.

were eclipsed by Dürer. Specimens of his work are very rare, costly, and much prized; but Bartsch says, "His prints generally bear the Gothic stamp of his age, but exhibit not one of its beauties. His composition is ignoble, and without talent, and his drawing is extremely bad." Dr. Thausing gives him no more than a kick when he declares that "the very rudely-drawn sheets of Israhel indicate the highest point of what a goldsmith could do in engraving"; and the latest of his critics, Professor Colvin, will not gainsay, but only mitigate the censures of his predecessors: "In truth, Israhel is no artist of genius, but there is more in him than these phrases allow."

These criticisms cover the whole of his work. We profess neither to pronounce an opinion on the composition of his Bible scenes, nor to condemn his saints and martyrs. We will admit that in technical resource he may be far behind the greater master of 1466; but these sweeping condemnations should be confined to these two matters, and withdrawn from the master's decorative work. We protest, too, against debasing this decorative work as insignificant, passing it by as of hardly any importance, and as worthy a place in the collectors' cases merely from the fact that impressions are still extant, and that a collection would be incomplete without them. But, indeed, before he gets to the end of the paper devoted to this master, Professor Colvin has more than half relented, for he declares that "these pieces of mere ornament exhibit the strong and not the weak side of the early engravers." Of Israhel's technical skill we will only say this, that his firmness of drawing has never been surpassed; and that in the handling of the burin, in a style of work wherein the eye would detect, more than in any other, the slightest vacillation from steady and determined purpose, there is no sign of wavering.

Having studied Schongauer's works, as we know he did, we cannot be surprised, however, to find the same great fault, the introduction of natural animals, in Van Meckenem's early work, although later he shook himself completely free. One of these early designs (B. 196) is exceedingly weak; it is a confused mass of scroll-work and of all sorts and conditions of birds, the whole having neither rhyme nor reason. The design (B. 198) was, apparently, executed soon afterwards, and exhibits marked improvement. There is more ambitious work in the conventional foliage, although it is still far from perfect in form, and there is introduced a regular aviary of somewhat feebly-drawn birds. Bartsch thus describes it:—"Un rinceau d'ornemens. Il est garni de six différents oiseaux, parmi lesquels

on remarque particulièrement un perroquet perché à la droite de l'estampe, vu de profil et tourné vers la gauche." The claws of Schongauer's owl were, indeed, still deep in Israhel's flesh.

But we must pass on rapidly to the copy of Schongauer's greater work,—the Gothic scroll. On Van Meckenem's plate there are two sprays or scrolls (figs. 5 and 5a), the first a very inferior copy, the second a variation of it, somewhat better drawn than its companion. Were it not that studies are always interesting, it is almost to be regretted that impressions of this plate have survived. Van Meckenem has the reputation of being, to a very great extent, a copyist of Martin Schongauer; that is, something more than a mere student of the master; one who, having studied, copied his master's designs and attached his own



Fig. 5.



Fig. 5a.

signature to them for circulation. It is said that there are upwards of fifty so copied; but, with regard to this one plate, it is improbable that either master intended it to be circulated. However this may be it is of the greatest interest and importance, both as it comes to us from the hand of the original designer and from the hand of the imitator. On its importance as a study of Schongauer's we have already touched. Its importance as a study of Van Meckenem's can be immediately judged by its influence on his subsequent work. A very slight study of the works which come before and those which follow this plate discovers at once its history. Evidently dissatisfied with the earlier works he had designed, such as the two already noticed, the master sought at the fountain of his inspiration a means of improvement. He found it in the "Gothic scroll," studied it diligently



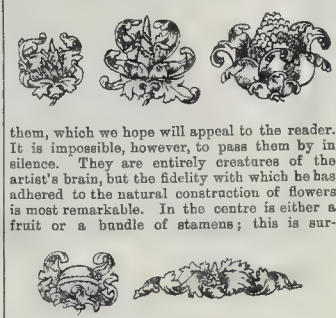
plied it roughly at first, then essayed his own hand in the same style; and, after this study, produced a series of designs based on it, which, as we look at them one after another in their usual order of arrangement, will increase in beauty, until they reach a consummation of perfection which succeeding generations have struggled vainly to attain.

We do not know on what system Bartsch has arranged these designs, nor even if he intends a list to be chronological; very few of them are dated, but the internal evidence furnished by the designs themselves fully justified an arrangement which must have been the result of careful study, such as was, perhaps, hardly to be expected from one who thought so little of them. One of the first results of Van Meekenen's study of Schongauer is a series of very curious panels; the one numbered B. 201 alone is in the Cambridge Collections (fig. 6—see separate plate); it measures 10½ in. by 5 in.; an acanthus scroll winds in a circular volution all over it; the leaf ornament is exceedingly beautiful, the conventional treatment never being lost sight of for a moment; the tangential flow of the main trunk is not the perfection at which he afterwards arrived, although it is by no means bad; in each of the circles are grotesque figures dancing and playing, the central one being a woman in the conical head-dress of the time. In this plate there is, as it were, a foretaste of the spirit of Renaissance ornament which seized on all artists not many years after Israel's death. The figures are introduced as the main feature of the designs, they stand on the acanthus scroll;

the acanthus scroll. The tangent forms of the chief stem are very smooth and fine, there is only one blemish to be detected in their harmonious flow; it is only a slight one, and was perhaps not to be avoided on account of the necessity of providing a seat for David the harper. The foliage is very fine, and the surface well and evenly covered. One very noticeable feature is that there are very few flowers; the perfect mastery over the difficult art of conventionalising floral form was not arrived at till the celebrated alphabet was cut.

But the most important panel designed by this master is the one in which he has woven, in cabalistic fashion, his own name, "Israel M" (fig. 8—see separate plate). The size of the plate is 10½ in. by 7 in., and it is a very triumph of designing skill. There is a framework, a mass of most elegant foliage winding hither and thither, and two intertwining bands bearing the legends, "*Non ultra Jacob nomen tuum erit, sed Israel vocaberis*"; and "*Da Gloriam Deo*." But by the time the legends have been read, the eye has also detected a majestic I traced from the top to the bottom of the frame, and then gradually, one by one, all the letters of the name Israel; and on the right, but sideways, the single letter M. The magic of the design is at once grasped. The reverential feeling which suggested it seems also to have inspired its author with enthusiasm; the traditions of design are all left far behind; he depends no longer for beauty on the mingled strength and grace of a chief stem winding through and giving rise to the foliage, but the letters are independent each of the other; they are hardly

with a design lending itself perfectly to its configuration, but there is no confusion, and, with all this mass of decoration, the letter itself stands out prominently and unmistakably. Space will not allow of the reproduction of more than these two initial letters, but as we have dwelt much on the beauty of the flowers so noticeable in these designs, and on their perfect construction on the principles of conventional form, we have copied a few of



rounded by a number of petals: in some there is only one row; in others there are both petals of a corolla and sepals of a calyx; but, however

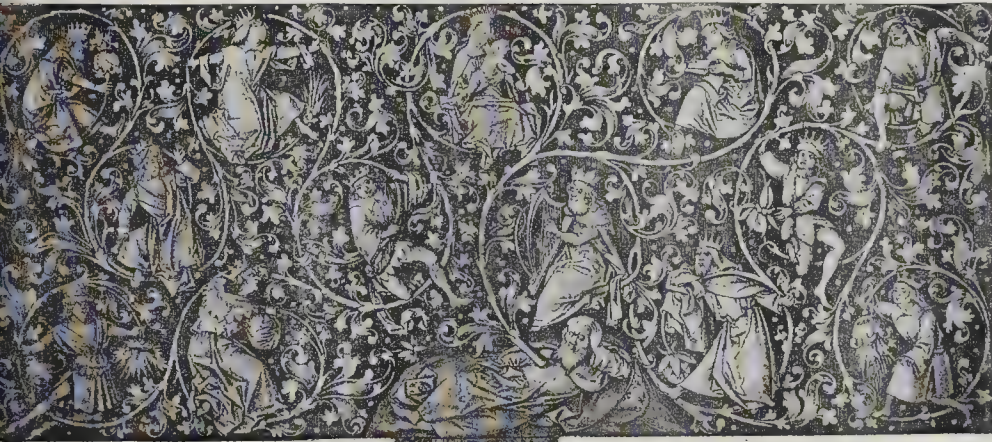


Fig. 7.

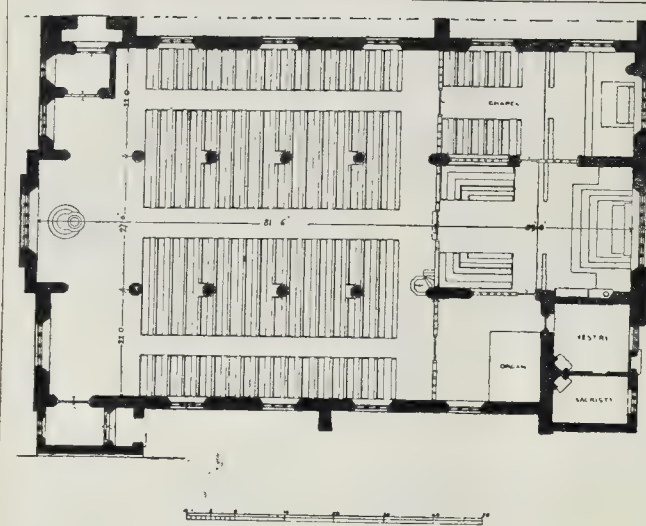
it is a ladder which they strive to climb; but it is subordinate to them, just as in Renaissance ornament, a centaur, an animal, a man, or a part of a man forms the central figure, from which wreaths of flowers and foliage spring. Of this Renaissance ornament we shall have to speak presently; it is sufficient to say here that the human form, although divine, does not lend itself very readily to conventional treatment, even if conventional treatment were attempted; the little figures in the panel, however, are, and are intended to be, perfectly real. The improvement in construction to which attention is to be directed, is that (subject to the main objection) a perfect and harmonious design is arrived at, instead of the natural form being introduced promiscuously with the conventional forms, in the manner in which the birds are introduced in the early panels we have already noticed. The Jesse panel (fig. 7) follows next, in Bartsch's list (B. 204), and marks an epoch in the powers of decorative design of the great goldsmith. The figures are the usual representations of the most celebrated of the descendants of Jesse of the seed of David. Their function, however, differs from that of the little people just noticed: they form no part of the decorative design, but are a series of pictures framed by the design which is based on

even interlaced, and yet they are more than half-concealed; it is an effort which must have been a gigantic failure or a splendid success, but from the moment the burin touched the copper the triumph must have been assured. The next panel (B. 207) is of the same class as (B. 201) already noticed, but of inferior merit. The next (B. 208), which we engrave, is exceedingly fine (fig. 9—see separate plate). It is a small picture, two seated figures, encircled in an elaborate framework, the whole forming a circle 6½ in. in diameter. The design of the frame is noticeable for the very great beauty of the flow of the foliage: there are also introduced a great number and variety of conventionalised flowers, which produce a very charming effect. But the zenith of Israel van Meekenen's art was reached in the celebrated alphabet, of which the initial B of this article, and E of the second part, are very fine examples. There are six plates (B 210—215), each containing four letters (one plate, unfortunately, is wanting in the Cambridge collection); they are very pure Gothic, the form in outline, so as to allow the cavities of the bodies of the letters to be decorated equally with the spaces. Every letter is closely packed with flowers and foliage; there is in none of them the slightest awkwardness of form, every available space is covered

numerous, the natural law of growth is followed, and there is not one of them that cannot be traced to its proper position on the stalk that bears the fancied flower.

**Builders' Benevolent Institution.**—The sixty-fourth election of pensioners took place (as briefly mentioned in our last) on Thursday, the 26th ult., at Willis's Rooms, on which occasion the President, Mr. Arthur C. Lucas, took the chair. He said there were three candidates on the list, two men and one woman. This was the fourth application of J. R. Biseley and the third of William Thurston. He was glad to announce that no poll would be required, as the committee had decided to elect the three candidates, and he now declared them duly elected. A vote of thanks, proposed by Mr. T. G. Smith and seconded by Mr. T. Stirling, was cordially carried. This the President duly acknowledged, expressing the great pleasure it had given him to be President of so useful an Institution, and adding that his interest in it would not cease with his year of office.—As will be seen by an advertisement on our front page, arrangements are being made for the annual ball in aid of the funds of this Institution. The secretary, Major Brutton, will be glad to receive the names of gentlemen willing to serve as stewards.





All Saints' Church, South Wimbledon.—Ground Plan.

## Illustrations.

## GOVERNMENT HOUSE, SANDAKAN.

**T**HIS building comprises a residence and offices for the Governor of British North Borneo. The offices are on the ground-floor, with residence over. The walls and piers are of brickwork, faced with cement, and all the woodwork of "Bilau." The rooms are large and lofty, and entirely surrounded by a wide open verandah, the shelter to that on the ground-story being increased by a pent roof and open cellular screens at the top of the openings. The entire area of the ground-floor is filled up solid and paved.

## 38, LIME-STREET.

This building, now approaching completion, is a block of offices on the estate of the Carpenters' Company, and is one of the last remaining sites which were created by the improvement lately made in this neighbourhood by the Carpenters' and other of the City companies. The building, which has only a narrow frontage to Lime-street, has a Portland stone front, with polished Aberdeen granite piers on the ground-floor, and contains several convenient and well-lighted suites of offices, and two floors of cellars below the ground. It is being built by Messrs. Colls & Sons, of Camberwell, who have also erected several other blocks on the same estate; and the architect is Mr. Alfred Howard.

## EXAMPLES OF MODERN WROUGHT IRONWORK.

It is not every day that we see a wrought-iron grille executed in illustration of a poem, but the first of the two plates of wrought-iron work given this week, with the spider and butterfly worked into it, is suggested by a poem of Spenser's, "Munipotmos," or, the Fate of the Butterfly. The work was executed, with two side panels, for Mr. Arthur Flower. Of the two other examples, the railings were for a house in Remington-court, designed by Mr. Stevenson, and the panel was designed to fill a fanlight in some offices in Glasgow, by the same architect; the design embodying the owner's arms.

All three examples were executed by Mr. A. Newman; the spider-and-butterfly panel, as we understand, was designed as well as executed in his workshop.

## DECORATIVE WORK OF THE EARLY GERMAN ENGRAVERS.

The three photo-prints of panels by Van Meckenien are referred to in the article under this title on p. 783, *ante*.

## ALL SAINTS' CHURCH, SOUTH WIMBLEDON.

This church is intended to be built on a good corner site in Haydon's-lane, South Wimbledon. The design of the church has been ruled by the conditions under which it has to be built. The site is broad, and, in a neighbourhood the population of which is increasing quickly, it is necessary to make the most of it. But only part of the site is now available for building on, and the large church is not yet wanted, and its cost is more than those who have undertaken the work are able to spend now. It is intended to be built in three parts; and these are arranged so that the temporary work may be as little as possible, and that at each stage of the building it may appear as a seemly, and, so far as it goes, a complete church inside, and outside may always show permanent fronts towards the two roads.

The church, when finished, will be 120 ft. 6 in. long inside, and 71 ft. wide, roofed over in three nearly equal spans; and the accommodation in pews and chairs will be 830. It is intended now to build only the north aisle, closing the arcade with a brick wall, except at the east end, where a small temporary aisle will be built to form a vestry and organ-chamber. The chapel will, for the time, serve as a chancel, and the sizes are so arranged that the choir-stalls intended for the chancel may first be set up and used in the chapel. This will make a convenient church for 250 people, and the cost of it is estimated at 3,500l. The architects are Mr. Somers Clarke and Mr. J. T. Micklethwaite.

## NEW PUBLIC BUILDINGS IN BIRMINGHAM.

On Friday in last week the Prince of Wales visited Birmingham, and opened the Jaffray Suburban Hospital, which has been erected at the sole cost of Mr. John Jaffray, and presented, together with eight acres of land, to the Governors of the Birmingham General Hospital, to be used as a branch hospital for the reception of patients suffering from chronic disease. The architect of the building was Mr. Yeoville Thomason.

On the following day his Royal Highness opened the new Art Galleries, which form, together with the Offices of the Gas Department, a continuation of the Council-house. In order to preserve the architectural harmony and design of the buildings, the Town Council entrusted the designs for the extensions to Mr. H. Yeoville Thomason, the architect of the original portion, and the building contract to Messrs. J. Barnsley & Sons. The result is a detached block of buildings fronting four streets. It is in the modern Italian Classical

style. Originally the site of the new art galleries was intended for Assize Courts, but the subject was reconsidered, and it was decided that the depth of land was not sufficient for that purpose. Subsequently the idea of an art gallery on a large scale, which had been deferred as a project for the future, was brought prominently forward by the offer of Messrs. Tangye to give 10,000l. for furnishing a public Art Gallery with specimens, and the Gas Committee's requirements of accommodation for their great accession of business determined the Corporation to complete the Council-house by the erection of spacious offices for that department, above which should be built a series of art galleries where the art treasures of the borough might be shown and loan collections exhibited. The Gas Offices occupy nearly the whole of the space on the basement and ground-floor; the Art Galleries (with an entrance-hall only on the ground-floor), occupy the whole of the upper portion of the new buildings. By the arrangements adopted the whole of the space at disposal has been made use of. In the external design a clock-tower at the north-west angle, and a Corinthian portico, forming the entrance to the Art Gallery, are the most conspicuous features. The portico is lofty, and in the pediment is a group of sculpture representing Birmingham contributing to the Fine Arts, from the studio of Mr. F. J. Williamson, of Esher. The clock-tower contains an illuminated clock, with bells, by Messrs. Gillett & Co., of Croydon, which is the gift to the town of Mr. Follett Osler. From the portico in Congreve-street is a central doorway leading into an entrance hall, 40 ft. by 30 ft., around the walls of which is an ornamental dado of various kinds of marble, and above a series of arcades of semicircular arches of stone, springing from Devonshire marble piers. On one side the arches are open, and carried by cylindrical marble columns, beyond which is the staircase, with marble balustrades, ascending to the floor on which the galleries are situated. The landing, which forms also a gallery, is treated in a similar manner, and is divided into three parts by arcades, having columns of Devonshire marble, with finely-carved capitals of Caen stone. Beyond the landing is a series of five galleries, approached one through the other by archways of marble and stone. The first of these is a fine room, of circular shape, 56 ft. in diameter, and 40 ft. high, arranged for pictures; the next is a smaller chamber, 52 ft. by 30 ft., which is devoted to Italian art; the third is the Industrial Museum, 97 ft. by 52 ft., divided longitudinally into three parts by arcades of ornamental ironwork, and having side galleries approached from the floor by circular iron staircases. This room will be devoted to art manufactures generally. The fourth gallery, which corresponds in general dimensions with the second one, will contain the Wedgwood collection, the gift of Mr. Tangye, and the last is the Picture Gallery, 83 ft. by 43 ft. and 40 ft. in height, which will be furnished with loan collections of pictures. The cost of the recently completed structure will amount to 100,000l., of which the cost of the Public Art Gallery was estimated at 41,000l. The external stone carving has been executed by Mr. J. Roddis, of Aston, and the internal by Messrs. Naylor, of Birmingham; the ornamental ironwork by Messrs. Hart, Son, Peard, and Co., and Messrs. Brawn & Co.; the marble-work by Mr. Blackler, of Torquay; the tiled floors and ceiling by Messrs. Minton, Hollins, & Co.; the concrete arching by Messrs. Dennett & Ingley; and the glass-work by Messrs. Hawkes, of Birmingham. Mr. Cooper Whitwell has been assistant architect to Mr. Thomason. The whole of the Art Galleries and Gas Offices are warmed with hot-water by means of radiators, this work having been carried out by Mr. W. W. Phipson, of London.

**New Vestry-hall, Edgbaston, Birmingham.**—In a limited competition for these new buildings, the designs of Messrs. Osborn & Reading, of Bennett's-hill, Birmingham, have been accepted. The buildings will comprise rate offices, board and committee rooms for select vestry, relief and vaccination department, a large assembly-room or vestry-hall, ante-rooms, caretaker's residence, &c. The buildings will be Renaissance in character, and the materials used red brick with dressings of dark red stone.







GOVERNMENT HOUSE, SANDAKAN.





INK PHOTO SPRAGUE & CO LONDON

DESIGNED BY—MR. WM. KIDNER, F.R.I.B.A., ARCHITECT.





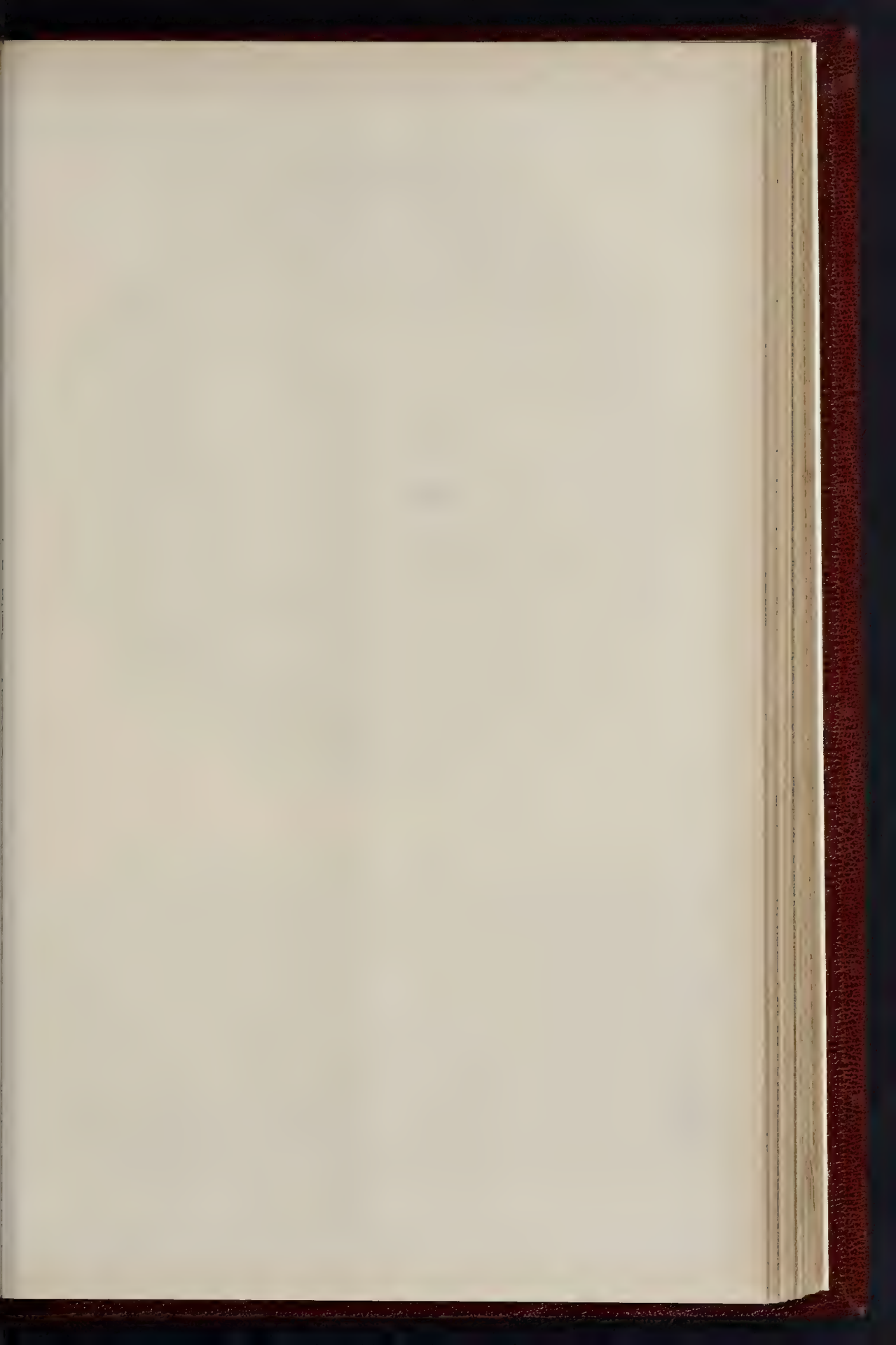


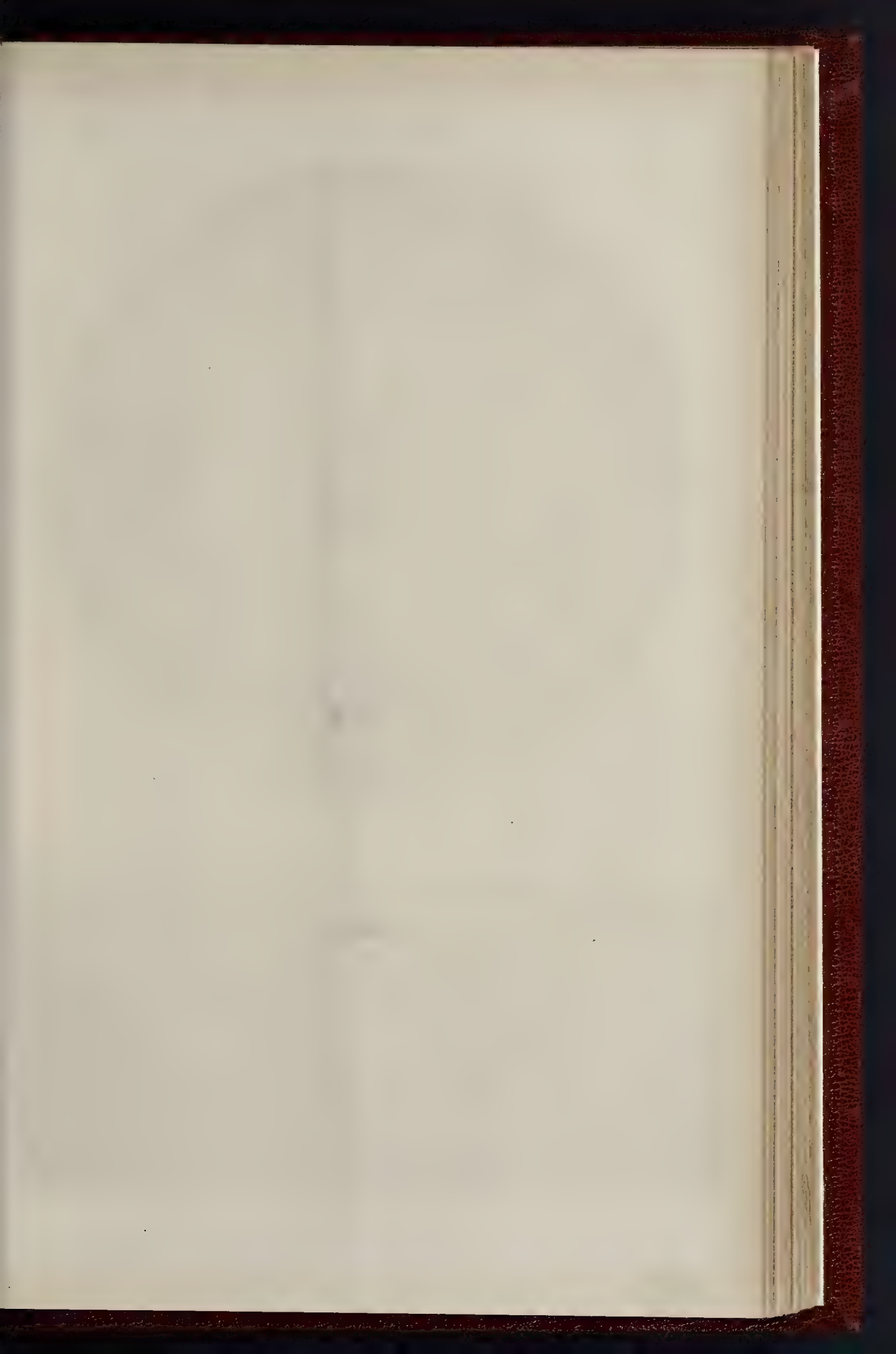


Fig. 9.—Panel: Van Meckenen.



Fig. 6.—Panel: Van Meckenen.







C. F. Kell Photo-Lith & Printer 8, Castle St. Holborn London E.C.

WROUGHT IRON GRILLE, EXECUTED BY MESSRS. A. NEWMAN & CO.







PROPOSED CHURCH AT WIMBLEDON—MESSRS SOMERS CLARKE AND J. T. MICKLETHWAITE, ARCHITECTS





PHOTO SPRAGUE & CO. LONDON

OFFICES IN LINE STREET.—MR. ALFRED HOWARD, ARCHITECT.

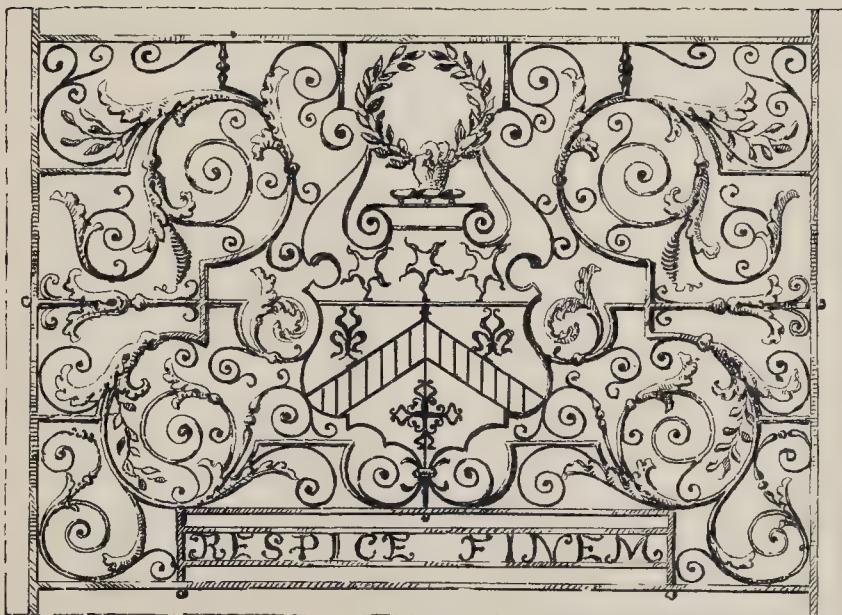




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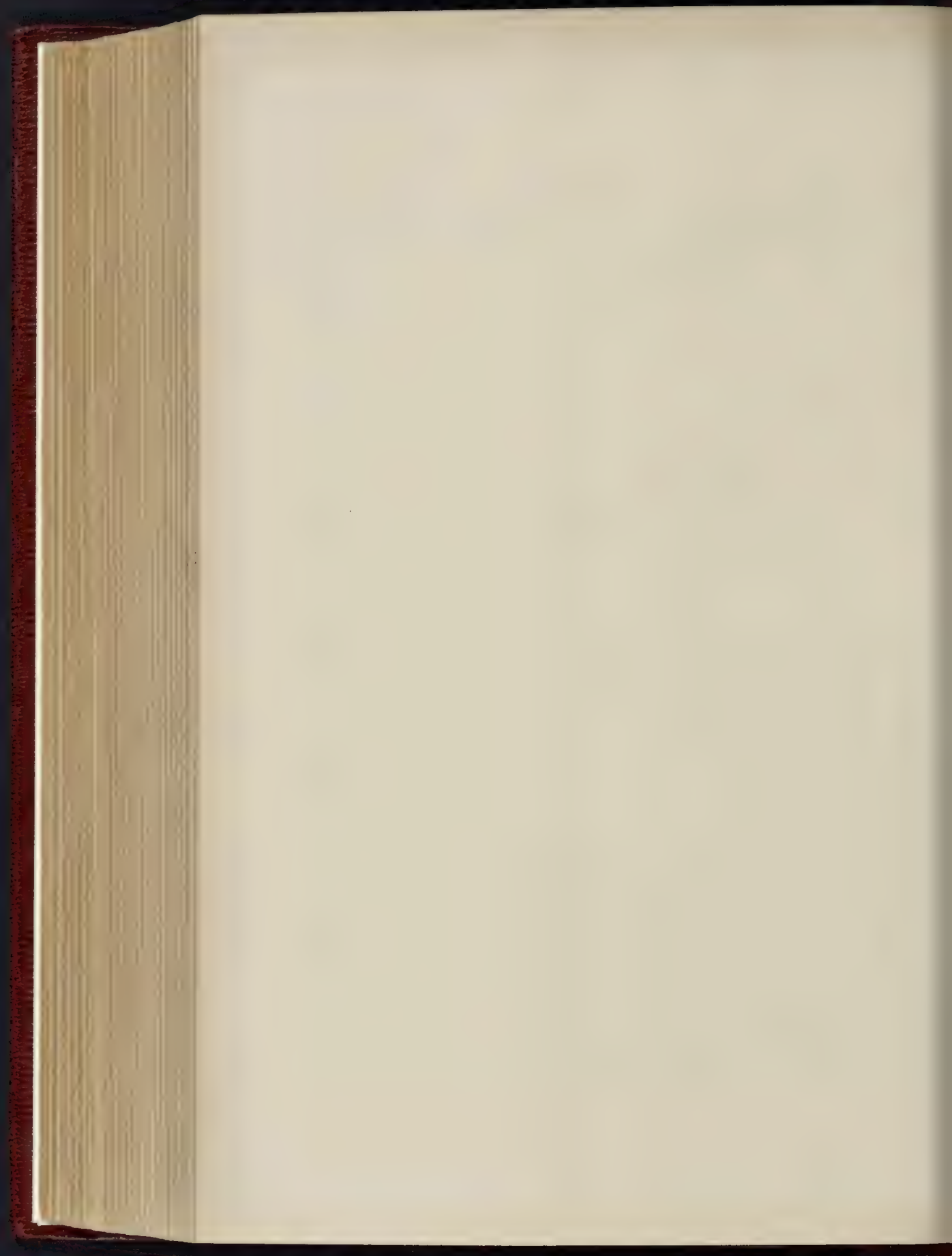




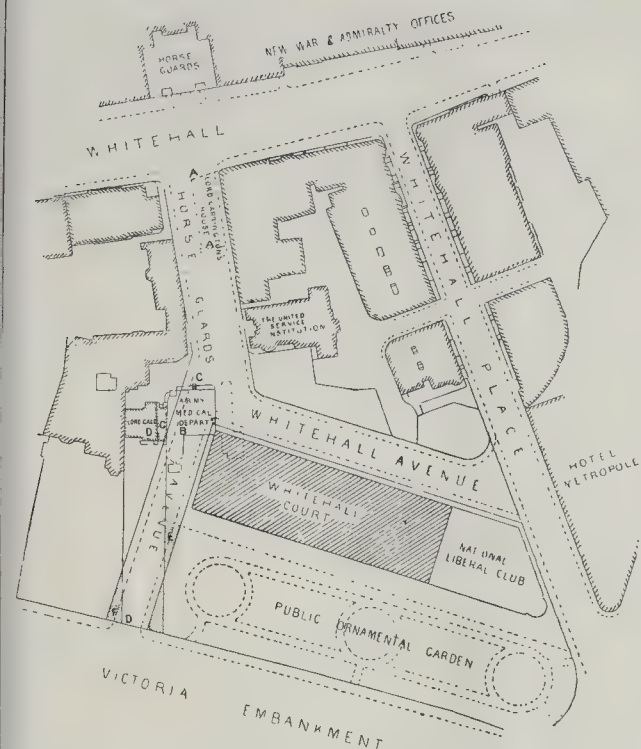
Fig. 8.—Pencil: Von Mecklen.

DECORATIVE WORK OF THE EARLY GERMAN ENGRAVERS. (See Article in this Number.)

PHOTO DRAINING CO. L.







New Streets Proposed by Whitehall Court Company.

#### PROPOSED NEW STREETS AT WHITEHALL.

The accompanying plan shows the proposal which the Whitehall Court Company make for riving new streets through between Whitehall, Whitehall-place, and the Victoria Embankment. The scheme includes the removal of Lord Harrington's house (A), the house occupied by the Army Medical Board (B), and Whitehall-ard (C), occupied by various tenants; and the acquisition of Lord Gage's house and garden (4, Whitehall-yard), and of the two small triangular bits of land marked E and F, and belonging respectively to the Com-pany have been able to secure the co-operation of the Treasury and of the Office of Woods and Forests, chiefly owing to the fact that the approach is nearly identical with that recommended in the Report of the Thames Embankment Commissioners in 1861. The company are applying for an Act for the carrying out of the scheme, which will probably not meet with any material opposition, as it is undoubtedly a public improvement. The Board of Works, we understand, have hitherto declined to entertain any idea of contributing to the scheme, on the ground that it is not one for the expenditure of public money. As the new approaches are absolutely alien for the objects of Whitehall Court, this seems a reasonable view to take. It is a pity that Horse Guards Avenue could not be laid out exactly central to the Horse Guards front, instead of being slightly south of the centre, the plan shows. It seems a small irregularity in the plan, but it will make a great difference the effect.

#### DISTRICT DRAINAGE AND HOUSE CONNEXIONS.

In the districts of those Local Authorities along the Thames Valley which have adopted and have in full operation a separate scheme of sewage disposal of their own, the vexed questions have been frequently raised, and in some instances the magisterial opinion has been taken on them, whether a Local Board can, under any circumstance, compel an owner of property to connect his house-drains with the general sewer or system of the district; and if so, what is the condition of things in reference to the drainage of any house which entitles a Local Board to charge the owner the cost of the work of connexion, or to lay the burden of such cost on the general rates of the district. It is universally admitted that the Public Health Act gives full and ample powers to Local Boards, as Sanitary Authorities, to remove or remedy, after the legal notices have been disobeyed, any nuisance arising from drains or otherwise, and to recover, in a summary manner, the cost of such work from the owners. There is plain sailing for local public officials and magistrates in cases where a nuisance is proved to exist. But an owner of property may naturally ask himself the question, "If I have, in the words of the Act, 'a drain sufficient for the actual drainage' of my house, even though it drain into a covered cesspool some distance from the house, and periodically cleaned out in the way prescribed by the Act, why should I be called upon to pay the cost of connexion with the Local Board sewer?" It is admitted, apart altogether from any argument as to the merits or demerits of the cesspool system, that the Public Health Act does not expressly condemn it, even in urban districts or towns. Hence there is difference of opinion even among authorities as to whether a Local Board can demand connexion with its sewers at the cost of the owner, where his house is already effectually drained by a properly kept cesspool. In a case just heard before the magistrates at Brentford, where a new drainage system has not long since been completed, an owner of two cottages was summoned by the Local Board for payment of

the cost of making the connexion to the public sewer. Proceedings were taken under the 23rd section of the Public Health Act, which provides that "where any house within the district of a Local Board is without drains sufficient for effectual drainage, the Local Board shall, by written notice, require the owner or occupier within a reasonable time specified to make a covered drain or drains, emptying into any sewer which the local authority are entitled to use, which is not more than 100 ft. from the site of the house; but if no such means of drainage are within that distance, then to empty into such covered cesspool or other place, not being under the house, as the Local Board may direct." The cottages in question, drained by cesspool, were only 14 ft. from the sewer; so that the sanction which the Act here gives to the existence of cesspools did not apply to this case. But it was contended that there was a drain sufficient for the effectual drainage of the cottages, and that the defendant could fairly shield himself under the 24th section of the Act from payment of the sum sued for. That section provides that "where any house within a district of a Local Board has a drain communicating with any sewer, which drain, though sufficient for effectual drainage of the house, is not adapted to the general sewerage scheme, or is in the opinion of the Local Board otherwise objectionable, the Local Authority may, on condition of providing a drain or drains as effectual for the drainage of the house, and communicating with such other sewer as they think fit, close such first-mentioned drain"; the section further providing that the Local Board charge the general rate of the district with the expenses of such work. It was argued, on behalf of the Local Board, that this section only referred to cases where the Board, having adopted and enforced connexion with one effectual system, had changed it for another; and where the Board could not call upon the owners to make fresh junctions. The circular of the Local Government Board interpretive of this section was quoted in confirmation of this view. The Local Government Board state that the 24th section empowers Local Boards to close any existing drain or drains on condition of providing others equally effectual and communicating with the new sewer. It must be said that the fact that this section only deals with the contingent or circumstance of a drain effectually draining "into any sewer," and not into any cesspool, brook, or ditch, would seem to give strength to the argument that the section only refers to cases where the Local Board replaces one public scheme by another, in which also there has been a public sewer. But no less an authority than Mr. Linnley, Counsel to the Local Government Board, seems to hold that this 24th section applies to houses built before the Local Board had established its own sewers; and if that interpretation be correct, it seems evident that Local Boards can make the connexions where houses are already effectually draining "into any sewer," and charge, not the owner, but the general rates with the expense. It seems equally evident that as a cesspool, brook, or a ditch cannot fairly come under the description "any sewer," the Local Board can abolish all draining into cesspools, brooks, and ditches, and establish connexion with their sewers, at the expense, not of the general rate, but of the private owners. The Magistrates at Brentford decided that the case above mentioned did not apply to the 24th section, inasmuch as there was no previous draining "into any sewer," but they did not give the Local Board the costs in the case as there was much doubt surrounding the true meaning of the 24th clause. It is important to observe, however, that Local Boards all over the country proceed on the assumption that they have full powers to charge the owners of houses built before the establishment of the Boards' sewers with the cost of the drain connexions, and without being called upon to distinguish between cases where the houses are already effectually drained "into any sewer," and those efficiently drained into a cesspool, brook, or ditch. But this assumption is likely to be disturbed by the conflicting opinions of authorities on the points above mentioned. It has generally been contended that as all sewers, sooner or later, unless they empty into a distinct drainage system, find their outlet in some open ditch or waterway, the expression "any sewer" does not relieve the owner of the cost of connection in such cir-

**A Revised Award at the Inventions Exhibition.**—We are informed that the Jury Commission have awarded Messrs. William Cooles & Co., of High-street, Marylebone, a Silver Medal for their patent "Embossed Flockers, Embossed Leather," and "Tergorine," and the Bronze Medal awarded to them by the jury for "Embossed Leather and Tergorine."



circumstances. At Twickenham lately complaint was made to the Local Government Board by a ratepayer, of the emptying of cesspools on a neighbouring property; and the fact that the Local Board have called upon the Central Authority to say whether cesspools can be removed in a Local Board District which has a drainage scheme, illustrates the doubt which exists in regard to these subjects. It is to be hoped that the Local Government Board will give some guiding opinion on the matter.

#### SCREW-MAKING.

If a strip of paper be wound round a shaft of wood,—say a lead pencil,—at an angle, it will be found that its edges fall into a position resembling the threads of a screw. This was, indeed, the method formerly used for originating the large screws used in machinery. A piece of paper was cut into the shape of an inclined plane, i.e., a right-angled triangle, the height of which corresponded to the length of the shaft of the intended screw, and the hypotenuse to the inclination or pitch of its threads. This was wrapped round tightly and pasted to the shaft, and a nick made with a file along the spiral line formed by its edge, the indentation being afterwards deepened until from the incipient worm a nut could be formed, which served as a holder or guide for the cutters that were to complete it. After the pattern-screw was made, any number of copies could be produced from it; but it was often a matter of importance to get a true thread of a new size or pattern, and many were the contrivances adopted for the purpose. A workman at Soho employed the following modification of the paper method.—He first of all turned his cylindrical shaft perfectly true, and then cut a strip of paper of the same length, whose width would just encircle the shaft when pasted round it, the edges coming together accurately. Before pasting it on he had marked it with a series of diagonal lines, drawing them from points made by compasses along the sides at intervals equal to the distance which one thread of the screw was intended to traverse. When it was cemented to the shaft, these lines ran into each other and formed a continuous thread along which he made a series of indentations in the metal by means of a centre punch and hammer, afterwards connecting them with a file. We may readily conceive that this method would admit of greater nicety of manipulation than the last, because there would be only one thickness of paper to cut through before reaching the iron. When he had produced a roughly-formed thread, he suspended the shaft in a box properly contrived, and cast round a portion of it a block of lead, the impressions in which served as cutter guides. A ruder method was to wind a piece of iron wire obliquely round the shaft, and form a mould from it by compression, with the same object of getting a guide for the cutters. A more scientifically elaborate, though still primitive, method of originating screws is described in the "Philosophical Transactions." Two straight edges are fixed parallel to each other upon a table, the distance between them being exactly equal to the length of the screw-shaft. Their own length must be equal to as many circumferences of the shaft as the thread is intended to traverse it, which depends, of course, upon whether the screw is intended to have a slow or a quick pitch. Thus, if the screw is to advance 1 in. in a complete revolution, and the shaft be 10 in. long, the length of the parallel straight edges must be ten circumferences of the shaft. A third straight-edge is now fixed diagonally between the other two from end to end, and its angle in that position is precisely that of the thread proposed to be made. In the upper edge of this cross-piece a groove has been cut, and a strip of Bristol board inserted, which is smeared with printer's ink. The smooth shaft is now made to roll evenly between the parallel uprights, over the diagonal, which prints upon it a regular spiral line, which the workman can follow with his tools. As the mechanical arts advanced it became easy to cut a correct thread in a lathe, without any guides or previous marking, the only requirements being that the cutter should be fixed at the proper angle, and that its rectilinear motion along the shaft should bear the same relation to its revolution as the pitch of the thread does to its circumference. Beautiful screw-cutting lathes are now constructed in which, by the substituti-

tion of wheels of different radii, these relative motions can be so adjusted as to cut threads of any pitch upon shafts of almost any size.—From *The Technical Educator* for December.

#### WESTMINSTER HALL.

SIR,—I fear from recent notices the treatment of Westminster Hall according to Mr. Pearson's plan has not met with unanimous acceptance as the best solution of this architectural problem. Doctors will differ, and it is not to be expected that any treatment could be planned which should satisfy all. Some there are who would make a point of conserving the old buttresses exactly as they are, in their crumbling condition, with their scraps of broken brick and tile and forlorn patches of cement, only adding, perhaps, some props and plasters to sustain them for a few more uncertain years. To them all the remaining architectural and old historical interest would otherwise be obliterated, and for ever. Others there are who would straightway abolish the buttresses altogether, with all traces of their former construction and relation to the building, and would even consign to oblivion the western side of the Hall, carefully concealing it from the public gaze as an incongruous, unfortunate, and impertinent element alongside the modern façade of the greatest architectural work of modern times. A scheme by which the existing state of things when the Hall was reconstructed, according to Richard II. may be reinstated must, according to them, be entirely subversive of all its historical or architectural character. Some look upon the space occupied by the screen wall as hopeless waste of a grand site. They would make light of the accommodation to be afforded by the rooms to be provided under the scheme. Others, again, consider that this utilitarian element is wholly condemned by the re-introduction, into the Hall, of staircases by which the rooms would be approached, as though its grand and spacious interior would be frittered away by such utilitarian accessories.

There may be, and doubtless there is, much to be said on the side of these objectors. But in these days of rampant negation, it is refreshing to find a scheme propounded which appears to meet the positive and special requirements of the case, as I unhesitatingly maintain Mr. Pearson's scheme does. It may be called facetiously a scheme "for picking up spilt milk" when he would rehabilitate this front with anything approaching to its former character, the indications of which are perfectly unmistakable. But I have heard of no other scheme which would transmit to the same extent, and with equal certainty, this historical record of the past, architecturally, aesthetically, and it may be added, without sacrifice to the sentimental interest which vast numbers, indeed the public generally, entertain in this building.

The replies quoted from Mr. Pearson's evidence, to questions asked with all the specious arts and aims of special pleading, to the effect that the main object which he had in view, in making his plan, was the preservation of the remains of the old Norman wall, must be interpreted not only with the context, but with his well-known opinions and views, expressed even in the report itself. He always maintains, and here he expressly states, that his principal object was the representation of the existing aspect of the Hall when reconstructed by Richard II. It is true, he adds also, that by this plan the preservation of the Norman remains would be secured. By his plan this great object would be obtained equally with the other. He would not be a party to the needless destruction of the old remains; but he all along made the resuscitation of the old west side the ruling principle and feature of his design. He would show to the nation that its present insignificant appearance is due, not to its original design, but to its present degraded state and the obliteration of its principal features, and to my mind he merits the universal thanks of all who may have a true appreciation of the building, which used to be regarded as almost the greatest of our secular remains of antiquity.

I trust that we shall yet be saved from the obliteration of this portion, whether through a laudable desire for modern architectural display, on the one hand, or through an insane and over-wrought conservatism (or from its counteracting influence) on the other.

I care not so much for the proposed surrounding of the Hall on the western side with a continuation of the modern buildings, if only the restoration be faithfully carried out, and access be given even by a narrow court, that its interest may not for ever and at once be lost. It will then have lessons still to transmit to futurity, which we should not be justified in sacrificing to any modern lack of reverent respect for antiquity. WILLIAM WHITE.

\*\* We print Mr. White's letter (which we take to be a protest on behalf of Mr. Pearson's views) with pleasure, but we entirely fail to see what are the "lessons to posterity" to be conveyed by carrying out the scheme, except that a nineteenth-century architect was content to destroy the area of the Great Hall by two flights of steps, to get to rooms which are to be built only because there is evidence that some kind of rooms were once there, the detail being almost entirely conjectural, as the evidence shows. We would prefer to see Mr. Pearson's "restoration" carried out as a mere piece of effect (though we do not at all admire it), rather than see it made the pretext for inconvenient and ill-lighted committee-rooms, to be got at only by spoiling the area of the Great Hall; and if ever a commencement is made of those steps, we expect the public opinion will be the same.

#### THE COST OF THE CIRCULAR HOSPITAL AT ANTWERP.

SIR,—So much discussion has taken place as to the cost of this hospital that the following official statement of the actual expenditure, kindly sent me by the able and courteous Secretary General of the Administration of Civil Hospitals, Antwerp, M. Ern. Bouwens, cannot fail to be of interest. The letter is dated Administration of Civil Hospitals, Antwerp, November 27th, 1885, and M. Bouwens writes:—

In compliance with the wish expressed in your letter of the 9th inst., I have the pleasure to send you, on the second page, a detailed statement of the various items and works of the Stuyvenberg Hospital, with the cost of each.

The total number of patients' beds in this institution is 468, made up as follows:—

Each large ward contains 24 beds on the ground-floor and 24 beds on the first floor (in eight pavilions)=8x48 ..... 384  
Each of six service pavilions (isolation rooms) contains five beds on the ground-floor, and five beds on the first floor=6x10 ..... 60  
Paying patients' wards (24 rooms, with one bed each) ..... 24

Total number of patients' beds, exclusive of five cots for children ..... 468

There are, besides, one bed by the operation-room, two beds in each service ward for the hospital attendants (male nurses); nine beds for resident students and superintendents; fourteen beds for servants; and five cots or cradles for children.

Cost of Construction of the Stuyvenberg (i.e., the Civil or Circular) Hospital at Antwerp.

| Description of Works                                                         | Cost in Francs. |
|------------------------------------------------------------------------------|-----------------|
| (including fees and cost of superintendence).                                | 8,498           |
| Competition for production of plans                                          | 1,888           |
| Cost of drains                                                               | 158,631         |
| Foundation                                                                   | 1,412,601       |
| Elevation: total construction                                                | 123,400         |
| Boundary wall                                                                | 275,538         |
| Carpentry and iron-foundry                                                   |                 |
| { Drainage (Lot 2) } Pipes and channels for air, water, and soil, (ironwork) | 16,441          |
| { Drainage (Lot 1) } Urinals, and wash-houses                                | 106,348         |
| Accessories                                                                  | 14,174          |
| Ironwork for heating                                                         | 55,736          |
| System of heating                                                            | 213,246         |
| Masonry of do.                                                               | 33,100          |
| { Drainage (Lot 3) } { carpentry }                                           | 15,748          |
| { Drainage (Lot 4) } See above, Lots 1 and 2                                 | 8,984           |
| Carpentry for laundry                                                        | 7,971           |
| Baths and installation (carpentry)                                           | 19,054          |
| Supplementary buildings                                                      | 2,007           |
| Gardening                                                                    | 6,000           |
| Enclosing railings                                                           | 19,409          |
| Paving and accessories                                                       | 77,033          |
| Ceiling and mouldings (?)                                                    | 57,583          |
| Laying of gas                                                                | 19,082          |
| Paving in paths                                                              | 10,070          |
| Accessories                                                                  | 8,471           |
| Ditto                                                                        | 73,843          |
| Laundry machines                                                             | 45,000          |
| Painting of buildings                                                        | 12,944          |
| Installation of baths (baths, pipes, and accessories)                        | 10,920          |
| Laboratory of the Dispensary                                                 | 17,499          |
| Operation-rooms: heating                                                     | 7,088           |
| Furniture                                                                    | 51,711          |
| Sundry works in the laundry                                                  | 9,643           |
| Lifts (?)                                                                    | 31,837          |
| Electric bells                                                               | 2,010           |

£117,259, or Frs. 2,931,481.  
Cost of ground (purchased by the Town of Antwerp) 11,116, = 277,904.  
Summary

Buildings ..... £117,259  
Site ..... 11,116  
£128,375 = Frs. 3,209,385



It will be seen that the building, exclusive of site cost, 2,931,482 fr., or 117,259l., and that it contains 468 beds for patients, exclusive of six cots for children, so that the actual cost per bed, including every item of expenditure from first to last, is 250l. 11s. in round numbers. The architect, M. Van Riel, gave the cost at 278l. per bed for 400 beds, including everything except furniture. Mr. Snell, in his book on "Hospital Construction," pp. 89-4, part ii., states:—"From what I could gather at the time of my visit (1882) as to the nature of the proposed works, it did not appear to me possible that the building could be completed for a less sum than about 368l. per bed." Mr. Snell has maintained throughout the discussion which has followed the reading of his paper before the Sanitary Institute at Leicester, that 368l. per bed was a correct statement of the cost of the Antwerp Hospital. It will be seen, however, from the official statement above given that his figures are very incorrect; that is to say, he has made the cost to appear to be 118l. per bed, or something like 45 per cent. more than it has in reality been. At the time of reading his paper before the Sanitary Institute, Mr. Snell admitted that his figures were estimates, and the President of the Section, Mr. Gordon Smith, in closing the discussion, stated, as reported in the *Builder* of October 17th last (p. 550), "Mr. Snell's figures are estimates, and, as I am inclined to think, they are exaggerated." Your readers are now in a position to judge what weight ought to be attached to this opinion of Mr. Gordon Smith of the figures in question.

HENRY C. BURDETT.

## SMOKE NUISANCE.

Sir,—My attention as managing director of Thompson's Smoke-consuming Stove and Grate Co., Limited, has been drawn to the letter of Mr. T. C. Sorby in your issue of October 24, 1885, in which he offers some suggestions for the better heating of boilers and other furnaces, and the consumption of smoke.

By one of those strange circumstances which happen at intervals, it would seem that my investigations for the better consumption of fuel have led to the same result as he shadows forth in his communication, and applied by me in the patents I have taken out for heating bakers' furnaces, steam boilers and kitcheners, &c. If Mr. Sorby had had a copy of the specification of our patents before him when he wrote he could not have given a more accurate and faithful description of the construction of our furnaces.

We are now exhibiting at St. Andrew's Chambers, No. 165, Queen Victoria-street, E.C., a kitchener in action constructed on the same principle, and there we show how perfect the combustion of the fuel is, its component parts being entirely utilised in the creation of a stream of heated air, which acts direct upon the oven and boiler in the same manner that it does on steam boilers or other furnaces; thus we not only gain an immense amount of heating power by the complete combustion of the fuel, but at the same time we show that it has been complete, the chimney-top (to which we have easy access), showing by the entire absence of smoke that no portion of the fuel has escaped in that form, thus demonstrating the perfect power of our furnace as a heater and smoke-consumer; in addition to this, the great saving in the quantity of fuel used is a most important item that must not be overlooked in estimating its value.

Should any one interested in the work of the abatement of smoke nuisance be desirous of seeing the kitchener, we shall be pleased to see him and explain its action.

HENRY THOMPSON.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

6,457, Fastenings for Double Doors. H. T. Gunner.

A catch is pivoted to framework of doorway, and when the doors are open this catch is caused by a spring to press a little forward. A slotted plate is placed over a hole in the door, and a striking plate is fixed on the door. When closed the arm of the catch goes in the hole, and, in closing, strikes against the arm, causing it to project behind the slotted plate. The left-hand door thus cannot be opened until the right-hand door is first moved into position, which will release the catch.

9,803, Rendering Paints, &c., Fire and Water Proof. Sir S. J. Blane.

"White paint" or "Kieselguhr" is subjected to an intense heat and mixed with "slag jelly," made by treating slag with hot acid. This material is mixed with paints, varnishes, &c., and renders them fire, damp, and weather proof. Thus a white paint is made of slag jelly 16 parts, Kieselguhr 8, zinc oxide 23, sodium silicate 28, and lime-water 30 parts.

11,345, Vehicle Wheel. B. Poole.

A channel-iron or rough-shaped ring is shrunk on the ordinary wooden felloe, and secured by screws, and indurubber or other flexible band being afterwards cemented into the channel.

14,316, Preparing Wood for Varnishing, Polishing, Painting, &c. R. Willis.

Powdered glass is made, with a sufficient quantity of varnish, into a thick soft paste, thinned as required with spirits of turpentine or other suitable liquid, and is well rubbed into the pores of the wood. The surplus material is removed, and the wood is rubbed with fine sand-paper, after which it is ready to receive polish, varnish, or paint. Powdered glass of the necessary fineness may be obtained by suspending pounded glass in water, and, after partial subsidence, drawing off the water holding the finer particles and allowing these to settle.

14,430, Artificial Marble. A. B. Joy and J. J. Lewen.

A cast of the object to be reproduced is taken in plaster of Paris mixed with zinc white, and also with finely-faked mica when it is desired that the cast shall have a crystalline appearance throughout its substance. A small quantity of ochre or other colouring matter may be added to the other ingredients. The cast, when dry, is immersed in a bath of linseed oil for six or seven days, and afterwards allowed to stand in a warm place for four or five days. It is then coated over with a mixture of old refined linseed oil and flake white. The glossy surface may finally be rubbed over with dry whiting.

14,712, Fireproof Building. J. N. Moersath.

The walls and joints are of iron, filled in with cement. It is built upon tubular screw piles, the continuations of which serve as chimneys or heating flues. They are in pieces, bolted together internally, and have external flange rings to support the joints. These are tubular, and may consist of two parallel pipes joined together by bracing straps. They support transverse T-irons, which are joined by buckle-plates. Cement is run on these to form the floors. The walls consist of parallel plates of corrugated iron, filled in with cement. The cement used is made of cork shavings, sawdust, &c., mixed with silicate of soda.

15,460, Making Slabs from Tiles. Boulenger, Paris.

Ceramic wall and ceiling facings are prepared in slabs by fixing together a number of tiles. The tiles are laid in a frame face downwards on a flat surface, and after the backs have been wetted, they are covered with a bed of hemp, tow, or flax. A wire netting, around which are placed four iron bars, is then laid over the whole. Upon the wire netting is laid another bed of tow, dipped in tempered plaster, and finally a layer of plaster is added. When the plaster has set, the frame is removed, the slab is turned over, the face cleaned, and the joints trimmed up, and finished.

## NEW APPLICATIONS FOR PATENTS.

Nov. 20.—14,222, J. Taylor, Improvements in Saw Spindles.—14,234, J. Keith, Heating and Ventilating Cellular Buildings.—14,236, W. Macfarlane, Adjusting Door Knobs and Handles to Spindles.

Nov. 21.—14,253, C. Garlick, Improvements in Stench Traps for Drains.—14,254, W. Towler, Cisterns for Water-closets, Urinals, &c.—14,271, W. and G. Barker, Improvements in Sanitary Sinks and Urinals.

Nov. 23.—14,321, W. Hucklebridge, Glass Roofing.—14,347, C. Cordon, Apparatus for Proping or Staying Purposes in Excavating, Building, &c.—14,352, F. Winn, Syphonic Apparatus for Discharging Water from Flushing Tanks or Cisterns.—14,353, J. Peckover, Stone-sawing Machines.

Nov. 24.—14,363, B. Clarke, Apparatus for Opening and Closing Lights, Shutters, Ventilators, &c.—14,374, E. Theedam, Chimney Tops or Cowls.

Nov. 25.—14,430, A. Ashworth, Construction of Desks and Cabinets.—14,432, H. Davies, Automatic Indicating Door Bolt.—14,446, J. Armstrong, Reversible Bolts for Locks and Latches.—14,457, Verity and Banks, Improved Pivot and Weather Bar Arrangement for Swing and Reversible Windows, Doors, &c.—14,467, J. Jeffreys, Improved System of Glazing.—14,479, Robinson and Carpenter, Blow-pipe, Lighting Apparatus, and Work Benches combined.—14,484, A. Noble, Ventilating and Chimney Cowls.

Nov. 26.—14,493, W. Lilly, Window Fasteners and Sash Fasteners.—14,500, Muselwhite and Prewett, Sash-line Socket.—14,518, J. Ward, Artificial Rockwork and Ground.—14,521, W. Luther, Astragals and Sash Bars.—14,529, W. Heatley and G. Hutchins, Waterproof Non-conducting Coverings for Panels, &c.—14,545, A. Bean, Improvements in Water-closets.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

11,692, H. King, Apparatus for Opening and Closing Fanlights and Casements.—11,817, Sanderson & Moffitt, Sash, Door, and Casement Fasteners.—12,529, J. Collier, Appliances for Opening Fanlights, Hinged Windows, &c.—12,700, J. Westmoreland, Ventilation and Construction of Buildings.—12,754, G. Newman, Floor Springs for Swing Doors.—13,033, G. Wishart, Ventilating and Chimney Cowls.—13,097, B. Finch, Ejector Cowl for Chimneys.—13,142, J. & C. Christie, Waste-preventing Flushing Apparatus for Water-closets.—

13,329, Barsford & Restall, Water-closets.—13,354, E. Aldous, Improvements in Water-closets, &c.—13,428, G. Kennedy, Apparatus for Coupling Ladders.—13,598, P. Winn, Apparatus for Discharging Water from Flushing-tanks or Cisterns.—13,766, W. Lindsay, Fireproof Floors.—2,718, R. Adams, Self-closing Appliances and Checks for Doors.—11,684, Simmons & Williams, Improvements in Lifts.—12,164, R. Johnson, Combination Ladder and Steps.—12,322, F. Smith, Wind-baffing Chimney Top.—12,547, Verity & Banks, Opening, Closing, and Regulating Fanlights, &c.—12,550, F. Austin, Improved Method of Disinfecting Water-closets, &c.—13,043, C. Cresswell, Improvements in Stoves or Fire-grates.—13,292, H. Denne, Window Fastener.—13,464, H. Johnson, Latches for Doors, Gates, &c.—13,645, A. Brookes, Drain Traps, &c.

## COMPLETE SPECIFICATIONS ACCEPTED.

## Open to opposition for two months.

16,696, F. Moore, Firegrates, Stoves, &c.—685, S. von Kosinaki, Apparatus for Ventilating, Heating, Drying, and Disinfecting Buildings, &c.—993, T. Palmer, Improvements in Clamps, &c.—1,539, Walker and Worsley, Attaching a Door and Other Knobs and Spindles.—8,702, G. Barker, Double-acting Air Pumps.—12,672, J. Cornish, Tiles for Floors of Malt and other Kilns.—1,460, J. Holden, Apparatus for Ventilating and Smoke Consuming.—1,678, A. Marriott, Apparatus for Heating Buildings by means of Hot Water or Steam.—3,604, J. Anderson, Self-regulating Water-waste Preventer.—3,964, A. Boulton, Powder or Material for Parquets, Floor Plates, &c.—10,571, D. Keith, Water-supply Apparatus for Washhand Basins, Water-closets, &c.—12,287, A. Lewis, Window-sash Fastener.—12,568, W. Lake, Manufacture of Pigments, Paints, Cements, Bricks, &c., from Iron Ore.

## RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

Nov. 23.

Bermondsey—7 and 8, Suffolk-place, 65 years, ground-rent 6l. 2s. .... 2530

Nov. 24.

By A. RICHARDS.

Stoke Newington Green—No. 33, copthold ..... 810

By W. H. MOORS.

Regent's Park—17, Chalcot-crescent, freehold ..... 600

New Southgate—4 and 5, Cromwell-road, 77 years, ground-rent, 6l. .... 125

By BONSURUS & FURS.

Piccadilly—34, Albemarle-street, freehold ..... 6,660

86, Jermyn-street, freehold ..... 3,300

By R. PARKINS.

Camberwell—27, 29, and 31, Lettism-street, freehold ..... 715

Southwark, Artillery-lane—A Block of Stabling, 13 years, ground-rent 7l. .... 210

By J. BAKER & WILKINSON.

Greenhill, near Harrow—A Plot of Freehold Land ..... 260

Kilburn—12 to 16, St. Julian's-road, 79 years, ground-rent 4l. .... 1,440

32, St. Julian's-road, 79 years, ground-rent 10l. .... 450

By W. HOLCOMES.

Caledonian-road—51, Huntingdon-street, 63 years, ground-rent 7l. .... 585

Kilburn—Ground-rents of 17l. 6s. 4d., term 78 years ..... 300

By E. JACOBSON & SON.

Peckham—17 to 23 odd, Wroton-road, 91 years, ground-rent 20l. .... 900

67, Westwood-terrace, 80 years, ground-rent 4l. 10s. .... 175

By A. COX.

Bermondsey—1 and 2, Fenner-road, freehold ..... 700

62, Alexis-street, 49 years, ground-rent 4l. .... 290

22, Balclava-road, 43 years, ground-rent 2s. 10d. .... 440

64, Southwark Park-road, 49 years, ground-rent 3l. .... 270

164, Spa-road, 33 years, ground-rent 4l. 8s. .... 410

56, Southwark Park-road, 49 years, ground-rent 3l. .... 410

Nov. 26.

By C. C. & E. T. MOORS.

Gray's Inn-road—25, Ampton-street, 29 years, no ground-rent ..... 510

Stepney, Alderney-road—"The Crown," freehold Beer House, a Plot of Land, and 1 to 17 odd, Primley-street ..... 1,470

2 to 26 even, Primley-street, freehold ..... 2,065

59 and 61, Alderney-road, freehold ..... 459

By ELMEX BROS.

Belgravia—13, Wilton-place, 36 years, ground-rent 6l. 8s. .... 3,060

14, Kinnerton-street, 36 years, ground-rent 3l. 10s. .... 600

Ground-rent of 6l. 10s., term 31 years, and reversion for 5 years ..... 145

Marylebone—123, Limon-grove, freehold ..... 1,160

22, Grove-street, freehold ..... 495

Newington Butts—No. 39, freehold ..... 1,280

By E. SIMMONS.

Bermondsey—36 to 46 even, Salisbury-place, freehold ..... 1,170

Belgrave-square—2, Chapel-place, 37 years, ground-rent 4l. .... 430

Peckham—5 and 7, East Surrey-grove, 77 years, ground-rent 8l. 8s. .... 405

41, Summer-road, 77 years, ground-rent 6l. .... 300

Brixton—42 and 44, Rattray-road, 88 years, ground-rent 10l. 15s. .... 685

Pimlico—71, Grosvenor-road, 43 years, ground-rent 8l. .... 600

Nov. 27.

By ROBERT RAIN.

Croydon—7 and 9, West-street, freehold ..... 440

Soho—7, Gerrard-street, freehold ..... 1,410

Euston-road—26, George-street, 23 years, ground-rent 8l. .... 600

Maida Hill—13, 15, and 17, Eltham Mews, 80 years, ground-rent 16l. .... 770

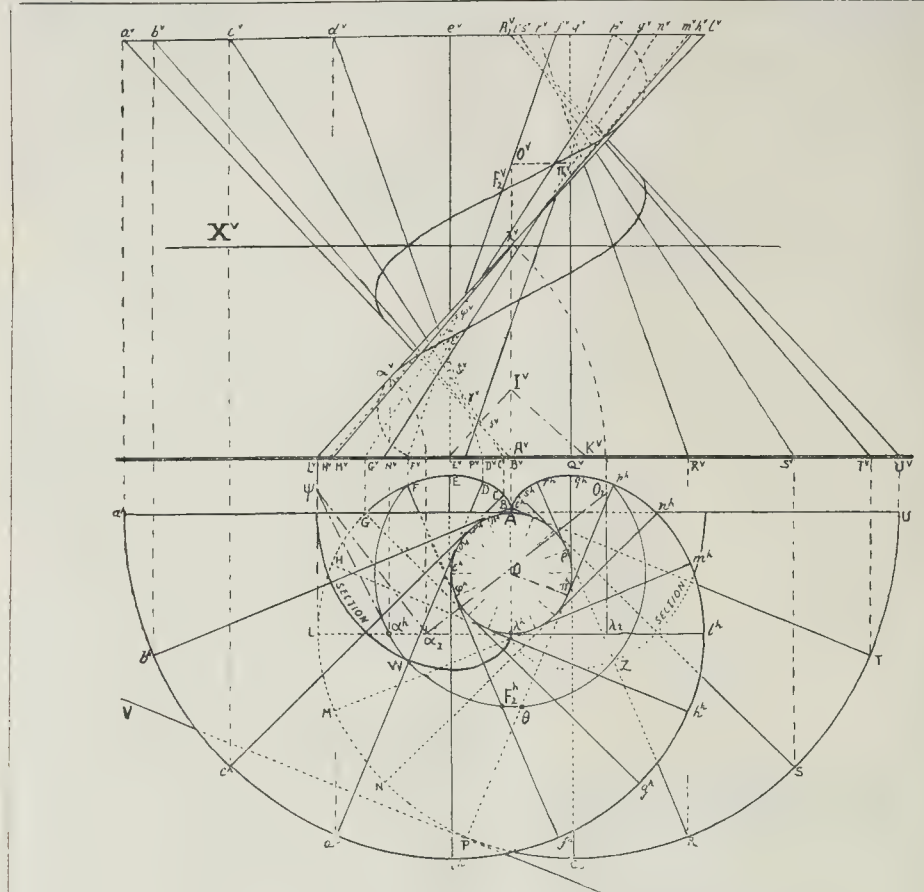


Fig. 208.

### The Student's Column.

#### DESCRIPTIVE GEOMETRY.—PART II.

XXVII.

**I**N fig. 208 we have drawn the plan and elevation of a developable helicoid, the height of which is limited by two horizontal planes, viz., the plane of the base, and another plane at the level reached by the helix after one complete convolution.\*

We might draw the helicoid by first delineating the helix, and then producing a series of tangents to it; but there is a much shorter way of getting the generators in which the delineation of the helix is not required.

We can at once determine the foot of each generator on the plan, and also the upper end of the generator where it penetrates the upper horizontal plane which limits our figure. We know that the feet of all the generators are situated on the involute spiral  $A, B, C, D, E, F, \dots$  formed by taking on the tangents to the base circle the distances  $\beta^A B = \text{arc } \beta^A A$ ,  $\gamma^A C = \text{arc } \gamma^A A$ ,  $\delta^A D = \text{arc } \delta^A A$ ,  $\dots$ . We can easily draw the generator  $Aa$  which is parallel to the elevation plane, for we know that it will be identical to the transformed helix. If the cylinder were developed, its transformed basis

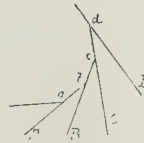


Fig. 209.

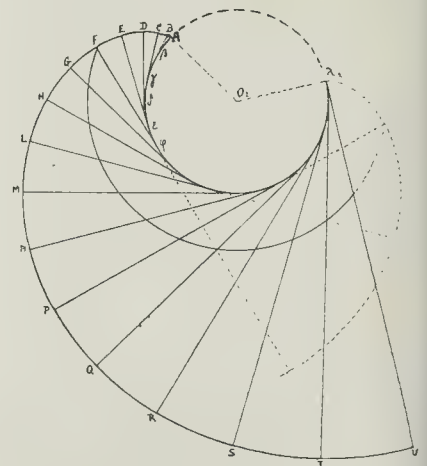


Fig. 210.

\* Exceptionally we have used in this figure some capital letters to indicate points, because we have to deal with three points of each generator, and want, for clearness sake, to indicate these three points by the same letter taken from three different alphabets. The foot of the generator is indicated by a capital letter such as  $D$ , the point where the generator is tangent to the helix is indicated by a Greek letter such as  $\delta$ , and the point where the generator reaches the upper plane is indicated by a small letter such as  $d$ .

would reach from  $A$  to  $a^b$ ; we have, therefore, only to make the line  $Aa^b$  equal to the circumference of the cylinder, and we shall have the plan of the generator  $Aa$ . As all the generators have the same inclination, they are therefore all of the same length, and we have only to mark the length  $Aa^b$  on every successive generator to get the curve  $a, b, c, d, e, f, \dots$  the section of

the helicoid by the upper plane. On the elevation the successive intersections of the generators give the elevation of the helix  $A^v \beta^v, \gamma^v, \delta^v, \dots, \&c.$

From our drawing (fig. 208) it is very easy to construct the helicoid with cardboard and thread, and we strongly advise our readers to make this model so as to gain a clear perception



appearance of this helicoid. We take  
eas of cardboard; draw on the one the  
A, B, C, D, E, . . . on the other the  
spiral  $\alpha, \beta, \gamma, \delta, \epsilon, \dots$ , and, keeping  
pitch  $A^{\circ} \alpha^{\circ}$ , by means of pieces of wood  
angles, we can insert the threads A $\alpha$ , B $\beta$ ,  
these threads will represent the surface.  
out out the circular eye in the upper  
of cardboard, you will be able to distinctly  
rough it the helix forming a sharp aris to  
rface.

horizontal section by a plane, such as,  
istance, X, will give the two branches of  
volute spiral. One of the branches is  
d by the intersection of the generators  
their point of contact with the helix: this  
section of the upper sheet of the helicoid,  
as the other branch is the section of the  
sheet of the helicoid.

ection of the helicoid by a cylinder concentric  
h the cylinder on which the directing helix  
helinated.

the circle F W Z be the base of the conic  
cylinder. It is evident that each gene-  
is cut by the cylinder in two points, one  
y its point of contact with the helix, and  
other above that point; for instance, the  
rator F $\beta$  is cut in F below  $\phi$ , and in F $_2$   
above  $\phi$ . We conclude, therefore, that the conic  
cylinder cuts the helicoid along two lines;  
ne is its intersection with the lower sheet,  
other its intersection with the upper sheet.  
e observe that for all generators the dis-  
ances between the points of intersection, such  
as F $_2$ , and the points of contact, such as  $\phi$ ,  
are equal; therefore, the difference of height  
een the points of intersection of two gene-  
rators with the cylinder must be equal to the  
ifference in height of the points of contact of  
the generators with the helix, and we con-  
clude that both intersections of the helicoid  
with the concentric cylinder are helices of the same  
pitch as the directing helix.

The reader will notice as an obvious conse-  
quence of the above that, if the generator of  
helicoid be made to slide along the helix on  
some point of contact, all the other points  
that generator will describe helices of equal  
pitch; but, if the generator be made to roll on  
helix (without sliding), then each point of  
generator will remain in a horizontal plane,  
describe an involute of the helix's base.  
The helicoid being developable, we know that  
any tangent to its surface in the point  $\theta$   
will be tangent all along the generator P p.  
The horizontal trace of the tangent plane is a  
straight line P V, tangent to the spiral, M N P Q . . .  
what is equivalent, perpendicular to the  
generator, P p. The lines P V and P p contained  
the tangent plane sufficiently determine it;  
as P V is parallel to the radius O  $\pi$ , we  
also say that the tangent plane to a helicoid  
contains a generator, and the radius of the cylinder  
at its point of contact with the generator.

By the above we can see also that all the  
tangent planes to this helicoid form the same  
angle with the horizontal plane, an angle equal  
to the inclination of the tangents to the helix  
at the points.

The tangent plane contains a superficial  
element of this helicoid it contains, therefore,  
the two neighbouring generators, or, what is the  
same thing, two neighbouring tangents to the  
helix. The tangent plane to this helicoid is,  
therefore, also the osculating plane to its  
directing helix or aris of retrogression.

In the elevation the generators L $\alpha$ , A $\alpha$ , A $_2$ U  
in the outline of the helicoid, for on these  
generators the tangent planes are perpendicular  
to the elevation plane.

#### Development of the Helicoid.

The helicoid could be developed by treating  
the surface as composed of a series of triangles,  
such as C $\phi$ D, D $\phi$ E, E $\phi$ F, . . . and turning each  
angle down one after another; but we have a  
much shorter and safer method, because we can  
work beforehand what will be the shape of some  
of the curves belonging to the helicoid when  
unrolled by the development of the  
surface.

When the helicoid is developed all the helices  
which are on its surface are transformed into  
straight lines. A few preliminary considerations are  
required to prove this.

If a curve is divided in equal parts (infinitely  
small) it becomes a polygon, the sides of which  
are tangent to the curve. The helicoid is  
formed by two of these infinitely small

sides is called the angle of contingence, for it is  
equal to the angle formed by the two neighbour-  
ing tangents, such as A $\phi$ B or B $\phi$ C (fig. 209).

Now, in most curves drawn on a developable  
surface, the angles of contingence are altered  
by the development of the surface, but the  
angles of contingence of the aris of retrogression  
remain the same; for when (fig. 209), in de-  
veloping the surface, we turn down the triangle  
B $\phi$ C round its side B $\phi$ , the angle of contingence  
of the two tangents does not alter.

In many curves the angles of contingence  
vary from point to point, but in the helix all  
these angles are equal; therefore, on the  
developed surface the transformed directing  
helix, or aris of retrogression, will be a plane  
curve, the angles of which are all equal. This  
can only be a circle.

The other helices, such as those which have  
their plans on the circle, P, W, Z (fig. 206),  
have all their points at an equal distance from  
the directing helix, and must, in the develop-  
ment, be transformed into circles concentric  
with the circle resulting from the directing  
helix.

This will help us to develop the helicoid on  
one of its tangent planes, such as the plane  
which contains the lines  $\lambda$  L and L L', a plane  
perpendicular to the elevation plane. The plane  
selected contains the line  $\lambda$  L, and also the line  
 $\psi$   $\alpha$ , the first of which is tangent to the directing  
helix, and the second of which is tangent  
to the larger helix projected on the circle F W Z.  
If we turn down that plane round its trace  
L L' we shall get L $\lambda$ , and  $\psi$   $\alpha$ , the lines them-  
selves on the plan; those lines will be tangent  
to the transformed helices, and we conclude  
that the centre of the two concentric circles  
derived from the helices is on the intersection  
of the perpendiculars  $\lambda$  O $_1$  and  $\alpha$  O $_2$ . The  
radius of the smaller circle is  $\lambda$  O $_1$ , the radius  
of the larger circle is  $\alpha$  O $_2$ .

Having obtained this result, we make the  
development in fig. 210, as follows:—We draw  
a circle with radius  $\lambda$  O $_1$ , and take an arc of  
it equal to the length of the directing helix, or,  
what is the same thing, of a generator such as  
A  $\alpha$  in fig. 208. Then we draw tangents B  $\beta$ ,  
C  $\gamma$ , D  $\delta$  . . . to this circle, making the  
lengths B  $\beta$ , C  $\gamma$ , D  $\delta$  . . . equal to the lengths  
of the arcs A  $\beta$ , A  $\gamma$ , A  $\delta$  . . . of the  
circle. The spiral A B C D E F G H . . . will  
be the transformed section of the helicoid by  
the plane of the base. The figure obtained will  
be the development of one sheet of the helicoid,  
the other sheet is represented on our drawing  
by a dotted line formed by the prolongation of  
the generators.

We can obtain a model of the helicoid given  
with its two sheets, by cutting the developments  
in paper, gluing them together along the edge  
of the circle, and winding the circle along the  
helix delineated on a cardboard cylinder. But  
the reader will obtain a sufficient idea of a  
developable helicoid by winding any paper ring  
round a thick pencil, for this will give him  
invariably such a surface.

There is a much faster method of finding  
the radius of the circle into which the directing  
helix is transformed. We give it as a practical  
method, but we will not attempt to explain it,  
as it is based on algebraical calculations, which  
we wish to spare our readers. On fig. 208,  
from E' we draw E' I' parallel to L' I', and  
from I' the perpendicular I' K'. The distance  
E' K' is the radius required.

#### MEETINGS.

SATURDAY, DECEMBER 5.

Architectural Association.—Visit to Wandsworth New  
Workhouse. Train from Waterloo at 2.5 to Earlsfield;  
2.19 Kingston Line.

Association of Public Sanitary Inspectors.—Mr. W.  
Middleweek on "The Dwellings, Habits, &c., and Over-  
crowding of the Poor in the Metropolis." 6 p.m.

MONDAY, DECEMBER 7.

Royal Academy.—Professor A. H. Church on "Colour  
and Colours."—L. 8 p.m.

Society of Engineers.—Mr. Philip S. Justice on "The  
Dephosphorisation of Iron in the Puddling Furnace." 7.30 p.m.

Surveyors' Institution.—Mr. A. D. Wells on "The Cost  
of Production and the Value received from Farm Crops." 8 p.m.

Royal Institute of the Architects of Ireland (Dublin).—  
Council Meeting.

Leeds and Yorkshire Architectural Society.—Annual  
Dinner.

Clerks of Works' Association.—Mr. J. Redden on  
"Some of the Works of Sir Christopher Wren in London." 8 p.m.

Inventors' Institute.—8 p.m.  
Victoria Institute.—8 p.m.

TUESDAY, DECEMBER 8.

Manchester Architectural Association.—Mr. W. K.  
Booth on "Pupilage." 7.30 p.m.

Institution of Civil Engineers.—Further discussion on  
Mr. Lury's paper on "High-Speed Motors" and on Mr.  
Gibbet Kopp's paper on "Continuous Current Dynam-  
Electric Machines and their Engines." 8 p.m.

WEDNESDAY, DECEMBER 9.

South Kensington Museum (Lecture Theatre).—Miss J.  
E. Harrison on "The Mythology of the Iliad as illustrated  
by Greek Vase Paintings."—VI. 6.15 p.m.

Royal Academy.—Professor A. H. Church on "Colour  
and Colours."—II. 8 p.m.

Society of Arts.—Professor F. Elgar on "The Load-lines  
of Ships." 8 p.m.

Liverpool Engineering Society.—Address by the retiring  
President, Mr. W. E. Mills. 8 p.m.

THURSDAY, DECEMBER 10.

Society of Antiquaries.—Mr. John Parker, F.S.A., on  
"The Manor of Aylesbury." 8.30 p.m.

Parkes Museum of Hygiene.—Mr. Eric S. Bruce on  
"Health and the Electric Light." 8 p.m.

Society of Telegraph-Engineers and Electricians.—  
Annual General Meeting. Papers by Mr. Walter J.  
Murphy and Mr. H. Kingford. 8 p.m.

FRIDAY, DECEMBER 11.

Royal Academy.—Professor A. H. Church on "Colour  
and Colours."—III. 8 p.m.

York Architectural Association.—Conversations. 7.30 p.m.

#### Miscellaneous.

Lectures at the Royal School of Mines.  
Prof. Warrington Smyth, F.R.S., continuing his  
lectures on "Mineralogy," in speaking of the  
importance which was attached by the explorer  
to the discovery of minerals which were known  
to be generally associated with the ore of which  
he is in search, said that this peculiarity was  
not confined to mineral, but extends to rock  
formations, certain conditions of the same rock  
being more favourable to the occurrence of ore  
than others. It is the business of the miner to  
become a thorough geologist of the district be-  
fore he allows his investigations to take a more  
practical form. It is observed in the North of  
England, for instance, that a vein is richest in  
the limestone, in a less degree, but still mode-  
rately productive in the gritstone, and becomes  
greatly impoverished in the shale. The explorer  
examines the brook courses and the sides of the  
hills until he identifies one of these beds, and  
then he has what he considers to be a key to  
the situation. Another point to be noticed is  
the fact that gentle undulating hills are always  
more likely to be productive than rugged heights.  
If it is believed pretty largely in a certain dis-  
trict, as in Devon and Cornwall, that ore of lead  
will not be found in sandstone, the chances are  
that sandstone formations are not frequent in  
that district. Objection of this kind was long  
held towards granite, because it was not found  
productive in the south-west district; but lead  
ore has been worked successfully for many  
years in the granite at Wicklow, and  
also in the province of Jaen in the south  
of Spain. There are generalisations, however,  
which are more reliable, such as the greater  
probability of finding veins in soft rocks than  
hard. Geologists would not distinguish between  
them, and yet to the miner this point is of the  
most vital importance. Physical constitution,  
as applied to all rocks, is therefore a necessary  
consideration. Sometimes a large compass  
needle is useful in determining spots likely to  
yield ore. In the North of England, perpen-  
dicular lodes are generally found to be more  
productive than others. This, among various  
facts, has given rise to prejudice in certain  
districts regarding more or less horizontal lodes,  
especially if they happen to run into a hill, it  
being supposed that the weight of the superin-  
cumbent mass squeezes the ore out. In other  
districts the opposite opinion is held, the theory  
being that little cover is very prejudicial to the  
existence of ore in large quantities. It is  
obviously necessary, therefore, in order to  
become a successful miner, that the character-  
istic features of various mining districts  
should be studied, and the prejudices and  
objections in connexion with each considered.

Architects and Parliament.—Mr. Lewis  
H. Isaacs, F.R.I.B.A., Surveyor to the Holborn  
District Board of Works, has been elected M.P.  
for the Walworth Division of Newington. On  
the other hand, we regret to see that Mr. J.  
Dick Peddie, who sat in the last Parliament, has  
lost his seat.

Steel Shutters.—At the new Tilbury Docks,  
of which we gave a description a little while  
ago, the sheds on the quays are to be closed by  
steel revolving shutters, which are being  
erected by Messrs. Clark, Bunnett, & Co.  
(Limited). The steel sheets to be used in their  
construction, placed end to end, would extend  
nearly twenty miles, and the quantity of steel  
springs required for the motive power twenty-  
four miles.



**Technical Art Teaching.**—A paper bearing the above title was read on Wednesday evening before the Society of Arts by Mr. F. Edward Hulme. Lord Alfred Churchill occupied the chair. Mr. Hulme commenced his paper with the observation that no one could look back ten years, or even five, without feeling that nationally they had made immense strides in art. It was easy, of course, to sneer at aestheticism as a passing fashion, and certainly some of its eccentricities deserved the ridicule and scorn of all wholesomely-minded people, but when all that was evanescent and unreal should have passed away, they would yet see beneath its frothy emptiness the real strength of the advancing tide. After referring to the services of Mr. Sparkes in connexion with Doullon art pottery, and of Mr. Hawle with the Nottingham lace trade, Mr. Hulme said that he was not so well satisfied with everything as to feel that he needed now but to "rest and be thankful," but he desired to raise his voice in protest against the altogether unjust idea that the schools and system of the Science and Art Department had been proved a failure, and must now be swept aside. So far from that, they had been an incalculable gain to the nation, and it now only required that they should endeavour to graft into their living structure that additional and more technical knowledge that the necessities of the time and of the place demanded. The designer, if he would essay the figure, must have at least as good a knowledge of anatomy as the sculptor or the painter. He again must have a good knowledge of plant structure, and, even if he hesitated to call himself a botanist, must be thoroughly acquainted with the leading laws of plant growth. Model drawing was, in Mr. Hulme's view, a most essential feature in art-education, and its practice could hardly be too emphatically advocated. Another most valuable study was plane geometrical drawing. In this branch of the subject Mr. Hulme said that most geometry books erred through giving the students too many problems, and there was, he believed, still room for a book for busy artisans to be called the "Common-sense Geometry," leaving out all kinds of useless and fancy constructions, and giving only the most useful problems in the most direct way. Architectural drawing also was advocated as a subject of the highest value, and in this respect actual observations and measurements were of the first importance.

**R. C. Church at Leek (Staffordshire).**—The foundation-stone of St. Mary's (R.C.) Church, Leek, has been laid by the Rev. Dr. Illey, R.C. Bishop Auxiliary of Birmingham. The plan consists of a nave and two aisles, a chancel (arranged for surplised choir), two side chapels, baptistery, confessional recessed in wall of aisle, opening into a small room for priest, fitted with a fireplace; nuns' choir, for the use of the adjoining convent: priests' sacristy, with heating-chamber under; and working sacristy surmounted by a very effective tower and spire, 140 ft. high. The organ-gallery is at the west end, the chancel and side chapels being at the east end. The interior dimensions of the church are 104 ft. long by 50 ft. wide, and the height to the apex of the barrel-roof ceiling of nave and chancel will be 53 ft. 6 in. The exterior elevation of the roof from floor to ridge is to be 64 ft. The columns and responds of nave and chancel arcading, the shafts supporting principals of roof, also the exterior shafts, columns, and bands on spire, will be of red Scotch stone; the rock-faced ashlar is to be of local Hazelhurst stone, and the dressings of Donlinton stone. Mr. Albert Vicars, London, is the architect; and Messrs. Barker & Sons, of Birmingham, are the contractors.

**Rosslyn-hill Chapel, Hampstead.**—The Rosslyn-hill Chapel has recently been enlarged by the addition of a new north aisle, which will increase the accommodation afforded by about a hundred sittings; a new chancel, with vestry and committee-room; and organ-chamber taking the place of the old vestry. The work has been executed by Messrs. Adamson & Sons, of Ealing; the additions being built of Bath stone and Kentish rag facings to correspond with the older portion. They are of similar character, Decorated Gothic, and were designed by Messrs. Worthington & Elgodd, of Manchester; Mr. Creed having acted as clerk of the works.

**The Pulsometer Engineering Company (Limited)** have opened an office at 74, Broomfield-lane, Glasgow.

**The London Pavilion Music Hall.**—The new London Pavilion Music Hall, overlooking what was until lately in fact as well as in name Piccadilly-circus, was opened on Monday night. We have had an opportunity of looking over the building, which seems to have called forth considerable ingenuity in planning, the most having been made of an awkward-shaped site. The hall itself, with its two galleries, will afford room for about 3,000 persons, and every precaution has been taken for the public safety in case of a sudden panic. There are three spacious staircases to be used for exit only. The hall is provided with a sliding roof similar to that introduced by the lessee, Mr. Villiers, at the Canterbury Music Hall, Westminster-road. The decorations are by Mr. E. W. Bradwell, of Great Portland-street, the work in relief having been executed by the Plastic Decoration and Papier Mâché Company, of Wellington-street, Strand, in fibrous plaster and cartonnage. The hall, which has only taken four months and seven days to build, has been erected from designs by Mr. J. E. Sanders, F.S.A., and the elevation is by Mr. R. J. Worley. There is to be a restaurant at the corner of the building at the junction of Piccadilly and the new street, but this is not quite ready for opening. The electric-light fittings and gasfittings (which in some instances serve the double purpose) have been made and fixed by Mr. W. G. Cannon, of London-road, Southwark,—in conjunction with the Edison-Swan Electric Lighting Company so far as the electric-lighting arrangements are concerned. The building is lighted up by 310 incandescent lamps each of 16-candle power. The lamps for the different sections of the building are conveniently divided into several separate circuits, and some gas-burners are always alight so as to prevent alarm in case of any accident to the electric-lighting apparatus. The current for the lamps is generated by two of the Edison-Hopkinson dynamos, each capable of sustaining 300 lamps of 16-candle-power, and there are two 16-h.p. Otto gas engines to serve as motive power, so that, in point of fact, the electric lighting machinery is duplicated. The lavatories are provided with Jennings's tip-up basins. The urinals are by Tylor & Sons, and the water-closets are Bostel's patent "Brighton Excelsior." Hydrants, fitted with Morris's instantaneous couplings, with an arrangement immediately adapting them to receive the fire-brigade hose, are placed on the different floors of the building, and the iron columns supporting the galleries are coated with plaster as a protective against injury by fire. In the ceiling over the upper gallery are eight sunburners to assist in the ventilation. Messrs. Peto were the builders.

**London.**—The Church of St. Michael, Cornhill, was re-opened on the 6th ult., after having been closed for some three months for renovation and repair. The interior of the building (one of Wren's) has been re-decorated throughout, with the exception of the reredos and north porch. In consequence of inadequate ventilation, the paint work and gilding were much deteriorated, and the work of restoration has been carried out by Messrs. G. Trollope & Sons, of Halkin-street, Belgrave-square, under the immediate direction of the architect, Mr. Chas. Reilly, of St. Swinburn's-lane. The church was considerably altered and decorated some twenty-five years ago by Sir Gilbert Scott, and (according to the *Citizen*), "care has been taken not to depart from the main features of his work; but a few excrescences have been removed and some highly Gothic features in his treatment have been brought more into harmony with Wren's design." Under the direction of the architect the church has been re-lighted by Messrs. W. Suggs & Co., Limited, of Westminster, by the introduction of four sun-burners specially designed for this church.

**Birmingham Architectural Association.** The first ordinary meeting of the current session was held at Queen's College on Tuesday evening last. Mr. John Cotton (vice-president) was in the chair. The Secretary read a memorial he had received from the Stone Carvers' Association in London, in reference to the detrimental effects of sub-contracting upon the stone carver's art. The following gentlemen were nominated for membership:—Messrs. F. B. Peacock, F. Evans, E. Wilkes, H. R. Bewlay, J. Crouch, J. C. Irvine, and F. B. Andrews. A paper was given by Mr. Tadman Foulkes, entitled "A Few Hints," which dealt mainly with the principal difficulties of the modern practitioner.

**The Reform of London Cabs.**—I announced that the promoters of the sixpence cab service for Birmingham are now turning their attention to London. They propose to start an enterprise which will revolutionise metropolitan cab service. Our "pet aversion"—the "growler"—is to be ousted from streets by a new four-wheel vehicle which said to have received the approval of the Strand-yard authorities, its principle being the back part will let down, thus making open carriage of it, while baggage is placed on the top and the front. We are also to be supplied with improved hansom cabs, and Victorias for the use of ladies shopping and visiting. We are glad to hear it. It may, however, be as well to impress upon the promoters of this enterprise that the great desideratum is an efficient and comfortable closed wheeled hackney-carriage. Damp hansom cabs are decidedly dangerous, and there are very hansom cabs which are even tolerable when dry. The "growler" would have been a diagram of the year one, and is an incomprehensible example of the survival of the unfittest. Excellent hansom cabs at present on the streets all very well for dry weather, but there is undoubtedly demand for a good closed wheeled cab.—*Lancet*.

**The Institution of Civil Engineers.**—The ordinary meeting on Tuesday, December 2nd, Sir Frederick J. Bramwell, F.R.S. (President) in the chair, it was announced that the following thirteen Associate Members had been referred to the class of Members:—A. Brown, Davidson, W. C. L. Floyd, S. Horsley, R. Lapeage, P. T. S. Large, H. U. McKie, R. Middleton, D. G. Otley, H. S. C. Roe, J. Single, W. G. Strype, and R. H. Swindlehurst. At the same meeting it was reported that candidates had been admitted as Students, the first ballot for the present session resulted in the election of fifteen Members, eighty Associate-Members, and eight Associates, to congratulate the Institution on this evidence of its flourishing condition.

**Smethwick.**—New Central Schools erected in Smethwick for the Harborne School Board have just been opened. Accommodation provided for 660 pupils, with lecture-rooms, science lectures, laboratory, and a school cookery. The works have been carried out by Mr. G. H. Marshall, builder, of Smethwick, at a cost of about 6,000*l.*, from designs by the Board, Messrs. J. P. Sharp & Co., of Birmingham.

**Proposed Cemetery at Sutton, Surrey.**—An inquiry was held at Sutton, Surrey, last week, before Major-General A. De Courcy, R. Engineers, with a view to an application for sanction to borrow 12,000*l.*, for the purpose of purchasing land for a cemetery, and erecting chapel, mortuary, lodge and entrance-gate, boundary-wall, &c., also purchasing land for a store-yard, and erecting stabling, stores. The plans had been prepared by Mr. J. Payne Curtis, A.M.I.C.E., Surveyor to the Board, who attended and gave details as to cost of constructing the various buildings, approaches thereto.

**Investments.**—Mathieson's "Vade Mecum for Investors," of which the third and last publication has been sent us, gives particulars in regard to almost every concern in which money can or may be invested,—Government securities, stocks, railways, and miscellaneous companies, &c. It is stated to be compiled from official sources. The book appears complete, and is in a small and convenient compass.

**Lynton.**—At a meeting of the Local Board of Health of Lynton on the 25th ult., it was decided to call in Messrs. Davison & Davison, civil engineers, of Windsor, to advise them on the drainage of the district, and to prepare the necessary plans and sections, &c.

**The Public Health (Metropolis) Bill.** At a recent meeting of the Association of Public Sanitary Inspectors, it was resolved "That the consideration of the Public Health (Metropolis) Bill be referred to the Council of this Association, with a view of amending same, and that practical suggestions (in writing) be invited from all members."

**Swanwick.**—An inquiry was held at Swanwick last Monday, with reference to an application of the Alfreton Rural Authority to borrow 2,000*l.* for the disposal of the sewage of Swanwick and Leabrooks by irrigation. Mr. W. H. Ford, Assoc.-M. Inst. C.E., explained the plan.



**W Purifying Process for Refuse**  
 Experiments were made some time ago by the Kronenberg workmen's colony near (Germany), belonging to the celebrated works of Krupp, for the purpose of purifying water from the houses sufficiently to use it flowing into a river without danger of water of the latter being rendered unfit for drinking purposes. The *Chemiker Zeitung* reports that this is as much as can reasonably be expected from a process of purification, it is evident that the use of river water for drinking is a remote contingency, against which special precautionary measures are necessary. The system of purification in question is based upon the simple fact that all the anions held in suspension by refuse water, such dissolved substances as have tendency towards decomposition, can be precipitated and decomposed by a very small addition of lime and green. The former is first added, and when it has exercised its full decomposing power, the date of iron completes the process of purification. At the Kronenberg colony this work is carried on satisfactorily by means of two tanks, into which the chemical agents are introduced by a simple method. There is an automatic contrivance for regulating the supply of chemicals so that they may be in proportion to the quantity of water to be treated. This is aided by the action of a water-wheel, the rate of which is regulated by the volume of water coming in, this varying at different times of the day, according to the domestications going on. The cost of the process out one-tenth of a penny per cubic metre (at 35 cubic feet) of liquid treated.

**Sanitary Condition of Wiesbaden.**  
 During the earlier part of the autumn reports have been current in the German press to the effect that the epidemic of a typhoid character had manifested itself at Wiesbaden had to some extent caused by negligence on the part of the local sanitary authorities. A local commission was named on behalf of the municipality to investigate the matter, Dr. Pottenkofer being amongst its members. According to the official report which has now appeared, the suspicions as to impurity in the water supply do not seem to have been founded. It was discovered in the supposition that disease had originated from cases having been amongst men employed in connection with the water supply works then being finished. Commission reports that the disease existed in town before the suspected water supply was working order. Moreover, the irregular use of the epidemic, as regards the localities visited, precludes the establishment of a definite accusation against the authorities responsible for the water supply. On the other hand, the commission has traced a connexion between the epidemic and the pollution of the river, as well as the close manner in which the town is built. The arrangements for dealing with faecal matter are considered to be in need of revision, as the system of pits is unsatisfactory. The treatment of refuse-water from the houses is also considered to require improvement. Excessive closeness of building is a factor demanding attention as well as the entire nature of house construction. The municipality has already commenced preliminary investigations in connexion with a thorough reform of the sanitary regulations of the town.

**Prevention of Escapes of Gas by Electricity.**  
 Arneval's appliance, shown in March at the Paris Electrical Exhibition consists of a spiral of chromic acid, the zinc of which is connected to the appliance is at rest quite outside liquid. When at work the latter covers both the spiral and a spiral of platinum wire is kept to a glow. If the dark red glowing light is conveyed along a pipe in bad condition, the place where the escape takes place is marked by increased brilliancy of the spiral in consequence of the catalytic action. The end of the spiral which carries the spiral is enclosed in metal tissue, and thus the explosive gas is prevented from becoming ignited. An appliance may be added in the day time which gives an alarm when escapes of gas are met with, as the spiral of the platinum wire would not be so easily distinguished as at night.

**Incoherent Lamps.**—Messrs. Woodhouse & Dawson have published a pamphlet on the merits of incandescent lamps, which, though it is essentially a trade circular, contains some useful information in regard to incandescent lighting.

## PRICES CURRENT OF MATERIALS.

| TIMBER.                               | £. | s. | d. | £. | s. | d. |
|---------------------------------------|----|----|----|----|----|----|
| Greenheart, B.G. ....                 | 6  | 10 | 0  | 7  | 10 | 0  |
| Teak, E.I. ....                       | 12 | 10 | 0  | 15 | 0  | 0  |
| Sequoia, U.S. ....                    | 0  | 2  | 6  | 0  | 2  | 6  |
| Ash, Canada ....                      | 3  | 0  | 0  | 5  | 0  | 0  |
| Birch ....                            | 3  | 0  | 0  | 4  | 10 | 0  |
| Elm ....                              | 3  | 10 | 0  | 5  | 0  | 0  |
| Fir, Dantzig, &c. ....                | 1  | 19 | 0  | 4  | 10 | 0  |
| Oak ....                              | 3  | 0  | 0  | 5  | 0  | 0  |
| Canada ....                           | 3  | 0  | 0  | 7  | 0  | 0  |
| Pine, Canada ....                     | 3  | 0  | 0  | 4  | 0  | 0  |
| Canada, yellow ....                   | 3  | 15 | 0  | 5  | 0  | 0  |
| Lath, Dantzig ....                    | 5  | 0  | 0  | 8  | 0  | 0  |
| St. Petersburg ....                   | 5  | 0  | 0  | 7  | 0  | 0  |
| Waincoat, Riga ....                   | 2  | 15 | 0  | 4  | 10 | 0  |
| Odessa ....                           | 3  | 2  | 6  | 3  | 7  | 6  |
| Deals, Finland, 2nd and 1st, std. 100 | 8  | 0  | 0  | 9  | 0  | 0  |
| Riga ....                             | 6  | 0  | 0  | 8  | 0  | 0  |
| St. Petersburg, 1st yal. ....         | 8  | 0  | 0  | 15 | 0  | 0  |
| 2nd, " ....                           | 6  | 0  | 0  | 10 | 0  | 0  |
| 3rd, " ....                           | 5  | 0  | 0  | 10 | 0  | 0  |
| Sweden, white ..... 6                 | 0  | 0  | 16 | 0  | 0  | 0  |
| White Sea ..... 8                     | 0  | 0  | 18 | 0  | 0  | 0  |
| Canada, Pine 1st ..... 12             | 0  | 0  | 12 | 0  | 0  | 0  |
| 2nd ..... 12                          | 0  | 0  | 18 | 0  | 0  | 0  |
| 3rd, &c. .... 7                       | 0  | 0  | 10 | 0  | 0  | 0  |
| Spruce 1st ..... 9                    | 0  | 0  | 12 | 0  | 0  | 0  |
| 2nd ..... 10                          | 0  | 0  | 8  | 0  | 0  | 0  |
| New Brunswick, &c. .... 4             | 0  | 0  | 7  | 10 | 0  | 0  |
| Battens, all kinds ..... 8            | 0  | 0  | 13 | 0  | 0  | 0  |
| Flooring Boards, sq. 1 in. - Free     | 0  | 9  | 0  | 0  | 13 | 0  |
| Second, first ..... 0                 | 7  | 6  | 0  | 8  | 8  | 0  |
| Other qualities ..... 0               | 5  | 0  | 0  | 7  | 0  | 0  |
| Cedar, Norway ..... 7                 | 0  | 3  | 4  | 0  | 4  | 0  |
| Honduras, &c. .... 0                  | 0  | 3  | 0  | 4  | 0  | 0  |
| Australian ..... 0                    | 0  | 3  | 0  | 3  | 4  | 0  |
| Mahogany, Cuba ..... 0                | 0  | 5  | 0  | 7  | 4  | 0  |
| St. Domingo cargo av. .... 0          | 5  | 4  | 0  | 7  | 4  | 0  |
| Mexican ..... 0                       | 0  | 4  | 0  | 6  | 5  | 0  |
| Tobacco cargo av. .... 0              | 0  | 4  | 0  | 6  | 5  | 0  |
| Honduras cargo av. .... 0             | 0  | 4  | 0  | 6  | 5  | 0  |
| Rosa, Rio ..... 0                     | 0  | 4  | 0  | 6  | 5  | 0  |
| Bahia ..... 0                         | 0  | 0  | 14 | 0  | 0  | 0  |
| Satin, St. Domingo ..... 0            | 0  | 0  | 0  | 0  | 0  | 0  |
| Porto ..... 0                         | 0  | 0  | 0  | 0  | 0  | 0  |
| Walnut, Italian ..... 0               | 0  | 4  | 0  | 6  | 5  | 0  |

## METALS.

| £.                              | s. | d. | £. | s. | d. |
|---------------------------------|----|----|----|----|----|
| Lead—Pig in Scotland .....      | 2  | 3  | 6  | 0  | 0  |
| Bar, Welsh, in London .....     | 4  | 15 | 0  | 5  | 0  |
| " " in Wales .....              | 4  | 7  | 8  | 4  | 10 |
| " " Staffordshire, London ..... | 5  | 15 | 7  | 0  | 0  |
| Sheets, single, in London ..... | 7  | 10 | 9  | 0  | 0  |
| Hoops .....                     | 6  | 5  | 0  | 7  | 5  |
| Nail-roads .....                | 5  | 15 | 0  | 7  | 0  |
| Corrugated .....                | 45 | 0  | 46 | 10 | 0  |
| British, cke. and ingt. ....    | 45 | 10 | 0  | 46 | 10 |
| Best selected .....             | 36 | 10 | 0  | 47 | 0  |
| Sheets, strong .....            | 54 | 0  | 0  | 0  | 0  |
| " India .....                   | 45 | 0  | 46 | 10 | 0  |
| Australian, fine cast .....     | 0  | 0  | 0  | 0  | 0  |
| Chili, bars .....               | 42 | 5  | 0  | 42 | 15 |
| Yellow Metal .....              | 0  | 0  | 44 | 0  | 42 |
| Lead—Fig, Spanish .....         | 12 | 5  | 0  | 0  | 0  |
| English, com. brands .....      | 12 | 0  | 0  | 12 | 5  |
| Silician, special .....         | 14 | 15 | 0  | 15 | 0  |
| Ordinary brands .....           | 14 | 15 | 0  | 14 | 7  |
| Tin—                            |    |    |    |    |    |
| Barca .....                     | 95 | 0  | 0  | 0  | 0  |
| Bilfion .....                   | 94 | 0  | 0  | 0  | 0  |
| Straits .....                   | 99 | 0  | 0  | 0  | 0  |
| Australian .....                | 93 | 7  | 6  | 94 | 0  |
| English ingots .....            | 97 | 0  | 0  | 98 | 0  |
| Tinplate—                       |    |    |    |    |    |
| IC coke .....                   | 14 | 6  | 0  | 16 | 0  |
| IX ditto .....                  | 21 | 0  | 0  | 25 | 0  |
| IX charcoal .....               | 16 | 0  | 0  | 26 | 0  |
| IX ditto .....                  | 24 | 0  | 0  | 26 | 0  |

## OILS.

|                              |    |    |   |    |    |   |
|------------------------------|----|----|---|----|----|---|
| Linseed .....                | 31 | 7  | 6 | 31 | 17 | 6 |
| Cocanut, Cochin .....        | 30 | 10 | 0 | 31 | 0  | 0 |
| Ceylon .....                 | 27 | 10 | 0 | 0  | 0  | 0 |
| Coconut .....                | 29 | 10 | 0 | 0  | 0  | 0 |
| Palm, Lagos .....            | 29 | 10 | 0 | 0  | 0  | 0 |
| Palm-nut Kernel .....        | 25 | 10 | 0 | 28 | 0  | 0 |
| Rapeseed, English pale ..... | 24 | 0  | 0 | 0  | 0  | 0 |
| " brown .....                | 22 | 5  | 0 | 0  | 0  | 0 |
| Cottonseed, refined .....    | 19 | 5  | 0 | 21 | 0  | 0 |
| Tallow and Oleine .....      | 25 | 0  | 0 | 45 | 0  | 0 |
| Lubricating, U.S. ....       | 7  | 0  | 0 | 10 | 0  | 0 |
| Refined .....                | 4  | 0  | 0 | 16 | 0  | 0 |

## CONTRACTS.

Epitome of Advertisements in this Number.

| Nature of Work, or Materials.            | By whom required.         | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|------------------------------------------|---------------------------|-----------------------------------|--------------------------|-------|
| Granite Curb .....                       | East Ham Local Board      | W. H. Savage                      | Dec. 8th                 | ii.   |
| Supply of New, and Purchase of Old Stone | Great Northern Ry. Co.    | Official                          | Dec. 10th                | ii.   |
| Broken Granite, Flints, &c. ....         | Barking Town Local Bd.    | do.                               | do.                      | ii.   |
| Works and Materials .....                | St. George's, Hanover-sq. | G. Livingstone                    | Dec. 12th                | ii.   |
| Fencing Work .....                       | Essex Local Board         | C. Jones                          | Dec. 14th                | ii.   |
| Kerbing, Tar-paving, &c. ....            | Leisham Brd. of Wks.      | Official                          | Dec. 15th                | ii.   |
| Telephone Poles .....                    | Lancashire, &c. Tel. Co.  | do.                               | do.                      | ii.   |
| Four Cottages, Boat-house, &c. ....      | Admiralty                 | do.                               | Dec. 18th                | ii.   |
| Completion of Esplanade Fur .....        | Rocheater Corporation     | Law & Chaberton                   | Dec. 19th                | ii.   |
| Stoneware Pipe-Sewer .....               | Wimbolden Local Bd.       | Official                          | Dec. 22nd                | ii.   |
| Sewerage Works .....                     | West Ham Local Board      | Lewis Angell                      | do.                      | ii.   |
| Collection, &c., of Dust .....           | Wandsworth Bd. of Wks     | Official                          | Jan. 5th                 | xiii. |

## TENDERS.

|                                                                                                                                                |            |
|------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| ASHFORD (near Staines).—For drainage and sanitary works at the West London District Schools, Ashford, Middlesex. Mr. Keith D. Young, architect | £1,318 0 0 |
| Dickens & Dickens .....                                                                                                                        | 1,316 0 0  |
| Sharpe & Co., Limited .....                                                                                                                    | 1,313 0 0  |
| G. Roberts .....                                                                                                                               | 1,295 0 0  |
| A. K. Addis .....                                                                                                                              | 1,285 0 0  |
| Cooke & Co. ....                                                                                                                               | 1,265 0 0  |
| B. Wells .....                                                                                                                                 | 1,247 0 0  |
| T. Anthony .....                                                                                                                               | 1,169 0 0  |
| Neville & Son .....                                                                                                                            | 1,160 0 0  |
| A. H. Apted .....                                                                                                                              | 1,138 14 0 |
| J. S. Halliwell .....                                                                                                                          | 1,108 0 0  |
| B. Walker .....                                                                                                                                | 1,061 0 0  |
| J. Kiddell .....                                                                                                                               | 961 13 0   |
| J. Knight .....                                                                                                                                | 947 0 0    |
| S. Saunders .....                                                                                                                              | 944 12 0   |
| W. G. Lilly .....                                                                                                                              | 924 0 0    |
| J. Bottrell .....                                                                                                                              | 915 0 0    |
| Leslie & Knight .....                                                                                                                          | 891 0 0    |
| H. C. Belch .....                                                                                                                              | 890 0 0    |
| North British Plumbing Company .....                                                                                                           | 861 0 3    |
| Burman & Sons .....                                                                                                                            | 860 0 0    |
| Calman & Co. ....                                                                                                                              | 842 0 0    |
| J. Newton .....                                                                                                                                | 839 0 0    |
| W. Nash .....                                                                                                                                  | 835 0 0    |
| G. Bell .....                                                                                                                                  | 827 0 0    |
| G. Gibson .....                                                                                                                                | 818 0 0    |
| G. Maxwell .....                                                                                                                               | 799 0 0    |
| E. Scott .....                                                                                                                                 | 798 0 0    |
| G. Neal .....                                                                                                                                  | 776 0 0    |
| C. Follitt .....                                                                                                                               | 769 10 0   |
| T. Nye .....                                                                                                                                   | 768 0 0    |
| Neville & Son .....                                                                                                                            | 727 0 0    |
| W. Johnson, Wandsworth (accepted)                                                                                                              | 726 0 0    |

BLACKHEATH.—For additions and alterations to "The Dignities," Westcombe Park, for Mr. W. Claude Johnson. Messrs. Higgs & Rudkin, architects, Bedford-row. Quantities supplied by Mr. J. Rookwood:

|                                                                                                                                                                                                                                         |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| W. Webster .....                                                                                                                                                                                                                        | £4,144 0 0 |
| Clarke & Bracey .....                                                                                                                                                                                                                   | 3,930 0 0  |
| B. E. Nightingale .....                                                                                                                                                                                                                 | 3,838 0 0  |
| Palmer & Frothingham .....                                                                                                                                                                                                              | 3,533 0 0  |
| Macey & Sons .....                                                                                                                                                                                                                      | 3,798 0 0  |
| H. L. Holloway, New Cross Gate .....                                                                                                                                                                                                    | 3,483 0 0  |
| * Accepted.                                                                                                                                                                                                                             |            |
| CARDIFF.—For new south block of offices for the Cardiff Exchange Buildings, Mount Stuart-square, for the Cardiff Exchange and Office Company (Limited). Messrs. James Seward, & Thomas, architects and surveyors, Cardiff and Swansea:— |            |
| D. C. Jones, Gloucester .....                                                                                                                                                                                                           | £2,159 0 0 |
| D. J. Davies, Cardiff .....                                                                                                                                                                                                             | 6,000 0 0  |
| C. Burton, Cardiff .....                                                                                                                                                                                                                | 5,738 0 0  |
| F. S. Lock, Cardiff (accepted) .....                                                                                                                                                                                                    | 5,316 0 0  |

DURHAM.—For alterations and additions for the Birtley Co-operative Society for Butchering Department. Mr. James E. Parsons, architect. Quantities supplied:—

|                                        |           |
|----------------------------------------|-----------|
| John Jennings, Chester-le-Street ..... | £268 2 3  |
| Tyrie & Graham, Gateshead .....        | 557 14 8  |
| Chipchase & Dobson, Jarrow .....       | 544 18 10 |
| Wakefield & Henderson, Gateshead ..... | 534 3 0   |
| Potts & Moorhead, Leamington .....     | 525 14 7  |
| Thomas Hunter, Washington .....        | 508 12 3  |
| Joseph Burnett & Son, Birtley .....    | 495 0 0   |
| * Accepted.                            |           |

EPBOM.—For the erection of mortuary and bakehouse to Workhouse. Mr. Herbert D. Appleton, architect, Wool Exchange. Quantities by Mr. F. T. W. Miller, Guildhall-chambers:—

|                       |          |           |
|-----------------------|----------|-----------|
| Borrage .....         | £250 0 0 | For Oven. |
| Balam .....           | 900 0 0  | 2100 0 0  |
| Walker .....          | 853 0 0  | 90 0 0    |
| Bullers .....         | 840 0 0  | 88 0 0    |
| Newman .....          | 839 0 0  | 81 0 0    |
| Potter .....          | 829 0 0  | 80 0 0    |
| Lake & Co. ....       | 820 0 0  | 75 0 0    |
| Newton .....          | 819 0 0  | 105 0 0   |
| Arney .....           | 813 12 0 | 86 0 0    |
| Humphris .....        | 810 0 0  | 72 0 0    |
| Grist .....           | 808 18 0 | 72 18 0   |
| Robson .....          | 800 12 7 | 126 15 3  |
| Robert .....          | 798 0 0  | 72 0 0    |
| Warr .....            | 795 0 0  | 97 0 0    |
| Evans .....           | 795 0 0  | 78 0 0    |
| Near & Co. ....       | 793 0 0  | 72 0 0    |
| Hughes .....          | 790 0 0  | 84 0 0    |
| Leslie & Knight ..... | 783 0 0  | 79 0 0    |
| Sawle .....           | 780 0 0  | 70 0 0    |
| S. Hards .....        | 744 12 0 | 71 18 0   |
| Killick .....         | 740 0 0  | 74 0 0    |
| G. Hards .....        | 645 10 0 | 78 19 0   |

HANWELL.—For new road and sewer, &c., at Hanwell Park, Hanwell. Messrs. Baker & Sons, surveyors, Queen Victoria-street:—

|                                |          |
|--------------------------------|----------|
| Rowland Bros. (accepted) ..... | £732 0 0 |
|--------------------------------|----------|

LEWES.—For the erection of detached residence, King Edward-road (exclusive of foundations), for Mr. Thomas Chatfield. Mr. J. B. Wall, architect, Walbrook:—

|                                         |            |
|-----------------------------------------|------------|
| James Longley, Crawley (accepted) ..... | £1,203 0 0 |
|-----------------------------------------|------------|

LEYTONSTONE.—For building a dwelling-house with addition in Mayville-road Park Estate, Leytonstone, Essex. Mr. W. C. Livermore, architect and surveyor:—

|                                             |          |
|---------------------------------------------|----------|
| A. Nicholls, Harrow-road, Leytonstone ..... | £365 0 0 |
| * Accepted.                                 |          |



**LONDON.**—For pulling down and rebuilding No. 58, Finsbury-pavement, for Mr. S. Solomon. Quantities by Messrs. D. Campbell & Son. Messrs. Theodore K. Green & Son, Finsbury-pavement, architects:—  
 L. H. & R. Roberts..... £2,795 0 0  
 Hall, Beddall, & Co. .... 2,790 0 0  
 Mark Manley..... 2,577 0 0  
 Ashby & Horner..... 2,550 0 0  
 Sabey & Son..... 2,517 0 0  
 R. Aves & Co. .... 2,488 0 0  
 Kilby & Gayford..... 2,472 0 0  
 Neave & Neave..... 2,459 0 0  
 Brass & Son..... 2,465 0 0  
 W. Woodward (accepted)..... 2,390 0 0

**LONDON.**—For building new coach-house and appurtenances at No. 42, Devonshire-street, W., for Mr. Thomas Hawkins. Mr. Mark H. Judge, architect:—  
 H. Tuten & Sons (accepted)..... £720 0 0

**LONDON.**—For fittings, 22, New Bond-street, for Messrs. F. Morris & Co. Mr. Alfred M. Ridge, architect:—  
 Trent Brothers..... £475 0 0  
 Scrivenor..... 473 0 0  
 Robinson..... 434 0 0  
 Anstey..... 205 0 0  
 Roberts (accepted)..... 192 0 0

**LONDON.**—For the erection of drill-shed for the Tower Hamlets Artillery Volunteers, Victoria Park-square. Mr. J. B. Wall, architect:—  
 Croogon & Co., Upper Thames-street\* £332 10 0  
 Accepted.

**LONDON.**—For alteration to 378, Mile End-road, for Mr. S. Sashy. Mr. J. B. Wall, architect:—  
 F. Head, South Hackney (accepted)..... £195 0 0

**LONDON.**—For providing and fixing a heating boiler and fittings at the St. Luke's Workhouse, for the Guardians of the Holborn Union. Messrs. H. Saxon Snell & Son, architects:—

Hodge & Son..... £304 3 8  
 Fraser & Co. .... 268 0 0  
 Marshall & Co. .... 115 0 0  
 Fraser & Fraser..... 193 0 0  
 May Bros. .... 185 0 0

**MITCHAM.**—For providing and fixing steam boilers, mains, and apparatus for heating; also hot-water supply, cold water mains, and supply firecocks and hydrants, at the New Workhouse, Mitcham, for the Guardians of the Holborn Union. Messrs. H. Saxon Snell & Son, architects:—

Berry & Son..... £8,297 0 0  
 Fraser & Co. .... 5,102 0 0  
 Potter & Son..... 5,047 0 0  
 Benham & Son..... 4,989 0 0  
 May Bros. .... 4,600 0 0

**SAXMUNDHAM.**—For alterations and additions to Benhall Lodge, Saxmundham, for Mr. Edmund W. Holland. Quantities supplied by Mr. B. J. Thacker. Mr. Henry Hall, architect, Doughty-street, Mecklenburgh-square:—

W. Rowland, London..... £5,315 0 0  
 R. S. Smith, Ipswich..... 5,186 0 0  
 Holliday & Greenwood, London..... 5,143 0 0  
 Alfred Cox, Ipswich..... 4,800 0 0  
 Howard & Son, Halesworth..... 4,729 0 0  
 W. H. Gibbs, Leiston..... 4,607 0 0  
 George Kenney, Ipswich..... 4,689 0 0  
 D. C. Jones & Co., Gloucester..... 4,565 0 0  
 Alfred Brown, Braintree..... 4,548 0 0  
 John Shillito & Sons, Bury St. Edmunds..... 4,544 0 0  
 Oliver T. Gibbons, Ipswich..... 4,536 0 0  
 T. H. Kingerlee, Oxford..... 4,533 0 0  
 George Grimwood & Sons, Sudbury..... 4,419 0 0  
 Cutting & Sons, Saxmundham..... 4,395 0 0  
 Everett & Co., Colchester..... 4,340 0 0  
 Leslie & Knight, London..... 4,309 0 0  
 Dobson, Colchester..... 4,195 0 0

*Warming and Hot-water Services, &c.*  
 Adams & Son..... 543 0 0

**SOUTHEASE.**—For additions, &c., to the "Castle Tavern," Somers-road, Southsea. Mr. James W. Stroud, architect, Brougham-road, Southsea:—

H. Jones..... £410 0 0  
 B. Newton..... 397 0 0  
 G. Beach..... 383 12 0  
 T. F. Hall (accepted)..... 340 0 0  
 [All of Southsea, Portsmouth.]

**STREATHAM.**—For shop fronts and fittings, Streatham, for Messrs. G. Taylor & Son. Mr. James Young, architect:—  
 Trent Bros. (accepted)..... £340 0 0

**WALWORTH.**—For certain plumber's work and repairs to roof at the Newton Infirmary, Westmoreland-road, for the Guardians of the Poor of St. Saviour's Union. Messrs. Henry Jarvis & Son, architects:—

Cattell..... £297 0 0  
 Riches..... 222 0 0  
 Evans..... 156 0 0  
 Castle..... 121 0 0  
 Wood & Co. .... 121 0 0  
 Stephens..... 117 0 0  
 Whicheo..... 105 0 0  
 Nash..... 98 0 0  
 Swan & Barlow..... 90 0 0  
 Walker..... 87 0 0  
 Roberts..... 79 0 0  
 Grady..... 73 10 0  
 W. G. Lilly, Crown-court, Pall Mall\* 73 0 0  
 Seed..... 65 0 0  
 Accepted.

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# The Builder.

Vol. XLIX, No. 2326.

SATURDAY, DECEMBER 12, 1885.

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### Sutton's Hospital in Charterhouse.



our issue of the 5th December we briefly announced that Charterhouse in London is marked for destruction in order that part of the site may be turned to more profitable account. Of

the many similar projects which we record from time to time we know none that should arouse in any but the most strictly utilitarian quarters a greater degree of interest. Standing remote, northwards of Charterhouse-square, and having lately escaped conversion into a fish-market, the buildings are unfamiliar to the general passer-by.

Many, doubtless, were surprised to read that the recent vast conflagration in Clerkenwell threatened to forestall the governors' present plans, and actually damaged the belfry behind what used to be Wilderness-row. Yet some will recall it to mind as the first *alma mater* of Wesley and Isaac Barrow; of Blackstone and Lord Ellenborough; the school of Lovelace and Crasshaw; Fastlake and John Leech; of Havelock and John Stewart; wherein Thirlwall and Grote, Addison and Steele were form-fellows. Thackeray seems to have entertained no great regard for the few months he passed at "Slaughterhouse" or "Smiffles," yet latterly, as his writings testify, he evinced a strong affection for the home of the "Cistercians" and their associations with "Grey Friars."

Singularly to tell, the earliest history of Charterhouse is closely associated with that of the Great Pestilence which ravaged Europe in the fourteenth century. Hecker describes for us the progress and desolation of the Black Death. Travelling from China to the East, it passed onwards from the Levant into Italy (as commemorated by Boccaccio), and thence over Spain, France, and Germany, into Great Britain. Stow relates how, entering our island in Dorset, and speeding onwards into Devon, Gloucester, and Oxford, it at length came to "London, and overspread all England, so wasting the people, that scarce the tenth [*sic*] person of all souls were left alive, and churchyards were not sufficient to receive the dead, but men were forced to choose out certain fields for burials; whereupon Ralph Stratford, bishop of London, in the year 1348, bought a piece of ground [some three acres in extent] called No Man's Land, which he enclosed with a wall of brick, and dedicated for burial of the dead." Pennant, be it noticed, identifies this plot with Pardon churchyard, since

used for interment of suicides and criminals.\* No Man's Land, formerly in St. Sepulchre's parish, is held by many authorities to correspond with the Crown holding cited in Domesday Book as being near to Newgate; one of the only two places in London, by the way, mentioned in that survey. Adjoining to No Man's Land was Spittle Croft, of thirteen acres, attached to St. Bartholomew's Spital,—whose parish was taken out of St. Sepulchre's at the Suppression,—which Sir Walter de Manny, a Flemish retainer of Philippa, King Edward III.'s bride, and a hero in her husband's French wars, purchased and applied to a like purpose. Quoting the inscription of a stone cross he had seen there, Stow avers that in 1349 more than 50,000 persons were interred in these two grounds. Some twenty years later the site was taken for that monastery,—not the first of its order in England,—for which was adopted the ascetic rule of Chartreuse founded by St. Bruno at Grenoble, and to which Michael de Northburgh, bishop of London, 1354-1361, proved a large as he was a first benefactor.† Northburgh is reputed to have persuaded De Manny to convert the latter's intended college for a warden, dean, and twelve priests secular, into a priory for twenty-four monks. Other holdings were acquired by the Carthusians, such as Hervy's Croft and Newchurch Haw; and to the south-eastern corner of the rest, an acre which in 1429 was let to them at an annual rent of a red rose by one William Rendre, citizen and barber. Rendre's acre, being pasture land, lay in Conduit Shoot near to Trillemille Brook in St. Andrew's de Holborn, and eastwards of the king's highway leading from Holborn to the prebendal manor of Kaunteloe (Kentish Town). The precincts have always been extra-parochial.

The fortunes of the House of the Salutation of God's Mother attained to their apogee during the priorship of John Houghton, when, *teste* Dugdale, their revenues amounted to 642*l.* a year. The monks were visited with a signal share of royal displeasure. For contumaciousness in the matter of the king's supremacy, Prior Houghton and Proctor Middlemore were (1534) committed to the Tower. Nor did speedy submission secure their safety. In 1535 Houghton was again imprisoned, and, with some monks, executed at Tyburn, May 4. On their way to the scaffold they were seen by Sir Thomas More, himself a captive, who had spent some time in religious retreat in Charterhouse. One of Houghton's arms was set over the gateway, opposite to the Hall, leading from

\* Pardon Church lay between the new Clerkenwell-road and Sutton-street; the site was afterwards given to a Welsh congregation.

† Vide Archdeacon Hale's account in the "Transactions of the London and Middlesex Archaeological Society," iii.

the entrance-court into the main or Hall court. Such of the monks as still held out against Fylott, Cromwell's visitor, were severely disposed of by execution, or the cruellest of imprisonment in Newgate at the hands of his agent, Thomas Bedyll. Other monks remained under William Trafford, the last prior, and two-and-twentieth of his house. A small party, who had sought refuge in Bruges, were reinstated by Mary, and to them her sister and successor granted a safe conduct to return abroad.

Most noteworthy is it to read how Charterhouse met with a fate different from that which generally overtook the dispossessed monasteries. It ultimately became, in fact, the home, in turn, of certain allied noble families. Having served for a while, like to the neighbouring priory of St. John of Jerusalem, as a storehouse for Henry's pavilions and nets, together with other equipments for the chase, it was granted (1542) to Thomas Hall and John Bridges for their joint lives. The king next gave it to his Lord Chancellor, Sir Thomas Audley,—Lord Audley, of Walden, whom he also endowed with the priory of Holy Trinity without Aldgate. In April, 1555, Lord Chancellor Audley sold Charterhouse to Sir Edward North, treasurer to the Court of Augmentations, elevated Baron North of Kirtling, county Cambridge, 17th February, 1554. Lord North sold it for 2,500*l.* to John (Dudley) Duke of Northumberland, at whose execution it again reverted to him by grant of the Crown. By deeds, dated May 31 and June 7, 1565, Roger, second Lord North, husband to Winifred, daughter of the Lord Rich who had succeeded to the adjoining St. Bartholomew's priory, conveys the property for 2,820*l.* to Thomas (Howard) fourth Duke of Norfolk, whose second wife was Margaret, daughter and sole heir to the named Thomas, Lord Audley of Walden. The house he here built for himself was for a while the Duke's prison-house. For having been committed to the Tower when a plague broke out in the Tower liberties, he was allowed to return hither under the easy custody of Sir Henry Neville. But scarcely within a few months of the completion of his design he was again seized and reconveyed to the Tower. At the Duke's conviction and attainder (1572), Charterhouse was made over to his second son, Thomas, who, succeeding to his mother in the barony of Walden, was here, in the existing great Hall, advanced Earl of Suffolk (May 4, 1603) by James I. On that day James made his public entry into his new capital, and willing to show respect to a family who had so suffered in his mother's cause, turned aside from out of Aldersgate-street to the then Howard House, which he reached at six in the evening. Here he and his following were right



regally entertained for a space of four days. Hence James went to Whitehall, and so to the Tower. With his customary rapacity, the Earl of Suffolk alienated Charterhouse, 9th May, 1611, to Thomas Sutton, Master-General of the Ordnance in the North, for 13,000*l*. Sutton died on December 12th (ever since commemorated as Founder's day) of that same year. In this short interval, having long desired to so devote, in his own words, a large and liberal estate to public good, he endowed what Fuller justly terms "a masterpiece of Protestant English charity," and which until Guy's time stood, says Pennant, as "the greatest gift in England, either in Protestant or Catholic times, ever bestowed by one man."

The last-named writer is hardly correct in declaring that "there is scarcely any vestige of the conventual building, which is said to have stood in the present garden." The Preachers' and Pensioners' Courts are Blore's work, it is true. Yet the curious might find some cells and other remains southwards of the playground; also in the kitchen, *antique* "Egyp<sup>t</sup>, the fayshe kychyne"; in the basement, western end, of the earlier school; and by the Chapel tower. Evidence House (the munition-room), Washhouse-court, and the Cloister, present several relics. Yet these, albeit highly interesting in themselves, yield in value, from the structural point of view, to their later surroundings. For in them we have a most excellent,—and, indeed, in London a quite unique,—example of a nobleman's private residence *temp.* Queen Elizabeth and her successor. The Officers' Library and the Drawing (or Governor's) Room, reached by a magnificent staircase of date 1571, were occupied by Elizabeth, as yet uncrowned, when on her way from Hatfield to the Tower. She stayed here from the 19th to the 28th of November, 1558, as the guest of Lord North. The interior of the Great Hall\* is remarkably fine.

It is unquestionably the Duke of Norfolk's work, since his initials and date T. N., 1571, are repeated in the carving. Its chimneypiece, as also the entrance to the chapel, are of Sutton's time. So important, indeed, are these several features that they may well form the subject of a separate article. Their details may be studied at leisure in the set of views taken (1880) for the Society for Photographing Relics of Old London, *à curis* Mr. Alfred Marks, to whom we are indebted for some valuable information not available to the ordinary visitor, and on points but dimly discernible in a winter's dark day.

We cannot here discuss the merits of the school's removal in 1872, followed by the migration hither of the Merchant Taylor boys from Suffolk-lane. The pious founder provided a free school for only the children of poor men; at their first meeting, July, 1613, the Governors confirmed these conditions. We can but surmise with what astonishment Sutton, did he arise from his costly alabaster tomb in the Chapel, would regard the buildings that crown the high lands northwards of Godalming; of his kindred foundation we are reluctant to speak. Comforted and relieved in their failing years, the pensioners move hither and thither in their high hats and long gowns like to ghosts of a time and usages which this age has well-nigh forgotten; or finding, at once seeks to change. In his "Sketch-book" (London Antiques) Washington Irving dwells with exquisite fancy upon the quaintness and sanctity that surround the closing years of these necessitous gentlemen. Thackeray's stronger hand has touched upon the pathos of their situation; his account culminates in that passage wherein he tells us how within sound of the chapel bell, and with "Adieu" on his lips, the Colonel, "whose heart was as that of a little child, had answered to his name, and stood in the presence of The Master."

**Society of Engineers.**—The Society of Engineers will hold its annual dinner at the Guildhall Tavern on Wednesday next, the 16th of December.

\* Styled by the boys "Old Codd's Hall"; their own they named "Young Codd's Hall."

### WATER MAINS.

It is usually considered necessary to give mains, and, indeed, every size of pipe conveying water, a cover of 3 ft., neither more nor less, this particular depth of cover being regarded as sufficient to meet the exigencies arising out of the necessity of offering resistance to the effects of frost, the concussion caused by traffic in the street or road above, and a convenient depth for examination and repair. The excavation of a considerable length of the trench is usually made before any of the pipes are placed in position, so that they may rest upon firm or "unmoved" ground, with the exception of a short length at the joint, where holes are formed of sufficient width and depth to admit of the pipes being joined with freedom. It is not usual, however, to excavate at any one time a greater length of trench than the pipe-layers can keep pace with, as unnecessary interference with traffic might accrue, and, for similar reasons, the trenches are refilled at the same rate as the pipe-laying proceeds. When the trench has to be hewn out of the solid rock, which is not unfrequently the case, it is excavated at a slightly increased depth, and about 6 in. of soft material is then laid upon the rock, forming a bed for the pipe to rest upon. In refilling the trench, after the pipe has been laid, the material ought always to be carefully beaten and consolidated at every 8 in. of depth, the finest being selected for immediate contact with the pipe. Sufficient space is left to receive the bottoming for the metal or paving stone requisite to properly restore the surface of the street or road. When the pipes pass through fields and the top of the pipe is necessarily near the surface of the ground, an embankment is formed of the surplus material from the pipe trenches, so as to give a cover of at least 2 ft., a convenient slope for this being 4 to 1. The soil must first be removed from the site of the embankment, and afterwards replaced, and neatly trimmed off and sown down. Where pipes have to be taken across bridges very little depth of cover is usually obtainable. In order, therefore, to secure the least possible exposure to the effects of vehicular traffic, the pipes are laid under the footpath, the bed for which is prepared at as great a depth as can be obtained. They are then surrounded with fresh concrete, and the pavement carefully relaid in a bed of mortar. Fig. 1 illustrates a case of this kind, the

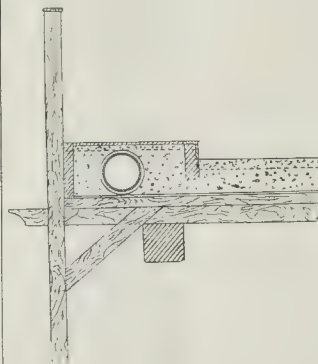


Fig. 1.

section being taken through the centre of the bridge, the dotted line representing the level of the footpath and surface of the road at the ends of the bridge. In circumstances where the ground is too soft to admit of the pipes being properly and firmly bedded they are rested upon short lengths of Baltic white pine deals, 9 in. by 3 in., and secured by hard-wood slack blocks, 4 in. by 4 in. at thick end, and 2 ft. long, placed one on each side of the pipe, and firmly driven, so as to give the pipe a proper bearing. The length, number, and distances apart of these sup-

ports are regulated from time to time as circumstances may dictate.

Where small streams are crossed it is often customary to carry any water that may be flowing down them at the point of the crossing of the water-mains, through pipes of a sufficiently large diameter to meet the requirements of the case. Where streams exist, when this cannot be conveniently done, it is often necessary to cross them by flanged pipes, affording them a substantial support of masonry or concrete abutments on both sides, hollowed out about 3 in., to receive the pipes. When exposed, they are covered with red Norway battens, 6½ in. broad and 2½ in. thick, selected, and free from sap-wood, cut to the proper level at the edges and curve at the top, and the whole crosscut. The battens are laid on the top of the flanges, fitted close, and secured by wrought-iron straps, 3 in. by ½ in., and keyed up with cottars. The stonework of the abutments is dressed off, so that the wood may fit close; but the covering should not be put on till the joints have been properly tested.

In dealing with the case where a river of considerable width has to be passed, and no suitable means of transit exist, two alternatives present themselves,—either a bridge must be constructed, which might prove a very expensive undertaking, or the pipes must be laid under the bed of the river. The determining factor, of course, is the question as to which, taking everything into consideration, would be ultimately the more economical. The latter was adopted some time ago, when a line of 36-in. pipes was laid below the river Clyde. Before we proceed to describe in detail the system of cofferdam adopted, it would be interesting to refer for a moment to a passage in Mr. Samuel Smiles's "Lives of the Engineers," p. 392, where he tells us how "James Watt, in his seventy-fifth year, was consulted by the Glasgow Waterworks Company as to the best mode of conveying water from a peninsula across the Clyde to the company's engines at Dalmarnock, a difficulty which appeared to them almost insurmountable; for it was necessary to fit the pipes through which the water passed to the uneven and shifting bed of the river. Watt, on turning over the subject in his mind, shortly hit upon a plan, which showed that his inventive powers were unimpaired by age. Taking the tail of the lobster for his model, he devised a tube of iron similarly articulated, of which he forwarded a drawing to the waterworks company, and, acting upon his recommendation, they had the tube forthwith made and laid down, with complete success. Watt declined to be paid for the essential service he had thus rendered the waterworks company; but the directors made a handsome acknowledgment by presenting him with a piece of plate of the value of a hundred guineas, accompanied by the cordial expression of their thanks and esteem." When we compare the early engineering enterprise as exhibited in the above reference, with its modern development, illustrated in the following details, the effect is not a little entertaining. A cofferdam was formed, consisting of two parallel rows of main piles, from 12 in. to 14 in. square, which were driven 9 ft. from centre to centre, the piles in each row being 6 ft. apart. Each 6-ft. space was filled in with 10-in. sheet piling, driven between a double line of wales, and a double line of guide wales, 12 in. by 6 in., checked and bolted by ½ in. bolts to main piles, so that, in driving, the direction of the piles was under complete control. The edges of all the piles and walings were sawn straight and parallel, the joints caulked, and the dam puddled outside, and made perfectly watertight. The dam was so strutted inside as to preserve the parallelism of the two rows of piles, and supported from the down-stream side, so that it was able to withstand the force of the river when in flood. The piles were all ringed at the top, and shod. Not more than one-third part of the width of the river was occupied by the sheet piling of the cofferdam at any one time. Although the space occupied by the main piles and the piles of the staging necessary for gaining access to the work occupied an additional width, a clear space of 50 ft. was maintained at all times for the



passage of vessels. Rows of 6-in. sheet piling were driven across the bed between the two rows of main piles, in advance of the pipe-laying, and at such distances apart as admitted of six pipes, each 12 ft. long, being laid at one time. After each six pipes were laid, a row of sheet piling or 6-in. planking was placed across the dam on the top of the concrete, which was put round the last pipe laid, and both this and the sheet piling in advance were caulked, strutted inside to the main piles, and puddled up on the outside, so that the dam was perfectly water-tight. These cross dams or bulkheads were placed sufficiently far from the end of the last pipe laid, to allow of the

outer part of the socket was carefully removed. A piece of  $\frac{3}{4}$ -in. wrought-iron tube was screwed into the centre hole in the socket, adjusted to stand at right angles to the axis of the pipe, sufficiently long to reach above the surface of the water after the pipe had been sunk, and marked in feet and inches. Each pipe was lowered into its position gradually by means of tackle attached to it, and in such a manner that the joint would not at any time be cantled more than 2 in. or  $4\frac{1}{2}^\circ$  off a perpendicular to the axis, the tubes fixed into the sockets enabling this to be done with accuracy, these tubes being afterwards removed. After the pipes had reached the proper depth, a

lead, shown in fig. 3, must have as much rope-yarn tightly driven into the socket as will leave a uniform space for lead all round, a width which is defined by the size of the pipe used.

| Diameter of Pipe.               | Depth of Lead. |
|---------------------------------|----------------|
| 42, 36, 27, and 24 in. ....     | 3 in.          |
| 21, 18, 16, 15, and 14 in. .... | 2½ in.         |
| 12, 9, and 6 in. ....           | 2 in.          |
| 5, 4, and 3 in. ....            | 1½ in.         |

A point of some interest, the facts of which are not frequently to be met with, is the amount of lead which a well-made joint will take. We give the weight in the case of seven of the most commonly-used pipes in the above list, viz., 36 in., 24 in., 15 in., 12 in., 9 in., 6 in., and 4 in., the weight of lead used for the joints of which should neither be more nor less than respectively 53 lb., 39½ lb., 22 lb., 17 lb., 10½ lb., 5 lb. 6 oz., and 2 lb. 14 oz. The lead is run into the socket by means of a clay fillet and jointed clasp ring, and the joint is afterwards neatly set up with caulking tools and 4 lb. hammers, and the joint left flush with the outside of the faucet; but a sufficient time must be allowed for the lead to cool before the joint is caulked up. In the case of lead joints being made in the turned and bored pipes, the whole space left for the purpose in the castings must be run up with lead, the joints, of course, being properly cleaned out before the lead is run in. Where flange-joints are adopted,—an expedient which is often necessary in forming a connexion with existing pipes, any length of pipe being easily obtained by the simple process of cutting them so as to make them fit in the required position. The carrying out of such a connexion is often of the greatest urgency, as a large portion of a town or city may be deprived of water until it is accomplished. The bolts used must be of the best iron, have square necks, and, usually, hexagonal heads and nuts are used; but the bolt must in all cases fill the nut. The joints ought to be made with flat-vulcanised india-rubber rings of good quality, always adopting the precaution of scraping the flanges clean before the joint is made.

Where pipes are laid of a larger size than those which may have existed in the locality, with the object of affording an increased supply of water to the district, it is often desirable to lift the old pipes, if in a sufficiently good condition, and relay them in another position. In the case of pipes with turned and bored joints, it is easy to remove them without cutting or otherwise injuring their joints, provided that the proper tools are used for the purpose. But in the case of the existence of lead joints, they must be melted out in the trench with as little annoyance to the inhabitants of the neighbourhood as may be possible. The pipes are then carefully lifted so as to avoid breakage, thoroughly scraped, and cleaned out inside in order to remove all rust, and then carted to the place where they are to be relaid.

The precautions which are usually resorted to in order to secure proper quality of metal, provide that the best grey metal be used, and under required conditions. The metal is remelted in a cupola, and at each casting a specimen bar and a specimen link are cast. The bars are 3 ft. 6 in. long, 2 in. deep, and 1 in. thick, which are placed on supports 3 ft. apart. They must bear a weight of 30 cwt., or 3,360 lb., in the centre without breaking. The links must bear a direct tensile strain of 7 tons on the square inch for twenty-four hours without breaking. These tests ought always to be made in the presence of the engineer or his representative. The casting of the pipes must be done vertically in dry sand, with the socket down. There must be sufficient head of metal to secure solidity, which head is subsequently cut off in a lathe. The pipes and special castings are then to be coated inside and out in a careful manner, according to Dr. R. A. Smith's patent process, applied at a proper heat; but care must be taken to have this accomplished before any rust sets in, and this often necessitates the coating being done before the pipes are proved; but, if they are proved before being coated, they must be carefully paid over inside with good raw linseed oil. The proof pressure generally adopted in



Fig. 2.—Turned and Bored Joints.

joints being made with freedom. After the excavations inside the cofferdam were made to the proper depth, piles, 12 in. by 12 in., were driven several feet into the bed of the river and the heads cut off level, and hollowed out to receive the pipes. Every second pipe was fastened by a wrought-iron strap to two piles, with the heads cut level with the top of the pipe. In the places where the cross dams were put inside the cofferdam, the trench was filled in to the level of the top of the pipe with Portland cement concrete, mixed and laid down so as to be perfectly water-tight. The concrete was composed of one part cement, one of clean river sand, and two of clean gravel, which,

quantity of sand was thrown in round them, so that the action of the water might carry it below the pipe, and give it a uniform bed at the required level.

The pipes in general use for distances where there are no bends in the line have turned and bored joints, the latest and most improved design for which, now adopted in all important works, is illustrated in fig. 2. But when deviations from the straight line occur, plain socket joints for lead are used. The special castings, of which there are numberless varieties, to suit every condition in which a pipe may be placed, except where they are provided with flanges, have also plain socket joints, as illustrated in fig. 2. It is always necessary, before



Fig. 3.—Wide Sockets for Lead Joints.

after being thoroughly mixed, was immediately used. While the trenches were being cut, it was necessary to work the pumps constantly, though the difficulty met with in respect of water was not so great as had been anticipated. After the pipes had been laid, the trenches were refilled with the material, and excavated to the level of the bed of the river, the sand and firm parts of the material being put next to the pipe. The process of laying the pipe was somewhat peculiar. The inner portions of the turned and bored parts were, after being carefully scraped and cleaned, paid over with a little thick anti-corrosive brown paint, and two pipes put together so that they might lie in the same straight line, and forced home by

lowering a pipe into the trench, to carefully brush it through, so as to remove any soil, stones, or other matter, which may have accidentally entered, and to scrape and clean the turned and bored parts. The pipes are lowered singly, brought to the proper inclination, firmly bedded, and made to rest throughout their whole length on the solid ground. Every effort ought to be always made to lay the pipes in straight lines; but where slight deviations occur, the joint must then be run up with lead. Curved special castings have to be provided for the more important bends, as, for example, those of small radius, but plain socket-joints will do where the bend is sufficiently large. In regard to the pipe shown in fig. 2, after it

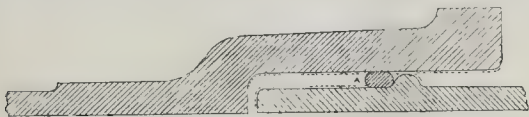


Fig. 4.—Socket for Rubber Ring Joint.

two screw bolts secured to a jointed ring round the socket of the pipe last laid, and to a strap across the socket of the pipe being laid. The pipe was then held in this position till the joint had been run. A piece of rope-yarn, prepared to the proper size, was then put into the socket, but not driven so far in as to prevent the lead completely filling the space prepared for the purpose, and kept in its place by a jointed clasp ring. The lead was run into the joint through holes bored into the socket, and to secure the utmost solidity of the lead joint, one-half more hot lead than was required was kept at hand in ladles. The rope-yarn was afterwards taken out, and then any lead which had found its way into the

has been properly cleaned and bedded, the turned and bored parts are paid round with good anti-corrosive brown paint of a proper consistency. The pipes are then driven together in a careful manner, the blows being directed all round the socket end of the pipe which is being driven, and repeated till it is quite home, but not longer. There is always an indication of this point in the driving, which experienced men recognise at once; but, the want of such recognition on the part of unpractised hands frequently gives rise to broken pipes. The driving-pipe is usually suspended by a stout rope from a plank supported over the trench upon two trestles, one on each side. Pipes and special castings, having wide joints for



practice, though it varies with different sizes of pipe, is not always higher in case of increase of diameter, as will be seen from a glance at the following table, which indicates the particulars of the pipes used in the Blane and Endrich Valleys on the line of the Loch Katrine Aqueduct:—

| Diameter of Pipe. | Thickness of Pipe. | Proof Pressure.           |                       |
|-------------------|--------------------|---------------------------|-----------------------|
|                   |                    | In vertical ft. of water. | In lb. on the sq. in. |
| 48 in.            | 1½ in.             | 200                       | 86½                   |
| 48 in.            | 1½ in.             | 400                       | 173½                  |
| 36 in.            | 1½ in.             | 500                       | 217                   |
| 36 in.            | 1½ in.             | 400                       | 173½                  |
| 30 in.            | 1½ in.             | 600                       | 260                   |
| 24 in.            | 1 in.              | 500                       | 217                   |
| 15 in.            | ¾ in.              | 500                       | 217                   |

Each pipe is rapped with a hand-hammer from end to end while the pressure is upon it to discover whether there are any sandy, porous, or blown places.

It is important during the process of turning and boring that the pipes should be secured in such a manner in the boring-machine that they will remain perfectly cylindrical. One half-inch of clearance must be allowed for the driving, and, to test the accuracy of the boring tools, two pipes are usually driven together at frequent intervals, say every second day. The ends of the pipes without sockets are cut with a bevel, and the flanges of special castings are faced in the lathe. All the special castings are made 1-8th in. thicker than the pipes to which they are to be connected, and castings which are in any part 3-16ths in. less in thickness than that specified, ought to be rejected. It is not always possible to cast specials after the manner described for pipes in general, but they must, as far as possible, be cast vertically with the sockets down in dry sand moulds and with dry sand cores. It is of the greatest importance that the special castings as well as the pipes should be perfectly free from sand or air-holes, smooth both inside and out. The turned and bored fillets should project beyond the body of the pipe.

The sinking of the pipe tracks between Glasgow and Rutherglen, owing to the extensive mining operations carried on in the neighbourhood, gave frequent trouble in the form of blown joints upon the water-mains. To obviate this a proposal, illustrated in fig. 4, to adopt rubber-ring joints, shown at A, was carried out in the spring of the present year. The dotted line is intended to indicate the parts which were turned and bored to gauges. The only objection to the employment of it seems to be the probability in course of years of the india-rubber ring losing its elasticity, and this is a small matter when the convenience with which it may be renewed is considered.

#### NOTES.

**T**HE *Manchester Guardian* states that a project for the formation of a ship canal from Boulogne to Paris has been laid before the Council Général of the Department of the Seine. The length of the line is stated at 187 miles, the capital required at 32,000,000l. This would give a cost of a little over 170,000l. per mile. The Suez Canal, in which there are no works of art of importance, with the exception of the piers projecting into the Mediterranean, cost 144,000l. per mile, to the end of 1882, for works, to which has to be added the further sum of 56,000l. per mile for financing, making altogether 200,000l. per mile. The traffic on the latter has increased gradually to a little under six million tons net, or eight million tons gross, measurement, making the entire transit of the canal in a year. The traffic estimated for the French ship canal is eighteen million tons in the year. The committee appointed by the Council Général to investigate the scheme have come to the conclusion that these figures have not a solid foundation; and being unwilling that the support of the authority in question should be given to an imperfectly-studied project, have

recommended the Council to pass to the order of the day, which has been done accordingly.

**T**HE question of the employment of colour in sculpture still continues to attract a great deal of attention on the Continent. One of the greatest supporters of the polychromatic theory is Dr. Georg Treu, Director of the Museum of Antiquities at Dresden, who is the author of a pamphlet entitled "Ought we to Colour our Statues?" a publication which has occasioned some sensation in art circles in Germany. Principally owing to the efforts of this gentleman the authorities of the National Gallery at Berlin have, we learn, organised an exhibition of painted and coloured plastic works. Their main object has been to familiarise artists and the art-loving public in general with all that has hitherto been attempted in this particular branch of art. The exhibition accordingly consists of a collection of examples of polychromatic sculpture belonging to all epochs and countries. The Berlin authorities have been very successful in obtaining from various museums, from public and private galleries, as well as from living sculptors, the loan of a number of exceedingly interesting specimens of coloured plastic work. Amongst them are plaster casts painted in oil, works in marble, slightly tinted, terra-cottas in all shades, and busts, composed of pieces of marble of different colours (the most detestable expedient, we may observe, ever employed to vulgarise a great form of art). Since it was opened this collection has been constantly visited by spectators, showing the extensive interest manifested in the subject.

**T**HE Corporation of Preston appears to have been more energetic than wise. For some twenty years they appear to have supplied the district of Fulwood with water, although they had no statutory power to do so. This they did before there was any local authority with the power to give such a supply; and they did it with the licence of the Fulwood Local Board. But this Local Board has since obtained statutory power to supply the district in question with water. The result is a lawsuit between the Corporation of Preston and the Fulwood Local Board, the first stage of which has just been decided by Mr. Justice North. It was, we should have supposed, pretty clear, even without a judicial decision, that the Corporation had no right to act as they did; for, as Mr. Justice North observed, if they had the right to lay down water-pipes half a mile outside their boundary, there was really no limit to their local jurisdiction. Then, as to the argument that the Corporation had received an irrevocable licence from the Local Board, it was invalid of a Corporation to grant permission to do that which it had no authority to do itself; for it stands to reason that the basis of any authority at all was wanting. Consequently, also, the Corporation had no legal right to break up the streets of the suburb of Fulwood. It is much to be hoped that the decision will serve to remind all corporations that their powers are bounded by statutory limits, and that, even for the most laudable purposes, they must not step beyond them.

**T**HE works of the competitors for the various medals and prizes awarded on "Commemoration Day" to the students in the schools of the Royal Academy were on view on Friday and Saturday last, in the galleries of Burlington House. The chief competitions for the gold medals, which are only offered in alternate years, are taking place on this occasion. We are glad to see an increase in the number of competitors in architecture, and that, though the subject, "A Town House," is a difficult one to treat, five out of the seven designs are of great merit, and one, at least, highly original, even to the verge of eccentricity. Entering the room there is first, on the left, a Renaissance design, the chief feature of which is an order of three-quarter columns, raised on a lofty basement, as high as, or higher than, the order. The basement contains the ground and first floors of the house,

and the latter is lighted by a range of enormous windows, which, unfortunately, weaken the basement in appearance. The column on the angle in the upper part and the two nearly equal cornices are also points for criticism; but the beautiful frieze of horses and general harmony of the composition, aided by clever draughtsmanship, have combined to produce a fine and original design. Next comes a rather effective but fussy pile in a florid Renaissance, and then a clever design in the well-known style of a prominent architect, effectively grouped and drawn as to the perspective, in brown ink lines and washes. The influence of some architects on their pupils and assistants is remarkably exemplified in this design and the one first described. Crossing the room we come to a really fine composition in the François I. style, with high roofs and dormers, well planned and drawn and carefully considered in all its details. The next set of drawings reveals to the startled critic a house which must be intended for Cairo or Damascus,—which, by the bye, there is nothing in the conditions to forbid,—a highly original and certainly very clever conception, but the drawing, though refined, very slight and weak. The other two sets of drawings show respectively a design in good regulation Classic, with which it would be almost as difficult to find fault as it would be to praise it highly, and one in the regulation Domestic Gothic of a few years back, of which the kindest thing to suppose is that the author submitted it as a joke.

**M**R. MIDDLEWEEK'S paper on the housing of the poor, read before the Association of Public Sanitary Inspectors last Saturday, took up, among other points, the subject of overcrowding as the result of a necessity for the workman to live near his work, and urged the remedy which has been so much discussed, of the extension of living-ground out of London by the installation of a regular system of workmen's trains. Previous evidence in regard to this point shows that it is very doubtful whether this system would be accepted by the mass of artisans, or whether it could be made to pay. Mr. Middleweek also attacked the "model dwelling" system, on the ground that the rents were too high in such buildings, and that there was very little recreation-ground in connexion with them in comparison with the number of children who lived in them. The latter statement is certainly true, but it is connected with the former inextricably. The aim of most people who promote model dwellings is to make them remunerative at as low rents as possible. If more ground is taken, rents must be proportionately higher, unless the buildings are to become a mere charity establishment for finding people homes at rents convenient to their means. Like others who have written and spoken on the subject, Mr. Middleweek seems to ignore what is at the root of the whole difficulty, the fact that more people crowd into London than there is work and living for. To give exceptional advantages to these in the matter of rents, and to compel railways by law to run trains on other than remunerative terms to enable working men to live out of London,—these and other such propositions, however benevolently intended, and however they might tide over a difficulty in a temporary manner, would in the long run only tend to develop the evil of overcrowding and pressure on space in London in more formidable dimensions.

**T**HE Société Centrale des Architectes, at its general meeting on Sunday, the 6th inst., elected its officers for the year 1886 as follows:—M. Bailly, member of the Institute, president; M. Hermant, vice-president; M. Wallon, principal secretary; MM. Monnier and C. Bernard, assistant secretaries; M. Paul Scdille, keeper of the records; M. Lesonfiché, treasurer; MM. Questel (member of the Institute); Alfonse Normand and J. Heinar, censors. At the previous meeting the Archaeological Commission nominated and caused to be elected Messrs. l'Anson, of London; Strohm, of St. Petersburg; and Da Silva,



of Lisbon, corresponding members of the Commission. The Council of the same Société, at its meeting on the 2nd of December, on the proposition of M. César Daly and other leading members, unanimously elected Mr. George Aitchison, Mr. R. P. Pullan, and Señor Mariano Belmas, corresponding members. Señor Belmas is secretary of the Spanish Society of Architects, Architect to the Public Works Department in Spain, and director of the "Revista de Arquitectura"; he is also an honorary and corresponding member of the Institute of British Architects.

THE paper read before the Edinburgh Architectural Association, on the 3rd, by Lord Dean of Guild Gowans, "On the Maintenance of the Health of the People and the Beauty of the City," contained much that was both true and well put. We observe the speaker commented on what we have several times drawn attention to, "the mistake of closing-in the angles of ground laid out for tenement houses," a remark which applies equally to quadrangular arrangements in public buildings. In regard to the beauty of the city, Dean Gowans regrets the introduction of brick and cement in Edinburgh, as showing a tendency to partially displace the stone architecture. In regard to the sanitary portion of the paper, we may quote the following as specially deserving of attention:—

"At our pit-heads and in our paraffin works, where there is always abundance of heated water, why should there not be baths for the use of the men, who, from the nature of their occupation, get soiled and begrimed, and who, from the want of such accommodation, have to find their way home more akin to animals than human creatures, and in this state have to enter among a family crowded into a single apartment, where there are no facilities for attending to what would not only refresh their bodies, but give comfort to their whole household? I would even go a little further in regard to this, and suggest that the men whom I am alluding to should not only wash and refresh themselves by free use of water at the works, but might, with little trouble to themselves, and certainly with great personal pleasure, have clothing suitable, which could be kept there, while comfortable and cleanly apparel could be put on for use in retiring to their homes."

THE Académie des Beaux-Arts, in a nearly full meeting (a thing of rare occurrence), on the 5th instant, elected Baron Alphonse de Rothschild an honorary member by twenty-seven votes against twenty given to M. Duplessis.

THERE is to be open shortly at Aberdeen a Winter Exhibition of Art and Industry, including loans from the national Exhibitions, work by leading manufacturers in china, pottery, glass, tapestry, embroidery, iron work, &c.; and loans from private collectors. The Exhibition will be held in the Aberdeen Art Gallery and Industrial Museum. We have reason to think the exhibition will be a very good one.

IN respect to the judgment of Chancellor Espin, granting a faculty for erecting chancel-gates in a church near Liverpool, which we recently noted (p. 745, ante), a legal correspondent writes:—"The Chancellor endeavoured to restrict the importance of the judgment by stating that the case was not to be regarded as a precedent. But to say a case is not a precedent cannot make it less so if it is one. The Toxteth Park case seems to be an example, at any rate, that Chancellors may grant faculties for chancel-gates to protect the chancel (this having been the main reason alleged), and we are not aware of any reported decision to the same effect. Of course, the decision of a Chancellor of one diocese does not bind another Chancellor as the decision of a Court of Appeal binds an inferior judge. But it does set an example which may induce other Chancellors to act in the same way, and it undoubtedly helps to direct the judgment when similar cases arise. In the present case, the gates were 4 ft. high, measuring from the nave, which shows they were a real protection against careless persons, at any rate."

IN a letter in the *Times* of the 4th, Mr. John Bickerdyke calls attention, in reference to the sad accident at Onney Bridge, to the desirability of examining the state of the bed of the river adjoining the piers of bridges after floods on the Thames. The scour of the water through the narrow arches of many of the bridges on such occasions must often change very materially the state of the ground adjoining the foundations of the piers, and though we know that bridges ought to be so founded as to be independent of such effects, and that all modern bridges built by competent engineers are so, we have not the same certainty with regard to some of the older Thames bridges. Is the state of their foundations periodically examined? It should be, in the case of railway bridges especially.

FROM Paris we hear that M. Muntz, the keeper of the library and collections of the Ecole des Beaux-Arts, in resuming, on Wednesday, the 2nd inst., his course of lectures on aesthetics, treated, before a numerous audience, the subject of the history of art in the fifteenth century, especially of Flemish art, its sources and successive developments, and the influence respectively of Flemish and Italian art at that epoch. This lecture was an introduction to the annual course; it was of great interest, and met with deserved success.

A CORRESPONDENT has brought under our notice a new idea in regard to decorative surfaces and backgrounds, by the use of tarnished silver surfaces, which give a brilliant corrosion of rich colouring of an apparently permanent nature. The panel we have seen had a floral design painted over part of the surface in ordinary pigments, the rich colours of the tarnished metal producing a brilliant background; but it is also suggested that the metal may be used in panels as a decorative surface in itself, just as coloured marbles are used. The panel shown to us had been executed, we understood, for three years, and had not altered in any way. The result was novel and very effective, and the idea seems worth consideration.

FROM a report in the *Birkenhead News* (Dec. 5), it seems that there has been something rather unsatisfactory in the proceedings in reference to the Birkenhead Abattoirs competition. It would appear that Alderman Mills and Alderman Walker had been appointed by a resolution of the Committee to report on the plans, and had selected three as in their opinion the best, but at the suggestion of the Committee they had allowed a fourth set of plans to be retained among the number recommended, which set, signed "Efficiency and Economy," had been placed first by the Committee, and were formally recommended for adoption by the Town Council under the names of their authors, Messrs. A. Bleakley, T. W. Cubbon, and C. O. Francis. The designs were sent in under motives, but these names were announced before any formal decision had been come to by the Town Council. Asked by Alderman Walker how they came to know the names before the decision was formulated, a member of the Council said that they had made up their minds before they sent to the Town Clerk for the letter containing the architects' names. The Town Clerk "regretted" that this had occurred, and the Mayor said it was "very unfortunate"; but as it appears that the authors of the design are Birkenhead men, and as another Councillor said he supported the committee partly because the successful architects belonged to Birkenhead, "and it was likely to give some employment to people in the borough," it is not very difficult to read between the lines of these virtuous regrets. Aldermen Walker and Mills (who, we believe, are both architects) said that their recommendations had been pooh-poohed, and suggested that an independent professional opinion should be taken, but it was replied that it was unnecessary to pay twenty or thirty guineas for an opinion, when they were quite competent to form one themselves.

Alderman Walker said "the whole business savoured very much of jobbery." Most people will agree with him.

IT is rather a natural "rider" to the subject of this last note to observe that the Hon. Secretaries of the Institute Competition Committee, Mr. Cole Adams and Mr. Aston Webb, wish it to be known that "they will be glad to afford Promoters of Competitions any assistance in drawing up their conditions." We wish promoters of competitions would avail themselves of it, for in general conditions of competition are drawn up in the most vague and irregular manner, even in regard to the primary object of conveying the meaning and wants of the promoters to the architects. But, as part of the result would be to increase the difficulty of the little friendly arrangements of "local option," perhaps many of the promoters will not be enthusiastic on the subject. They must remember, however, that a great proportion of the best class of the architects have bound themselves to enter no competition except under certain conditions, so that if they choose to frame conditions at their own sweet will, they can only have a limited field of talent to select from.

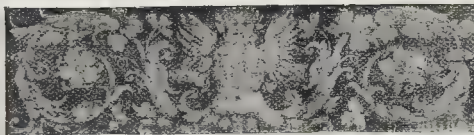
#### EXCAVATIONS IN ASIA MINOR.

ON Thursday, the 3rd inst., Mr. R. P. Pullan read a paper before the Royal Archaeological Institute of Great Britain and Ireland, on his recent excavations in Asia Minor. The western coast of this country is remarkable for its geographical formation. It is indented by immense gulfs, with peninsulas of corresponding length. The gulf of Kos, for instance, is about ninety miles in length, and the peninsula of Cnidus is of similar length, while at the widest part it measures only about ten miles across. There are but three rivers of any importance: the Meander, the Hermus, and the Cayster. These run through wide plains covered by alluvial soil, brought down by the gradual process of denudation, from the adjacent ranges of Mount Latmos, Mycale, and Tmolus. Mr. Pullan said that he had explored the coast from the borders of Caria to the Dardanelles, a distance of between 300 and 400 miles, proceeding sometimes by carriages and sometimes on horseback. With the aid of a map he described his journeys to Ionia, Lydia, Æolia, and the Troad. At Pergamos, he had seen upon the Acropolis traces of fine sculptured marble on the spot where the German expedition had lately disinterred the large altar of which casts are to be seen in the collection at South Kensington. In the course of his exploration he had visited the sites of the Temples of Apollo Branchides, near Miletyus; Athene Polias, at Priene; Diana Leucophraye, at Magnesia; Mæandrian Cybele, at Sardis; Apollo Smintheus, in the Troad; and that of Dionysus, at Teos. Mr. Pullan subsequently had charge of an expedition for the excavation of the Temples of Teos, Apollo Smintheus, and Athene Polias, for the Dilettanti Society. These operations were carried on successfully at various intervals during a period of ten years, and resulted in the discovery of certain data for the restorations of these buildings, which were published in the fourth volume of the "Antiquities of Ionia," by the Society of Dilettanti, and in the exhumation of numerous inscriptions and pieces of sculpture which are now deposited in the British Museum, where they may be inspected by those who are interested in them. The paper was illustrated by a large collection of views, some of which were selected from those now being exhibited at the Burlington Fine Arts Club.

**New Public Abattoirs, Birkenhead.**—At a meeting of the Birkenhead Town Council, held last week, the Markets Committee unanimously recommended that the designs under the motto "Efficiency with Economy," submitted in competition for the new public abattoirs to be erected in New Chester-road, be adopted. This resolution, on being put to the vote, was carried. The authors of the selected designs were found to be Messrs. Alex. Bleakley, A.R.I.B.A., Thomas Cubbon, and C. O. Francis, of Birkenhead. The estimated cost of the building is 7,000l. We have referred to the matter under the heading "Notes."







# THE DECORATIVE WORK OF THE EARLY GERMAN ENGRAVERS.\*

PART II.

ALBRECHT DÜRER AND HIS FOLLOWERS.



there was but a short stride to be taken to reach the summit of perfection. That stride was soon taken, and the summit reached, by Albrecht Dürer. It is strange, however, that he does not appear to have paid any serious attention to the production of ornamental designs. It is the more curious when we remember that he was still a young man when Israhel van Meckenien died, and that he certainly was well acquainted with, if not influenced by, the work of that master; neither could he fail to have

the hearts of masters of penmanship. About thirty of these have been reproduced by Obernetter, of Munich.

We now arrive at the group of engravers known by the name of "The Little Masters." They were the immediate successors, followers, and imitators of Dürer, but none of them rose to his excellence in pictorial work, although their decorative work is much of it exceedingly good. Their reverential imitation of the great master was carried to such an extent that, where good fortune allowed them to use a capital A, they invented a monogram closely resembling his.

The first of these masters is Albrecht Altdorfer, of Ratisbon. He has left twenty-three studies for vases, which, taken together, merit Professor Colvin's encomium that they are "in an excellent and refined taste." We said at the beginning of our paper that occasionally we should be compelled to differ from that eminent critic, and we have now come to one very great divergence of opinion. In studying these cup designs, we had noted them as nearly all deserving of praise, some as of great excellence, but two as hopelessly bad, both in form and design. In our after-reference to the Professor's papers in the *Portfolio*, from which, as we have already acknowledged, we have culled much valuable information, we found these two unfortunate held up for especial praise: "one of them a vase with a pattern of shells, and another with lilies of the valley, being as beautiful as any inventions of their class." We fear that we must abide by the opinion contained in our notes. In fact, we find it very difficult to think which is

It is a curious feature in certain stages of all styles of decorative art, this jumble, this mixture of representative with decorative work. It was already noticeable in the anastasis work of the missal painters during the last years of the fifteenth century. Owen Jones has figured some curious specimens of it in plate LXIII. of his



Fig. 10.

"Grammar of Ornament." The painter seemed unable to restrain his work within the limits of the art he worked in; because he was able to paint a flower or a bird, he must needs introduce them on all occasions; till at length, in the midst of conventional scrolls, we have birds, beasts, fishes, and flies flying about flowers and



Fig. 11.

been impressed with the beauty of his designs. Nor is the absence of pure ornamental work from Dürer's hand to be accounted for by the fact that he was not a goldsmith, for, as Professor Colvin has pointed out, one of the greatest uses of engraving was to furnish ready-made compositions to artists who had not much inventive faculty of their own; and if the engraver worked for the artists of all kinds, he would also be employed by the uninspired metal-workers.

There are, however, six very curious designs by Dürer (*dedales*, labyrinths, Bartsch calls them) forebroidery. They are in that twisted, knotted style so dear to broderers, the braid being laid on the ground-work, and twisted and turned about in regularly repeated contortions till the whole of it is covered without a break in the line of the pattern. These designs are circular, about 8 inches in diameter, the pattern being cut and left white on a black ground. There is an escutcheon in the middle, and, being on a square plate, the angles are filled up with a small leaflet bearing a fragment of the original pattern. They are hardly of sufficient interest to warrant the reproduction of any of them; they show, however, that Dürer was a master, at least, of the intricacies of construction in design, and, so far, they are masterpieces. He also seems to have been the parent of those extraordinary calligraphic mysteries which even yet delight

\* See p. 783, ante. The initial letter is from Van Meckenien's alphabet, mentioned in the previous article.

the uglier or the worse designed. In the shell pattern (B. 81) there is little or no attempt at beauty of form or design, the bosses are simply covered with ugly shells, the engraving showing that the workman was to get them as near to nature as possible. To the lily of the valley pattern (B. 94), the same remarks apply. The

trees, which have their shadows too, and are made to "look as if they grew there." We have already pointed out how the early designs of Israhel van Meckenien were disfigured in the same way, and how in his riper experience he shook himself free and went back to the pure spirit of Gothic design; but this panel of Altdorfer



Fig. 12.

surface of the cup is formed into slabs, arranged tile-wise, one overlapping the other, each slab bearing a sprig of the natural flower. As a general rule, however, a good and not over-modelled acanthus-leaf is used to decorate the surfaces. One of them (1,079) is of very great excellence, and worthy of reproduction (fig. 10).

tells a different story; it is of the highest excellence as a piece of engraving and in the fundamental arrangement and flow of the lines, but the vicious style is adopted when the master is at his best. The gradual decline of decorative art has at last come to an end, for it has reached the lowest depth of debasement. The lines of demarcation between representa-



tive and decorative art had been steadily getting hazier, till at length they had altogether vanished, and were no longer recognised. Then came the study in Rome of the great antiques lying only beneath the surface of the soil, and with it the Renaissance of art. One is constrained to dwell for a short time on this great epoch in the history of the arts. Sir Digby Wyatt has truly said that, in its earliest stage, the Renaissance of art in Italy was a revival of principles; but had that revival had its origin in the discovery of Greek antiques, the result would undoubtedly have been a much better and more exalted style. The Roman models themselves had ceased to be perfect, had fallen somewhat away from the purity of Greek design, though much that was very good remained. Tangential flow and the equal covering of spaces were still the first principles on which



Fig. 13.

the great rolling curves were drawn, but in the conventional treatment of the acanthus-leaf the later workmen had overmodelled the surface, and while still retaining a conventionalised outline, had gone nearer to a faithful representation of the natural modulations of the leaf. This indecision was the blemish of the work which was to exercise so great an influence on the world's art; and, unfortunately, the style it was set to reform itself had developed such a craving after natural form, that it had ceased even to be a blemish, it had almost worked its ruin. Thus it came to pass that the Italian designers, working



Fig. 14.

on the new scheme, while they came back once more to flowing tangential lines and evenly covered spaces, and adopted many of the Roman conventional forms, could not altogether reject their hankering after nature. The best of the Renaissance designs are very far from perfect: there are many good acanthus scrolls, and many new forms based on other leaves and flowers, but there are also, as essential ingredients in the design, tragic and comic masques, musical instruments, semi-Priapal terminals, antique altars, tripods, and vessels of libation, dancing amorini, and hybrid marine monsters and chimeras."

Professor Colvin has traced with consummate skill the influence of the Italian masters on

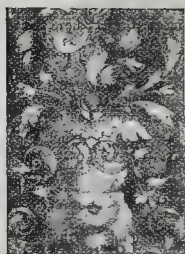


Fig. 16.

Albert Dürer and his followers; we are, therefore, not surprised to find in their work friezes and panels designed in the spirit of the Renaissance. But in what we have said of the revival, it must be remembered that into whatever country it travelled, the new spirit did not efface, but merely worked on the old spirit; where that old spirit was very debased the result was still infected with weakness: where it had signs of



Fig. 15.

power much better work resulted. Thus, in Italy, we find perhaps the weakest of all Renaissance ornaments; but in Germany the Gothic influence was still alive, and therefore it is, we think, that in the late work of these German masters we find a much more vigorous Renaissance ornament,—the design, both in construction and conventionalising, still bearing



Fig. 17.

the impress of the influence of Van Meckonen's genius. Let us, at the risk of reiteration, once more point out the difference between the principle involved in the introduction of real objects in the designs of the earlier, and that in those of the later masters. In the former they were used in one of two ways: either pictorially, the pure decoration being introduced as a framework, and being independent of them as a part of the design; or as part of the design, filling up awkward spaces, but still without entering into its construction. In the latter they formed the main feature of the design, which was constructed upon them as a basis. What was a weakness therefore in the one was a strength in the other. This strong point in the Renaissance, however, very soon showed signs of decay: the canons of decorative art were soon abandoned, and then it was that all sorts of objects treated naturally were mixed higgledy-piggledy into the conventional leaves and flowers of pure decoration. There are two Renaissance panels by Altdorfer well worthy of attention (pp. 106, 107); one of these we engrave (fig. 11).

After Altdorfer comes Hans Sebald Beham, whom, with his brother Barthélemy, Professor Colvin ranks as the most accomplished of the Little Masters. Sebald executed a large number of decorative works, chiefly friezes and panels (one of which we have placed at the end of this article): several designs of no very great merit for the heraldic *entourage* of coats of arms, and a few cups which cannot be considered very beautiful. Many of the friezes are classical studies of pure figure work, and the decorative ones are without exception in the Renaissance style, with usually the human form as the mainspring of the design: two of his best works are, we think, a small panel (B. 235), called by Bartach "Les Deux Têtes de Poisson" (fig. 12). There are also worthy of note four upright panels (B. 243—6), in which the central ornament is the vase so characteristic of the Renaissance; but the scroll and foliage work is very fine.

Of Barthélemy Beham we need only notice one small panel (p. 73), which we engrave (fig. 13).

Jakob Binck, like the Behams, was completely imbued with the spirit of the Renaissance, his designs being full of vases, nymphs, and little naked boys; but his foliage is excellent, as the accompanying engraving testifies (fig. 14). He also made several designs for the sides of dagger-sheaths: they are 6 in. high by about 4 in. in breadth at the base: the upper half is usually devoted to a figure, the lower to a support of decorative foliage. The one we engrave (p. 126a), "Le Soldat à la Gourde," is a very fine example of this form of design (fig. 15).

The master of the monogram I. B., worked much in the same groove as Jakob Binck; the frieze of which the subject is two men trying to break a vase with massive clubs (B. 45), which is engraved at the head of the first part of this paper (page 783, ante; described by error in the foot-note there as the work of Barthélemy Beham), is fine of its kind. We suppose the absence of lower extremities incapacitated them from keeping steady enough to deliver very accurate blows, as the vase is not cracked anywhere that we can see. Another small panel (B. 39), a torso, with foliage springing from it, is exceedingly graceful; the foliage, however, is even more realistic than usual (fig. 16).

The few designs that come from the hand of George Pencz may be passed over as being devoid of any great merit.



Lukas van Leyden was, as his name implies, not a German, but a Dutchman. He is, however, not unfrequently grouped with the Little Masters, and one of his studies being very remarkable, we have ventured to include his name among the German masters whose work we are considering. In his arabesque panels, two of which we engrave (figs. 17, 18), there is a tremendous amount of human form, but there is a very great charm about the conventional detail.

The plate to which, however, we would draw special attention is (B. 163), containing two very graceful studies for scrolls (fig. 19). They deserve very careful examination.

We have left till the last one of the most prolific of the Little Masters,—Heinrich Aldegräver, —whose work is, after Israhel van Meckenens', we think, the most interesting of these German engravers. In his decorative work there are two very strongly-marked styles; the first which comprises all his early work is pure decoration, being designed in the spirit of Van Meckenens, but in which a simpler leaf-form takes the place of the acanthus; the second seems to have originated about the year 1523, and is, of course, Renaissance wedded to the first style. His designs are not all dated, but all, we think without exception, in the Renaissance style bear that or

of the whole series would do much to improve the metal work of the present day. Of his innumerable friezes and panels we select four, three of which are in his best Renaissance style:



Fig. 18.

It would seem as if the master had been anxious to compare the old with the new style of decoration, to see what could be done without birds, beasts, and fishes; and in truth, with the exception of the too realistic stem, he has succeeded in the old style without those incumbrances, better than in the new. The wave of the upper scroll is good, but of the most ordinary type; but in the lower one the flow of the main stem is a masterpiece of inventive skill. The scroll in which the foliage works, though based on the simple form, does not adhere rigidly to it, but the trunk itself branches out into a second scroll of double wave length (to use a scientific ex-

pression), a later date. He did not, however, entirely forsake his first method, but seems frequently to have reverted to it, more especially when he had to work out sets of designs. In a set of dagger-sheaths, two will be in the first and two in the second manner. Of these sheaths, as well as of hilts, there are a great number of plates, and they are all marked by the same exquisite flow of curve and well-balanced foliage.

The scabbards of the daggers are nearly all designed after the model of Binck's "Soldat à la Gourde," the top part being a figure standing on a scroll of ornament. The figures themselves are excellent, but of the ornaments it is impossible to speak adequately. Whether in pure



Fig. 19.

ornament or in Renaissance, there is the most wonderful command of flowing curved lines, and in the construction of the design he never repeats himself, every one comes fresh from his hand stamped with the mark of his genius.

The one we engrave (B. 251) is a wonderful specimen of his power (fig. 20). Observe how gracefully the central sprays stand, and how beautifully another winds round them, droops, then raises its head again. The leaf-form which the master has adopted is, perhaps, not so majestic as the acanthus, but it is singularly graceful in its simplicity. Its outline is strictly conventionalised, and the engraving shows no exaggerated surface modelling. Another very charming scabbard we can do no more than refer to by its number; it is B. 215, but, indeed, a little study

of the whole series would do much to improve the metal work of the present day. Of his innumerable friezes and panels we select four, three of which are in his best Renaissance style:



Fig. 20.

B. 245 is the head-piece to this part of the paper, the others (figs. 21, 22, and 23) are B. 197, B. 202, and B. 256.

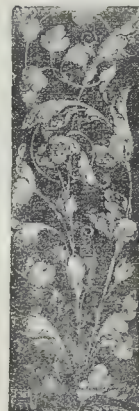


Fig. 21.

We live in an age quite given over to decorative art in some form or other, good or bad; and yet we feel that the reader will have been very patient with us if he reads down to



these last words, not only because of the difficulty of transcribing lines into words; but also because this age, although quite given over as aforesaid, is not a little apt to take what is given to it without caring for too deep an examination into its references as to character; or, because the persons who live in

epochs, and by different nations, are of course infinitely varying. On this account, therefore, it may seem almost presumptuous to talk of the canons of an art which so many have practised for their delight so variously. But whether we look at the earliest or the latest works of savage tribes; at the productions of

art had, indeed, been practised long before the discovery of engraving; we have here, however, a new body of men taking to it and elaborating it for the benefit of the trade in which they worked. In the plates which have been reproduced, we have endeavoured to select such as will show best the history of the development of the art among its new professors; and we think this history is remarkable in illustrating the way in which rudimentary essential principles force their way to the front, and claim the attention of those who are devoting themselves to bringing any branch of art-work



Fig. 23.

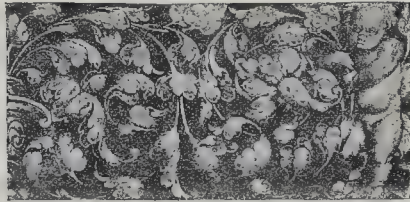


Fig. 22.

it are not a little apt to rest satisfied with their own notions as to what is good and bad in art; or not a little apt to think that "so long as a thing is pretty" the principles of the art of decoration are barely worth discussion. Some form of decoration has been cultivated by all people in all ages; the forms which have been adopted at different

the civilised ancient or modern; whether we study the designs from the East or from the West, it is certain that through them all certain rudimentary principles have been recognised and acted on to the best advantage,—that is, with the most pleasing result. Such universal principles are legitimately called the canons of the art to which they are applied. Decorative

to perfection. That some of these German masters attained perfection we think cannot be denied; to some, a second rank can only be accorded; but they all must have worked very lovingly at their plates, and we have spent a little time in very lovingly studying them, that this branch of their work might not be wholly given over to neglect.



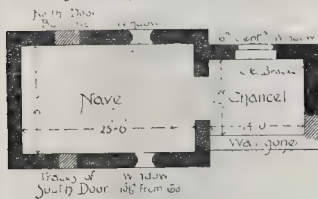
# THE NEWLY-DISCOVERED SAXON CHURCH AT DEERHURST.

We are now enabled to reproduce the plan, as far as is known at present, and some of the details of the architectural and epigraphical points of interest of the newly-found Anglo-Saxon Church at Deerhurst, of which we laid a general notice before our readers on the 21st of November last. Since that article was in print, Mr. John H. Middleton, M.A., F.S.A., read a paper on the church, and exhibited some drawings and a squeeze of the "Odda Inscription" at Oxford, before the Society of Antiquaries, which has increased the interest already felt by antiquaries and architects in this remarkable building. The plan has not been hitherto published, and we are glad to be able

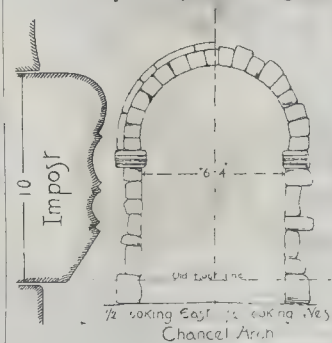
the nave side, by reason of the floor of the room, where the brick pier and wall remain *in situ*, as in the accompanying sketch. The details of the chancel-arch are very important factors towards determining the true date of this ancient building. They certainly bear little resemblance to anything of the kind in the larger church, and as the impost is the only ornamental feature in the whole building we must naturally look to it for the solution of the question of date examined in the light of existing remains. There can be little doubt, however, that the architectural evidence will be found to agree with the testimony of the ancient literary records, of which we gave a

impost, although enough remains, both of jamb and vousoirs, to show, by the arrangement of the stones, the wide joints and other details, that the door and the arch of the chancel are contemporary with the edifice itself.

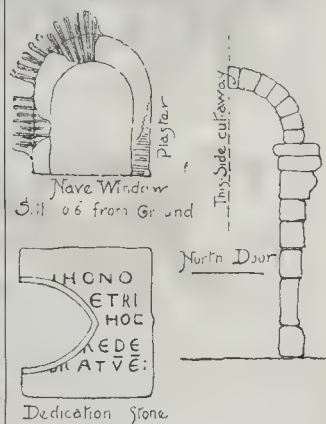
The inscription has led to some ingenious attempts at restoration, and it has been suggested that it may be read — "In honore[m] Sui Petri ap[osto]li hoc [altare] rededicatum est," instead of the reading — "In honore Sancte Trinitatis hoc altare dedicatum est." This, of course, is a point which cannot be satisfactorily



to give a sketch of it, which will enable those who read our notice to follow the measurement and outline then described. One feature in the walls, which are constructed of thin pieces and slabs of the local blue lias, with a very large proportion of mortar, deserves mention; it is the excellence and solidity of the ashlar work at all the angles, which are five in number, the only one destroyed being that at the south-east corner of the chancel. The work of these is admirable, being wrought in large stones. This is all the more curious as none of the Saxon angles of the larger church not far from this one are worked in ashlar, although it is used in some of the jambs of the many doorways and window-openings of that edifice. The whole building was originally plastered thickly, both inside and out, with hard white stucco. The drawing of the chancel-arch is the best that can be given at present, as the jambs, but not the arch itself, are still concealed from view on



summary in our first notice. The windows of this church, according to Mr. Middleton's belief, were probably open to the air, and in all probability were furnished with osier wattle-work or screens, as has been observed in other instances; a portion of the oak lining to the head of the only original window, of which we here give a sketch to show the arrangement of the slabs in two concentric arches, roughly set in the copious masses of mortar which comprises more than half the contents of the walls, has been found in its original position. The north door bears a general similitude to the chancel-arch, but has not been furnished by the original sculptors with so elaborate an



decided without more evidence than is at present available. The palaeographical interest lies in the shape of some of the letters, and the square C certainly points to a possible early date, as those will not fail to observe who are able to inspect the somewhat similar dedication stone of St. Paul's Monastery at Jarrow, figured in the extra "Winchester volume" of the British Archaeological Association, p. 441. Now that the Ecclesiastical Commissioners have given permission to the Society for Preserving Ancient Buildings to restore this chapel at



the Society's own cost, we feel certain that none of those ancient features described above will be deteriorated, and we can only hope that the very moderate sum of money likely to be required, about 100*l.* or 120*l.*, will be raised without difficulty or delay. On the east side, the picturesque half-timbered Tudor house, which has been incorporated, or, so to speak, grafted upon the chancel walls, the north and east of which have been lowered, so as to run only to the level of the floor above, and cut away altogether on the south side (see plan) to suit the house, will remain, as it now stands. It has good details, and may be made serviceable; far from being detrimental to the adjoining chapel, it will serve to keep it protected from the weather, and set off its archaic characteristics. The Commissioners are now putting this house in order. The range of buildings on the western side require removal, and this will probably be carried out, as the Commissioners are willing to allow them to be taken down.

#### GREEK VASE PAINTINGS AT THE SOUTH KENSINGTON MUSEUM LECTURE THEATRE.

ON Wednesday last Miss Jane E. Harrison finished her course of lectures on Greek Vase Paintings. The lectures have been interesting in the highest degree, from first to last, and admirably delivered, and Miss Harrison powerfully unfolded the whole tragedy of Troy from the day of the fateful Judgment of Paris down to "the night of Troy's last agony." Perhaps, however, the most fascinating of the lectures were the fourth and fifth, which treated of the exploits of Achilles before Troy. On the same François vase on which is represented the marriage procession of Peleus and Thetis, is also depicted the first ruthless act of their son, the slaying of the young Troilus, as he came to water his horses at the spring sacred to Apollo. Few vase-paintings deal with the subjects of the Iliad itself, and they are chiefly concerned with the embassy to Achilles, in II. ix.; with the merciless dragging of the body of Hektor by Achilles round the tomb of Patroklos, and with the ransoming of the body of Hektor. For the last incident Miss Harrison showed not only vase-paintings, but a most interesting piece of archaic work, a bronze mirror from Olympia, where the scene is treated with the most perfect simplicity, after the severe, condensed manner of the Peloponnesian school. The aged Priam touches the chin of Achilles, in the regular attitude of Greek supplication. Behind is Hermes, to show that the event took place by the will of the gods; on the ground the body of Hektor. Many beautiful vases illustrated the career of Achilles subsequent to the Iliad: his slaying of the Amazon queen, Penthesileia; of the Ethiopian prince, Memnon; and lastly, in a splendid paraphrase from the speech of the shade of Agamemnon in the twenty-fourth Odyssey, the lecturer told of his untimely death, and the dirge chanted over him by his mother and her attendant Nereids. In the last lecture, Miss Harrison, in reference to the legends of the destruction of Troy, dwelt especially on the manner in which the larger compositions of the red-figured period were built up on the lines of the black-figured types. The decorations of the famous Vivienzo vase, from Naples, is made up of five familiar archaic groups,—Æneas with his father, Anchises; Ajax and Cassandra; the slaying of Priam and Astyanax by Neoptolemos; the recognition of Aithra by her grandsons. After dwelling in detail on each of these types, Miss Harrison concluded with three beautiful vases, representing the fateful meeting of Menelaos and Helen. It is pleasant to find that the ancient vase-painter took the chivalrous view of regarding Helen as the blind instrument of the goddess Aphrodite. At the close of the lecture, Mr. Newton delivered a short address on the subject of the British School at Athens. After thanking the audience for their hearty support of an object of national interest, he sketched the progress of the school from its first formation at Marlborough House in 1828. A building site has been granted by the Greek Government, and the building is progressing under the direction of Mr. Penrose; but funds are sorely needed for the founding of a library and the endowing of a director. Mr. Newton concluded with the interesting statement that, according to Byzantine tradition, the true Palladium of Troy, with which the

fortunes of Rome were inextricably bound up, now lies buried at the foot of the so-called Burnt Column at Constantinople. Should that city fall into the hands of Western conquerors this ancient Palladium might once more see the light; and in that case it was to be hoped that such an able lecturer as Miss Harrison may again discuss both the literary and artistic traditions which have come down to us of the Story of Troy. After the paying of expenses, 87*l.* have been cleared for the fund for the British School of Archaeology at Athens.

#### A NEWLY-DISCOVERED ROMAN VILLA AT YATTON.

THE REV. PEREGRINARY H. M. SCARTH, M.A., F.S.A., rector of Wrington, near Yatton, Somersetshire, whose recent work on Roman Britain has done much to disseminate an accurate knowledge of our history under Roman domination, laid before the Society of Antiquaries on Thursday, 3rd inst., a short paper descriptive of the recently-discovered Roman villa at Wimberham, in the parish of Yatton, about twelve miles to the south-west of Bristol and seven miles north of Axbridge. This parish is watered by the River Yeo, which, after lending its name to Yeovil and Ilchester or Ilchester, runs into the Bristol Channel and forms part of a plain extending nearly to the banks of the River Severn. The surface is generally level, except in the district of Cleve. Close by, on the east, is the celebrated pre-historic fortress known as Cadbury Camp. The villa was discovered during the progress of some drainage works. The walls run up the river bank, and ten apartments have been traced, comprising six tessellated pavements, which have now been judiciously covered over with sheds. The patterns of the mosaic work are principally flowers and geometrical designs. Two of the rooms were supplied with hypocausts. As far back as the year 1828 an ancient Roman coffin was found in the same field, which has now yielded the vestiges of this villa to the activity of human progress. Roman remains of various kinds, especially coins, are not uncommon in the district, as at Cadbury for example. Other Roman villas are known to exist in the vicinity, and clear indications of ancient mining are afforded by the finding of pigs of lead with Roman inscriptions on them. Evidence also is not wanting that tends to prove that reclamation of the low-lying lands of the River Severn was practised in Roman times, even at a time before the villa was erected, for an inscribed stone indicating the amount of work performed by a Roman cohort stationed there was washed out of the embankment. No less than twenty-one Roman coins were discovered in the villa. These range from the time of Gallienus, A.D. 260, to Constantine I. A.D. 337, or II. A.D. 340, and thus denote an occupation of about a century. Mr. Pigott, who has superintended the excavations, has also been so fortunate as to find a hoard of about 800 coins about two miles away from this spot, at Kingston-Seymour; these are for the most part of the third century of the Christian era. The great care taken by Mr. Pigott in preserving the remains of the Yatton villa, and his intelligence in classifying the antiquities found on the site, deserve the highest praise, which we are willing to be universally accorded to him. It is a curious fact that so large a number of the deposits of coins found in Britain are of this above-mentioned date, and it was the opinion of Dr. J. Evans, President of the Society, that this points to some great crisis in the history of the past of the Roman Empire, probably during the reign of Tetricus, one of the thirty tyrants, and the last of the pretenders who ruled Gaul during its separation from the Empire under Gallienus and his successors, A.D. 267-274. Another curious fact, not fully explained, is the frequent finding in these hoards of spurious or imitation coins side by side with genuine coins of the same ruler: hence the former can hardly be called forgeries, as they can scarcely have been made use of for fraudulent purposes.

**The Institute of Builders.**—Mr. Richard S. Henshaw has been appointed Secretary of the Institute of Builders, on the resignation of Mr. Leonard J. Maton, B.A.

#### THE DESTROYED NORMAN TURRET AT ST ALBAN'S ABBEY.

SIR,—I have thought that the facts with reference to the Norman turret recently destroyed should be put on record by means of illustrations. Fig. 1 is a copy from the original drawing, which was reproduced by photolithography as plate 4 in my large book. The measurements of this were taken in 1876. This turret at the south-west corner of the south transept was part of the Norman building erected by Paul of Caen, and consecrated in 1115. It was constructed of Roman tiles up to the level of the string above the window arches, and was of considerable size, being 9 ft. 8 in. in diameter, and about 24 ft. high above the springing (of the Norman gable), which still remains. All above the highest part of this springer has been removed. The dimensions of the still existing turret on the north transept are almost identical with those of this turret, the destruction of which has created so much comment. The position and sizes of the openings, the character of the caps and bases of the shafts, and the arrangement of the arches, were similar to those in the north transept turret, and similar also to work in the great Norman tower (Fig. 5). The wall tiles were laid with wide joints, as elsewhere in the Norman work, and the newel of the staircase was of shaped Roman tiles, like the other newels of the Norman staircases.

Fig. 3 shows a detail of the shaft, cap, and base, from the turret.

Fig. 5 shows a part of the external gallery of the great Norman tower mentioned above, which may be compared with the arcade of the destroyed turret (Fig. 4).

It has been suggested, on the part of the gentleman who is responsible for the destruction of the turret, that it was neither "in visible form or external structure" of Norman date, and that it was in very bad condition. I do not think there is any doubt as to its antiquity amongst those who know St. Alban's, and these illustrations will convince those who never saw it. As to the structural condition, I would mention that the turret was examined by the late Sir Gilbert Scott about ten years ago, and repairs were carried out under his direction. The parapets and the brickwork above the string over the openings, were of modern date. This work was not valuable, but was pleasant in colour and harmonised by time and weather with its surroundings. The old part of the turret below the string, over the openings, was very valuable, and the greater part of the 24 ft. in height was forcibly torn down with the aid of crowbars.

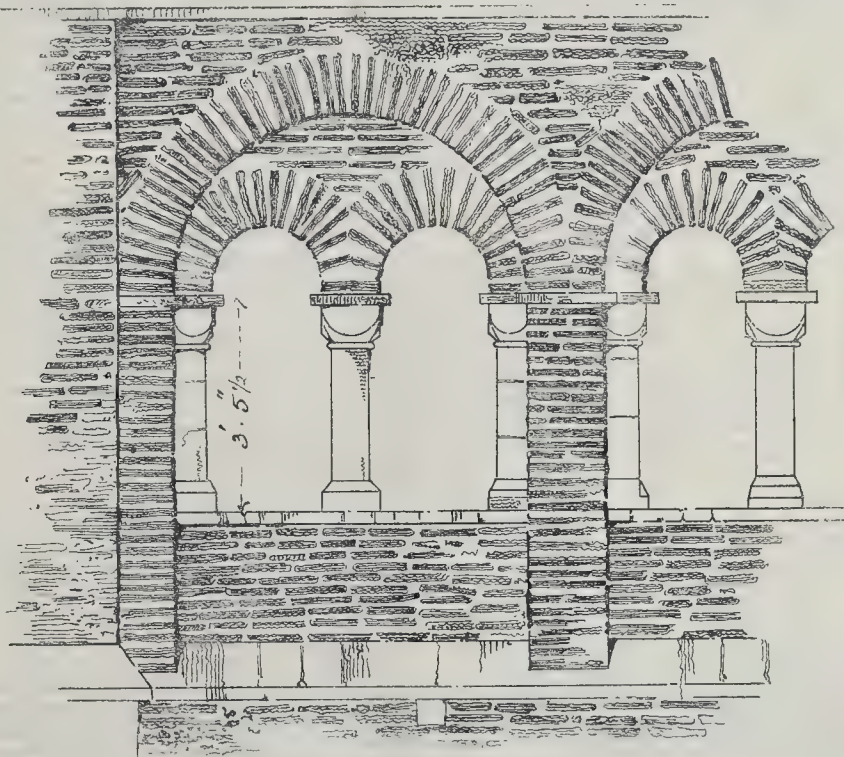
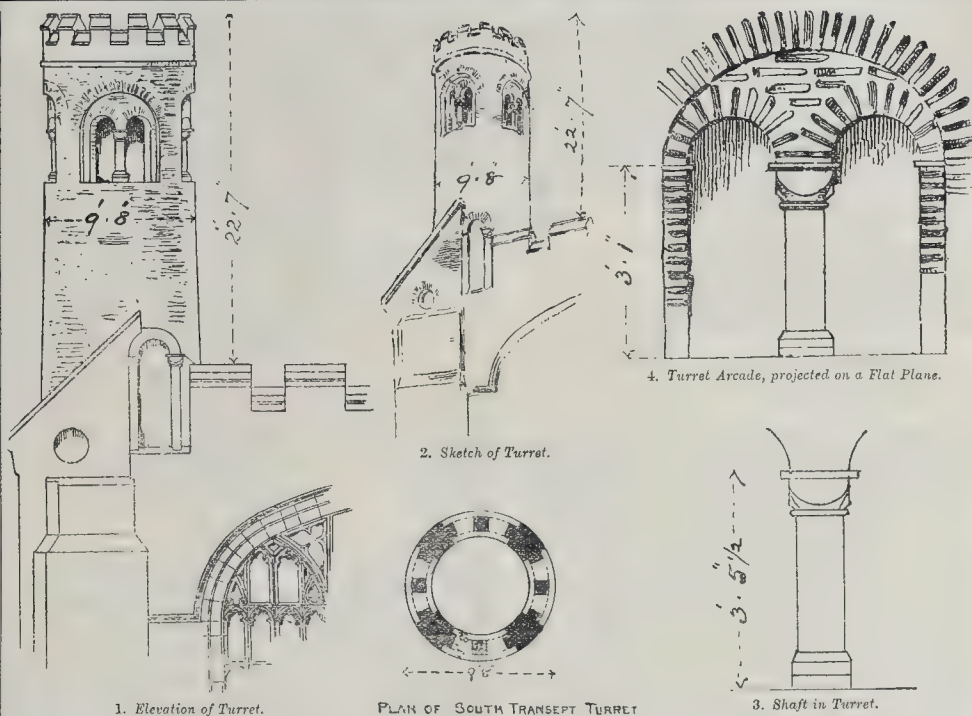
The mischief is done, and the *Builder* has said all that need be said. It has been stated that there is an intention to deal similarly with the north transept turret, and that some other portions of the buildings as well, now lead a threatened life, but I hope they will be spared.

JAMES NEALE, F.S.A.

No. 10, Bloomsbury-square, W.C.

**The Smithfield Club Show.**—There was a good display of machinery and implements at the Agricultural Hall this week, but for the most part these pertained chiefly to agriculture. There were some exhibits of more general interest, however. Portable, "semi-fixed," and fixed engines of various useful types suited for builders' and contractors' purposes were shown by Messrs. Barrows & Stuart, of Banbury; Messrs. Clayton & Shuttleworth, of Lincoln; Messrs. Edgington & Stevenson, of Queen Victoria-street; Mr. E. S. Hindley, of Bourton; Messrs. Marshall, Sons, & Co., of Gainsborough; and Messrs. E. R. & F. Turner, of Ipswich. Wrought-iron tanks were shown by Mr. John Bolland, and by Messrs. Burney & Co.; apparatus for well-sinking by Messrs. Isler & Co.; and fittings for stables, cow-houses, and pigeries by the St. Pancras Ironworks Company. The Enslage Society exhibited a remarkably good show of ensilage, which seems to be rapidly increasing in favour, and in connexion with this subject Messrs. F. W. Reynolds & Co., of Southwark, showed their apparatus for compressing the silage. In the Arcade opening on to Islington-green, Messrs. Chambers, Monney, & Co., of Bishopsgate-street, had a stand, their principal exhibits being two new stoves,—the "Fawcett" range, and a new patent "smoke-consuming" portable cooking range, for use with open or close fire,—which appear to embody several desirable improvements.





THE DESTROYED NORMAN TURRET AT ST. ALBAN'S.

## Illustrations.

## SKETCH OF LUCCA CATHEDRAL.

**THIS** is a reproduction from one of Mr. Ernest George's numerous and admirable architectural sketches, remarkable for the harmony of composition into which the square masses of the basilica and the adjoining houses fall. As an architectural illustration it is but slightly touched in regard to detail; it is as a piece of expressive architectural grouping that we reproduce it: a bit of the poetry of architecture.

## DESIGN FOR OFFICES.

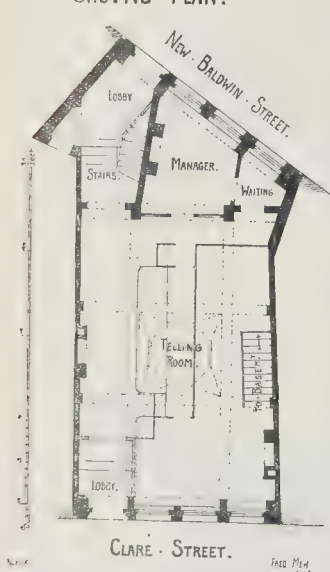
This design, for offices or flats for a corner site, was hung in the Architectural Room at the last Royal Academy Exhibition. It is designed and drawn by Mr. P. J. Marvin.

## NEW PREMISES FOR THE BRISTOL BRANCH OF THE CAPITAL AND COUNTIES BANK.

The new premises for the Bristol Branch of the Capital and Counties Bank recently completed are situated on a site in Clare-street, with the advantage of an additional frontage to New Baldwin-street, giving access from both these important thoroughfares. The building consists of five stories, of which the ground and basement floors are devoted to the purposes of the bank, the upper floors having been arranged for suites of offices and caretaker's apartments. The ground-floor is entirely taken up by the telling-room (with a dome skylight in centre), except the portion towards New Baldwin-street, where the manager's rooms and the staircase are placed; and on the basement are the store and strong rooms, lavatories, kitchen, &c.

The two fronts being nearly equal in size are similar in their architectural treatment, which is carried out with details somewhat Greek in character, having rustication on the ground-story, and recessed upper stories, with three-quarter columns, and pilasters, cornices, and pediments.

## GROUND-PLAN.



The fronts as high as the top of ground-floor are executed in Belgian granite, similar to that used in the New Law Courts at Brussels, this building being the first in which it has been used to any extent in this country.

The columns to the upper stories are of polished grey marble, with carved capitals, the whole of the fronts otherwise, above the ground-floor cornice, being faced with Bathstone. The works have been carried out by Messrs. W. Cowlin & Son, of Bristol, Mr. E. Honey having acted as clerk of works.



Offices and Out and Medical Relief Station for the Holborn Union.—Ground Plan.

- A. Entrances to Medical Relief Department.
- B. Entrances to Board Room and Offices on Upper Floor.
- C. Entrances to Out Relief Department.
- D. Dispensary.
- E. Medical Officers' Consulting Rooms.
- F. Medical Officers' Examination Rooms.
- G. Waiting Rooms.
- H. Porters' Rooms.

- K. Committee Rooms.
- L. Relieving Officers' Rooms.
- M. Water-Closets and Lavatories or Urinals.
- N. Yards.
- O. Ambulance Shed.
- P. Stables.
- R. Harness Room.
- S. Hay Store.

The fireproofing of the several strong-rooms, and the constructional ironwork have been supplied by Messrs. Dennett & Ingle, of Whitehall; the Belgian granite work and marble columns by Messrs. Tagnon, of Gray's Inn-road, from their quarries at Wellin, in Luxembourg. The stone of the fronts is from the Corsham Bath Stone Company's Quarry; the carving was executed by Mr. E. Sheppard, of Bristol. The architect was Mr. Frederick Mew, of London.

## THE MONUMENT TO THE LATE MR. J. R. GREEN.

This monument to the late Mr. Green, author of the well-known "History of the English People," is erected in the cemetery at Mentone. It is of the finest white statuary marble from Serravezza, delicately carved; the central panel is an "Investitura" of Giallo di Siena, polished, and bearing the epitaph of bronze letters riveted through the backing. The lunette is also of Giallo di Siena, having a circular panel of white marble, inclosing a laurel wreath in relief on a ground of gold mosaic. The fittings in the soffit of the arch are also filled with gold mosaic.

The work has been carried out by Signor Cappabianca, of Rome, from the drawings and details of Mr. Howard Ince, of London, from whose drawing our illustration is taken.

## FREE PUBLIC LIBRARY, WIMBLEDON.

The design shown in our illustration was selected in public competition in July last, about forty sets being submitted. The plan is very simple, the point striven at being that the Librarian or his Assistant should be able to thoroughly oversee the whole Library without much walking about. Then, as the newspapers, &c., have most readers, they are placed near the door, with the tables for those using reference library situated in the more retired parts of the building. The Librarian's rooms are over the front entrance, and have a private communication to both street and office. Tenders have been submitted, that of Mr. Johnson, of Wimbledon, being the lowest, 2,165*l.*, including lighting and heating, but not the bookcases. The architects are Messrs. Potts, Sulman, & Hennings, of London.

## CHURCH OF NOTRE DAME, DINANT.

The Church of Notre Dame, Dinant, was commenced at the end of the twelfth century. The triforium is specially worthy of notice. The slender columns supporting the arcading in the chancel seem scarcely strong enough to support the great weight imposed upon them, and are now tied together and strengthened with iron rods. The windows in the end wall are bad modern restorations.

The drawing by Mr. R. A. Biggs was exhibited at the Royal Academy.

## HOLBORN UNION ADMINISTRATIVE OFFICES AND MEDICAL AND OUT RELIEF DEPARTMENTS.

The foundation stone of this building was laid by the Guardians of the Poor of the Holborn Union on the 10th inst.

The building provides accommodation on the ground-floor for the Out Relief and Medical Relief Departments in the shape of large and well-ventilated waiting-rooms for the paupers, and commodious consultation-rooms for the use of the medical and relieving officers, besides two committee-rooms for inquiry by the Guardians into the *bona fides* of the applicants for relief.

In the rear of the site provision is made, in the shape of stabling and ambulance sheds, for the conveyance of the paupers to the various outlying infirmaries, schools, and other buildings of the union.

The whole of the upper floors of the main building are devoted to the clerks' and other administrative offices, besides board and committee-rooms for the meetings of the Guardians. The nature of the ground required that a basement should be constructed over the whole site, and the space will form good accommodation for strong-rooms, drug stores, heating furnaces, &c.

The architects are Messrs. H. Saxon Snell & Son. The builder is Mr. Mark Gentry, who has undertaken to execute the whole of the works, including fittings and every accessory, for the sum of 16,490*l.*

## Royal Institution of Great Britain.—At the general monthly meeting, held on Monday last, December 7th, 1885, Mr. George Busk, F.R.S., Treasurer and Vice-President, in the chair, the following were among the lecture arrangements announced:—

Reginald Stuart Poole, Esq., LL.D., of the British Museum, Correspondent, France. Three Lectures on Naucratis: (1) Relations of the Greeks with Egypt from the Heroic Age to Ptolemaic; (2) The Emporium of Naucratis; (3) The Egyptian Sources of Greek Art. On Tuesdays, Jan. 28, Feb. 3, & 8.

Charles T. Newton, C.B., LL.D., M.A. Three Lectures on the Unpublished Portion of the Greek and Roman Sculptures in the British Museum (illustrated by Drawings and Casts). On Tuesdays, Feb. 16, 23, March 2.

Rev. G. Taylor, D.D., Master of St. John's College, Cambridge. Two Lectures on the History of Geometry: the Greeks and the Moderns. On Saturdays, Feb. 27, March 6.

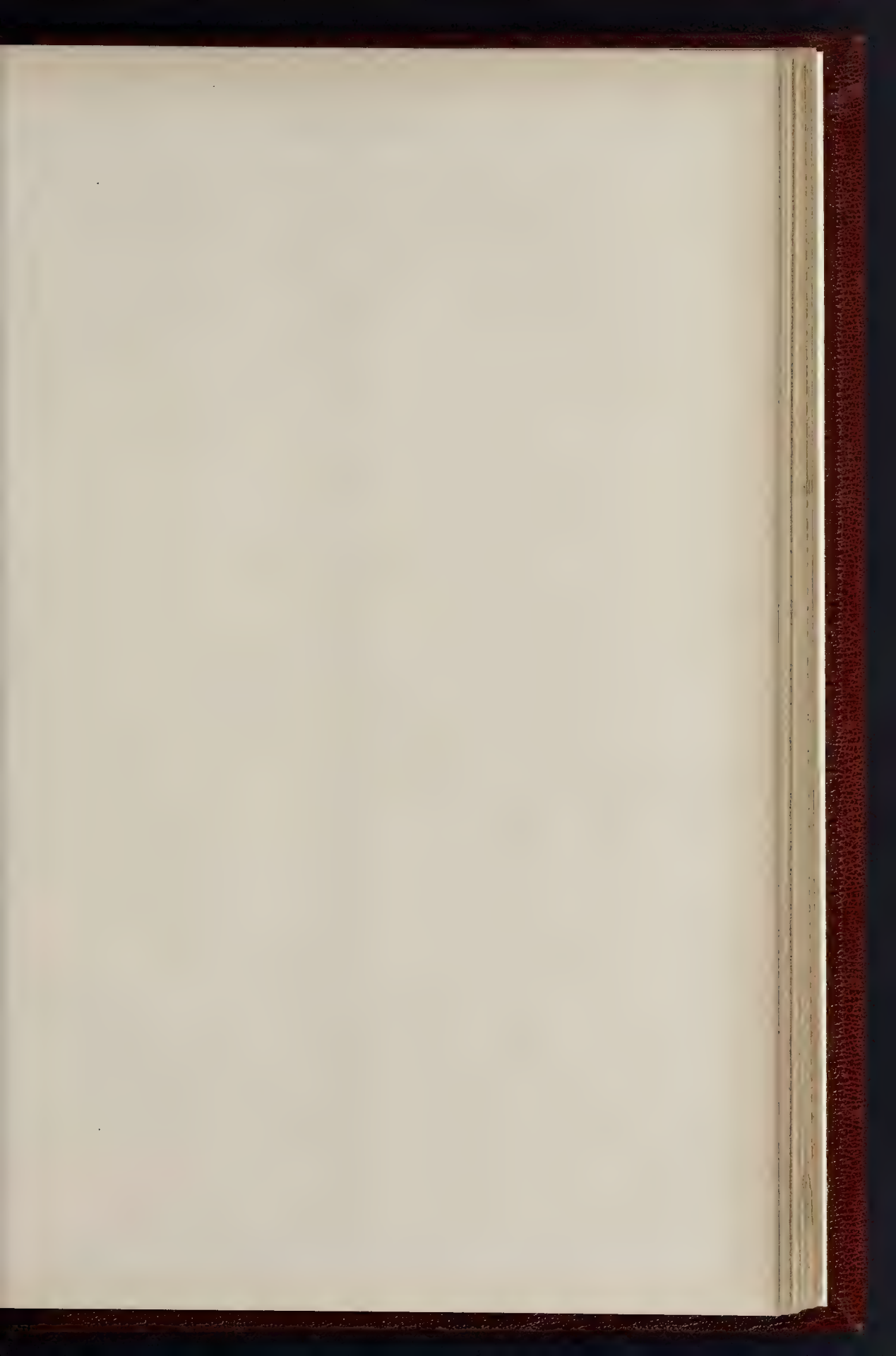
Professor Oliver Lodge, D.Sc. Two Lectures on Fuel and Smoke. On Saturdays, April 10, 17.

## Society of Medical Officers of Health.—

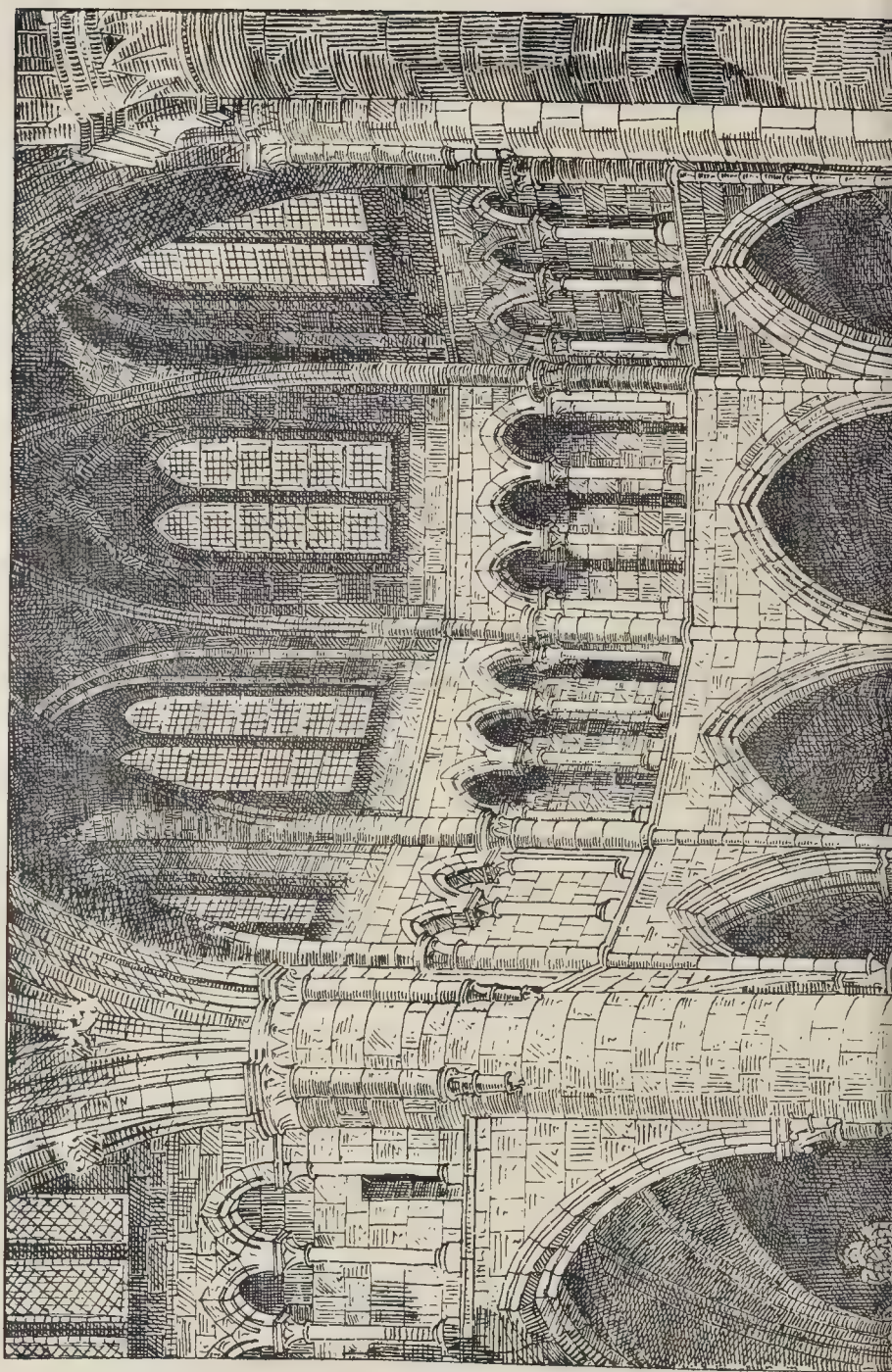
At a meeting of this Society to be held on Friday next, December 18th, Dr. E. C. Stanton will read a paper on "The Recommendations of the Royal Commission on the Housing of the Working Classes as they affect the Status of the Medical Officer of Health."

\* The plan, as will be seen, is on the lithographed view, but so small that we have thought it better to give a larger one separately.

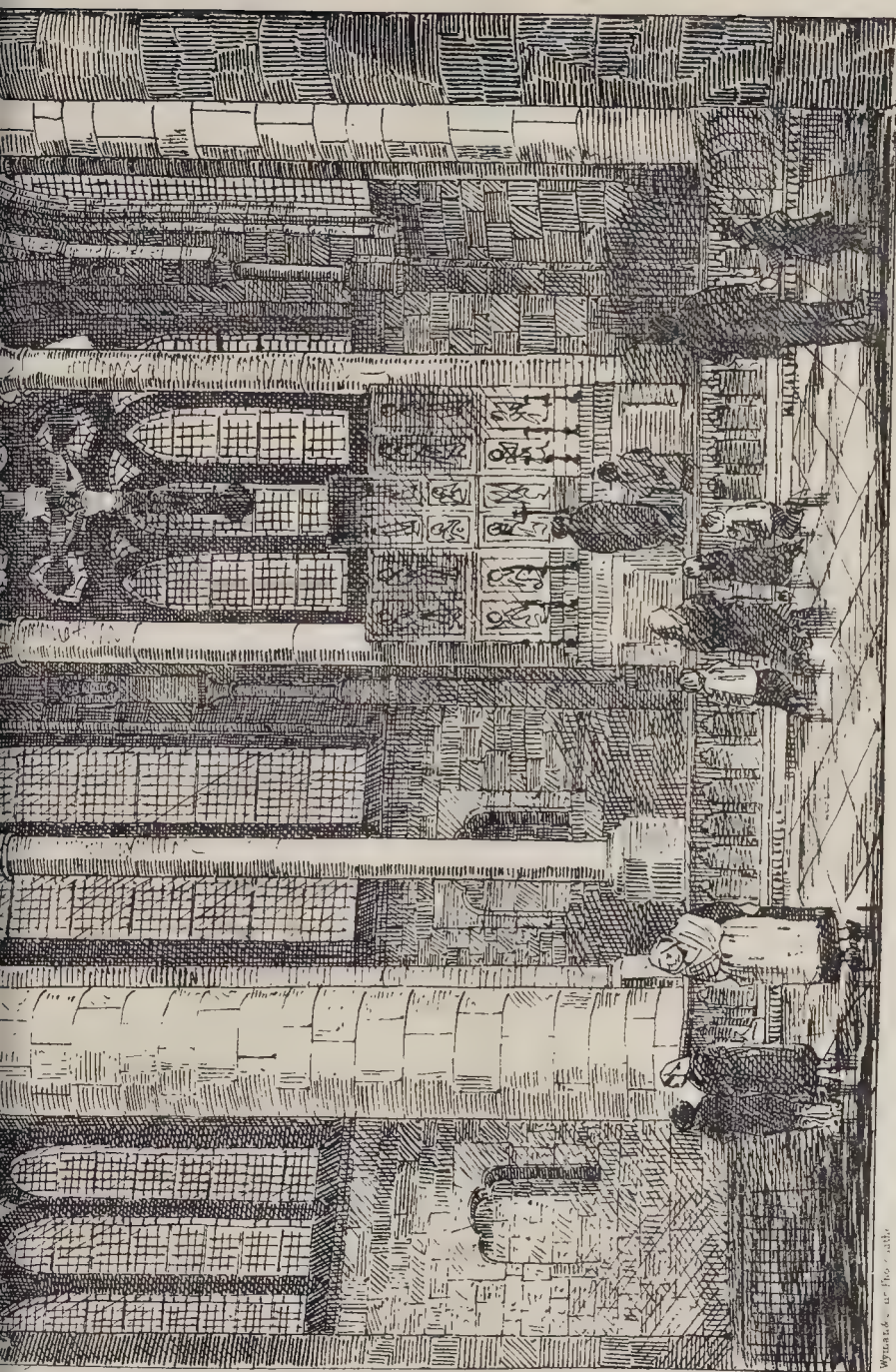




THE BUILDER. DECEMBER 12, 1895.







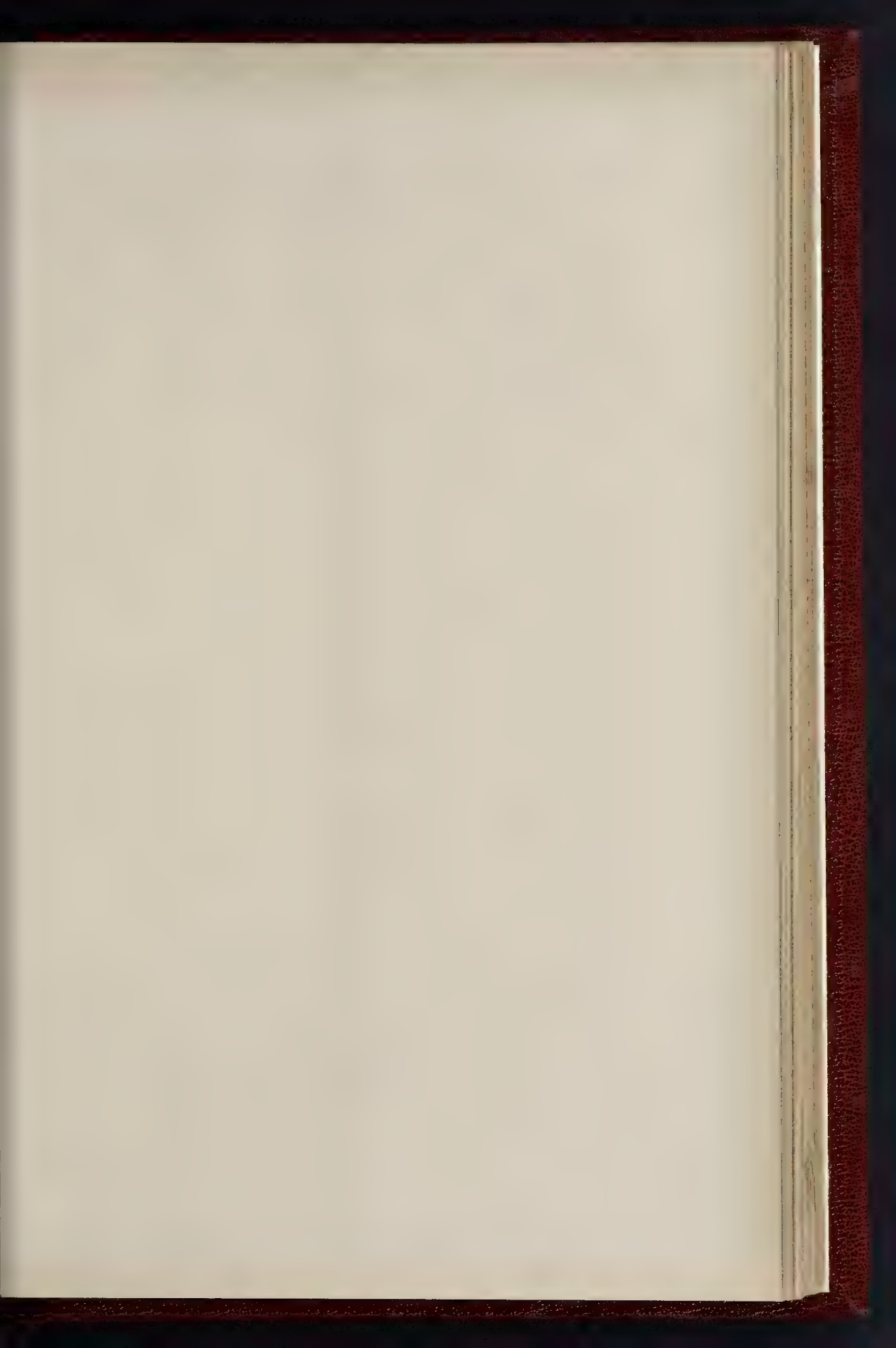
W. H. W. & Co. Lith.

INTERIOR OF THE CHURCH OF NOTRE DAME, DINANT. — DRAWN BY MR. E. A. DEUGES, A.R.L.E.A.  
(Published at the Royal Academy, 1887.)

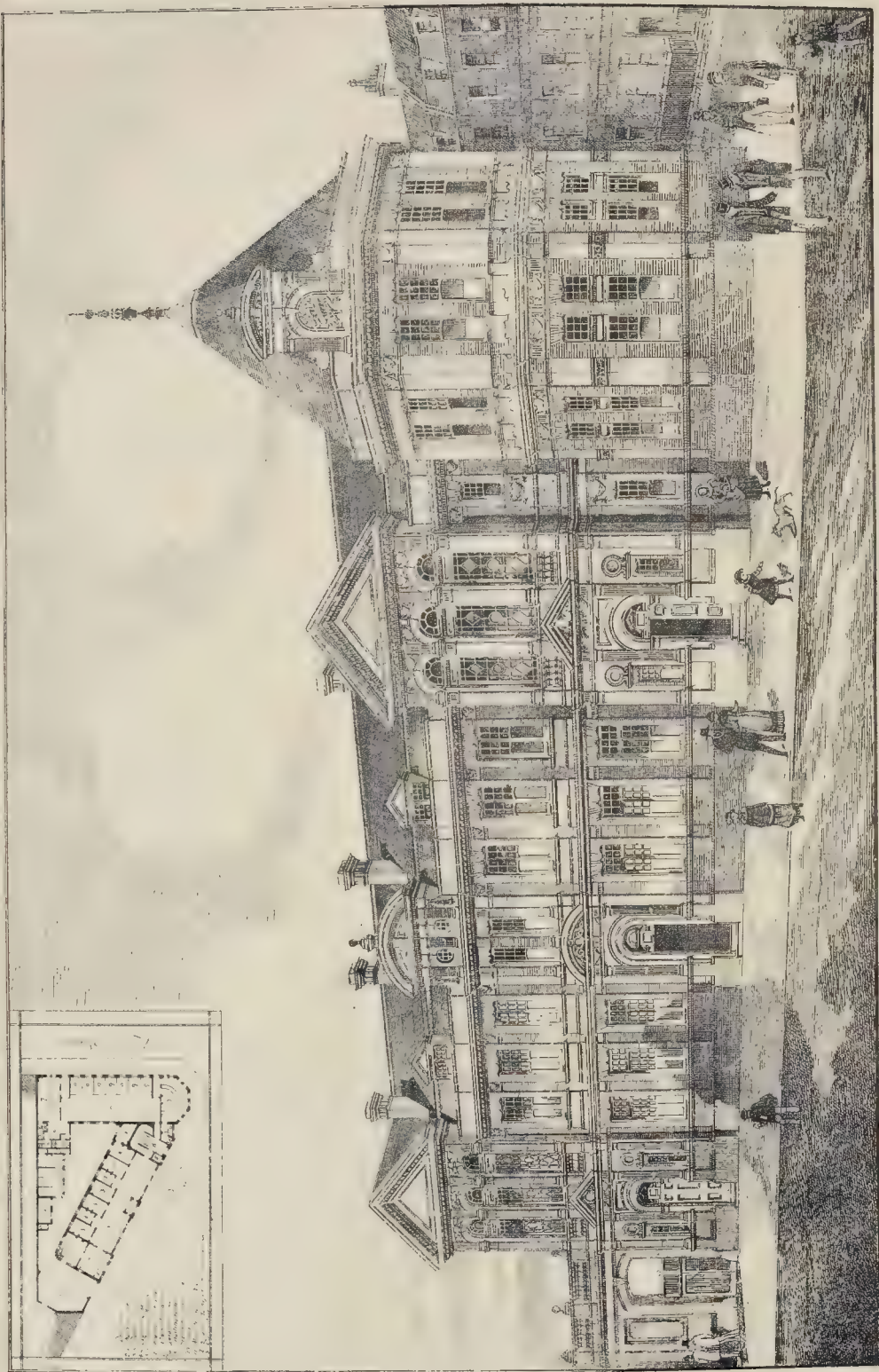
W. H. W. & Co. Lith.







THE BUILDER DECEMBER 12 1886

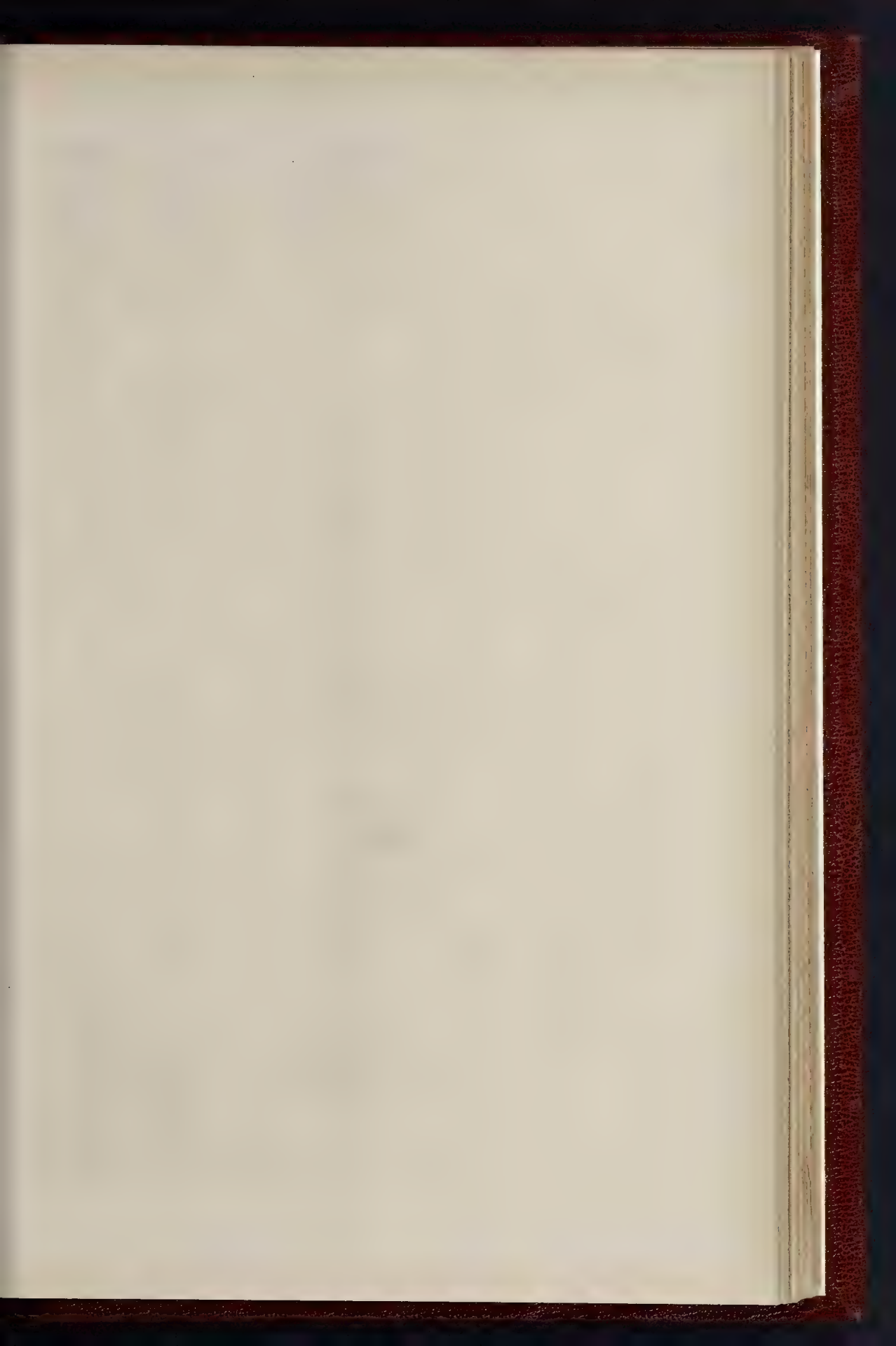


Wyman & Sons Photo Litho

HOLBORN UNION, DISPENSARY, RELIEF STATION, AND GUARDIANS' OFFICES.—MESSRS. H. SAXON SNELL & SONS, ARCHITECTS.

City Road, N. London, W.C.



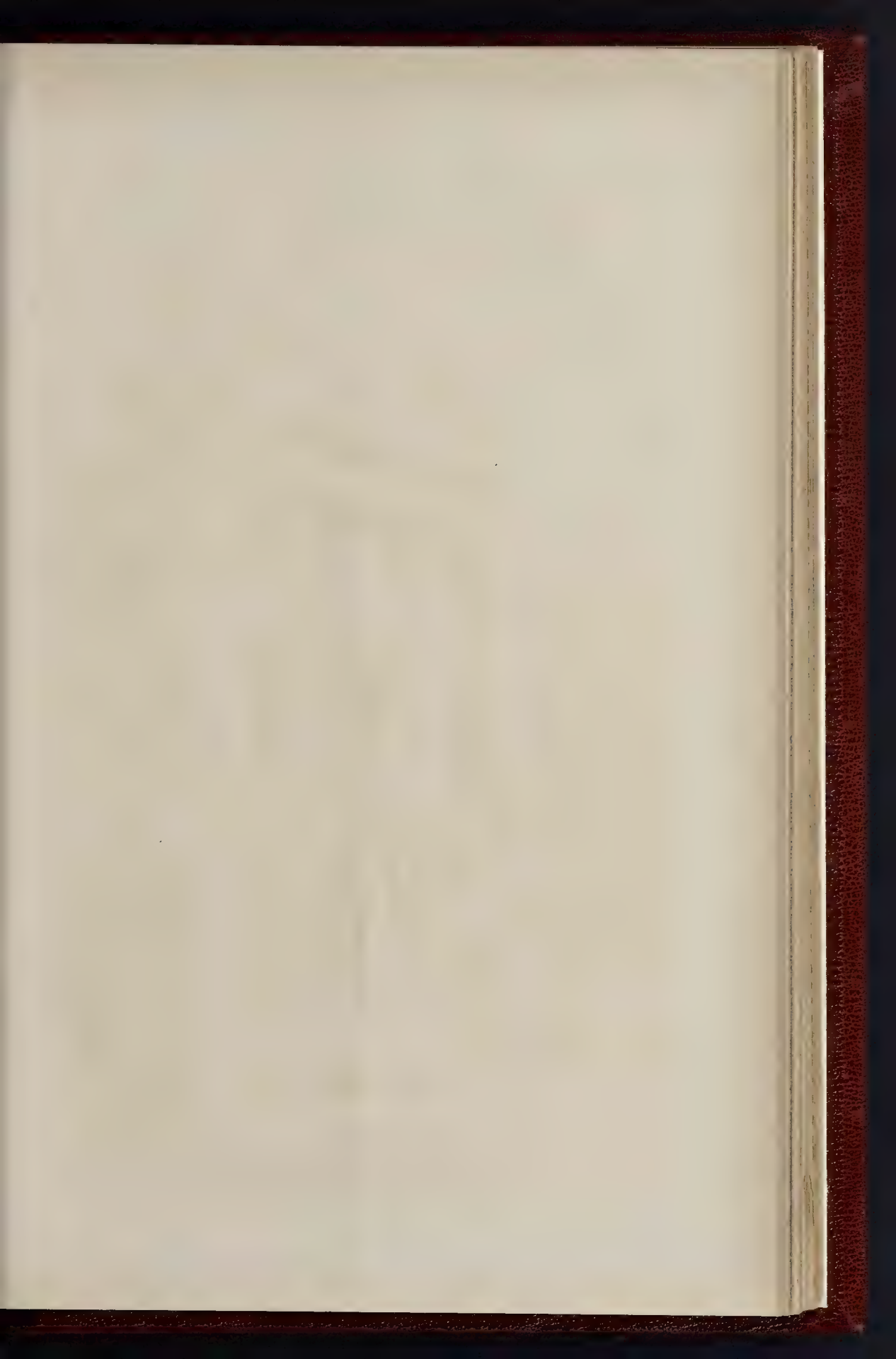


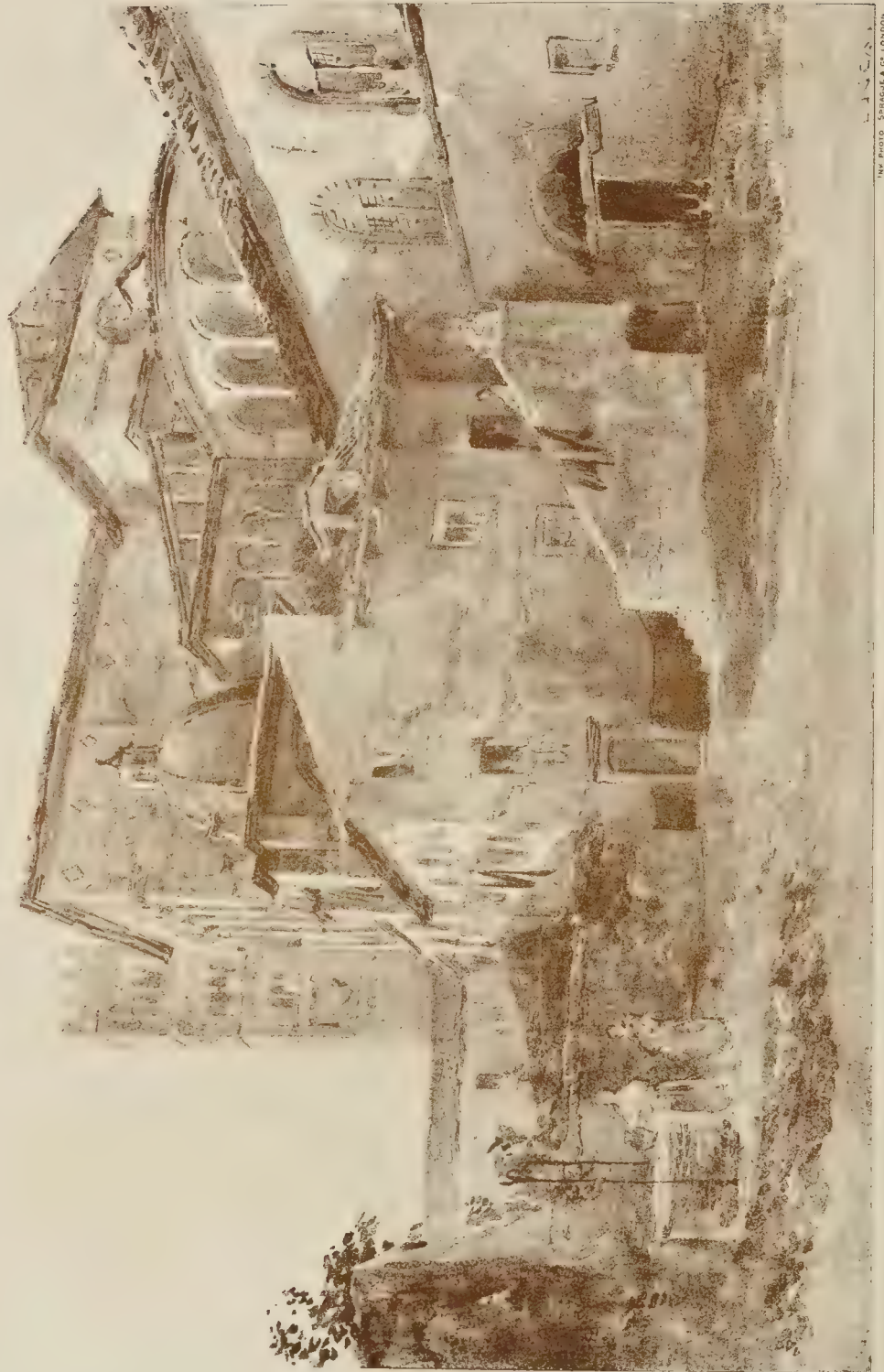


BY PHOTO. SPRAGUE & CO. LONDON

NEW PREMISES FOR THE BRISTOL BRANCH OF THE CAPITAL AND COUNTIES BANK  
W. F. MEW, ARCHT. & ASSOCIATES







NEW PHOTO. SHREVE & CO. LONDON.





DESIGN FOR A BLOCK OF OFFICES FOR A CORNER SITE.—By Mr. P. J. MARVIN  
(EXHIBITED AT THE ROYAL ACADEMY, 1885.)



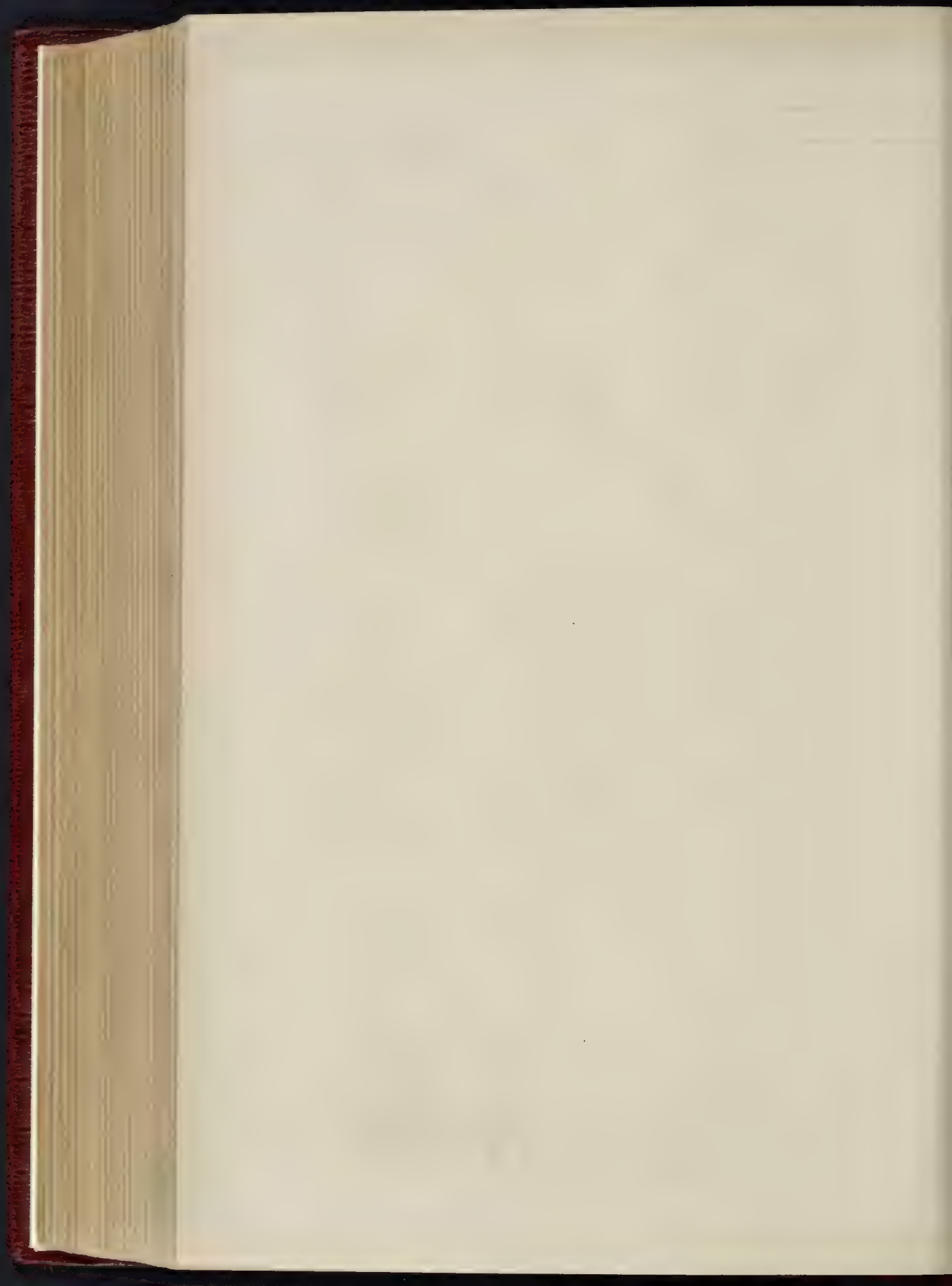




PHOTO SPRAGUE & CO. LONDON

MEMORIAL TO THE LATE J. R. GREEN, IN THE CAMPO SANTO, MENTONE.

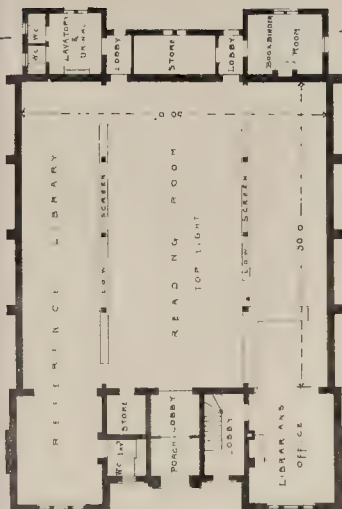
MR. J. HOWARD ESQ., ARCHITECT.





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## THE VENTILATION OF PRIVATE DWELLINGS.

ARCHITECTURAL ASSOCIATION.

THE fourth meeting of this Association for the present session was held on the 4th inst., at Conduit-street, Mr. J. A. Gotch (Vice-president) in the chair.

It was announced that Mr. William H. White (Secretary of the Institute) had offered the members several copies of his paper on "Architecture: its Past, Present, and Future," read by him before the Leeds and Yorkshire Architectural Society.

With respect to the water-colour class, now being formed, it was stated that those desirous of joining should communicate with Mr. Hilton Nash before the 31st of March next.

Mr. G. H. Blagrove then read a paper entitled "Ventilation of Private Dwellings." He said:—

The atmosphere, as most persons are aware, is mainly composed of two gases, nitrogen and oxygen. The former, constituting nearly four-fifths of the entire body of the air, serves as a medium in which the other ingredients are diluted. Of the oxygen there is rather less than 21 per cent., and its presence is essential to the support of animal life. The percentage of it which we consume in breathing varies according to circumstances, such as age, sex, time of day or night, whether we are sleeping or waking, and whether or not we have just partaken of a meal. The smallest amount is probably 4 per cent., while the largest has been stated at more than 12 per cent. This appears to be an exaggeration, because, according to a certain law of affinity between gases, we cannot abstract much more than 10 per cent. of oxygen from the atmosphere, however often we inhale it. I do not think it safe to allow less than 10 per cent. for our average consumption, because we must remember that at night a certain proportion of oxygen is abstracted from the air by vegetation. We see from this the danger of attempting to breathe the same air twice over. Besides other gases of various kinds in minute quantities, common air contains carbonic acid gas, or anhydride of carbon, to the amount of about four parts in 10,000. In exchange for the pure oxygen which we inhale, we return to the air nearly 8 per cent. of carbonic acid, and a variable amount of watery vapour impregnated with certain organic impurities. This vapour does not mix uniformly with the air, but has a tendency to hang about in clouds, similar to those which become visible in a partial vacuum. I calculate that, altogether, we evolve about 11 cubic feet of vitiated air per head every hour, including what is thrown off by the skin. Carbonic acid gas has been spoken of as poisonous, but this appears to be a mistake. It has the power, when in sufficient quantity, of producing suffocation; but the most poisonous ingredient in exhaled air is said to be the organic impurities discharged. It will be seen that we require 11 cubic feet of pure air per head every hour for breathing purposes; and, if we could depend upon its purity, this amount would suffice. It must not be imagined, however, that if we introduce this amount into a room, it will be sufficient, because the impure air which we throw off has a tendency to diffuse itself, thus polluting a large proportion of the air which we require for breathing purposes. In a room containing a given number of persons, a certain amount of polluted air must be withdrawn per hour, and, of course, an equal amount of pure air must be introduced to replace it. This amount has been variously stated by different authorities. Some early writers on ventilation have given it at from 2 to 4 cubic feet per minute, or from 120 to 240 per hour. Péclet states it at 250, Hood and Morin at 300, Dr. Reid at 600, and Capt. Douglas Galton arrives by experiment at 1,200, and by calculation at 3,000. This calculation is based upon the assumption that the impure air diffuses itself rapidly at a uniform rate throughout the entire atmosphere of a room. The assumption is nearly true as regards the carbonic acid, but not as regards the organic impurities. Adopting this assumption, however, we find that although a large volume of air requires a longer time to reach a given standard of impurity than a smaller one, yet when that standard is reached, the supply of fresh air necessary to prevent higher contamination is the same in a small as in a large room. We should then have to make up our minds as to what degree of partial purity would satisfy us, and regulate the ventilation

accordingly. Ventilation would then consist, as it often does, in merely diluting impurities which can never be completely expelled. There is no doubt that the organic impurities thrown off by the skin and lungs are apt to linger in the corners of a room, and can only be driven away by strong currents of fresh air introduced by opening windows and doors for a certain period every day. This is the "airing" to which every inhabited room should be subjected, and is quite distinct from regular ventilation.

The hypothesis that exhaled air diffuses itself uniformly cannot be sustained, because it has a tendency to ascend, through being lighter than the air at ordinary temperatures. It is lighter because it is rarified by heat, and saturated with vapour. I find that a cubic foot of exhaled air weighs just 493 grains immediately after it is expelled from the lungs. It is soon partially chilled, however, and arrives at the same specific gravity as that of common air at about 60° Fahr., in which temperature it has no tendency to rise, but hangs about in clouds, and is liable to be inhaled over again. This is one reason why heated rooms are unhealthy, another being that as the whole atmosphere is rarified, the same quantity of oxygen cannot be inhaled at a breath as in colder temperatures. Most persons will find 65° a pleasant as well as healthy temperature, and I should never recommend anything higher than 75°, except in Turkish baths.

If we suppose the fresh air to be introduced from the lower part of a room, while the foul air finds an exit at the ceiling level, we shall see that it might be possible to keep the supply practically pure. To my mind, the problem of perfect ventilation depends upon two conditions: the rate at which the foul air ascends, and the rate at which it is diffused. If the velocity of diffusion were equal to the velocity of ascent, the air below the level of our nostrils would never be contaminated by our breath, which would be constantly replaced by perfectly pure air. All we should have to do then would be to provide for the egress of as much air as could become contaminated in the time occupied by each exhalation in reaching the outlet. The higher the outlet the greater would have to be the amount of outflow, and by consequence, the greater the amount of supply. The velocity of ascent would be retarded as the foul air approached, by admixture, an equal density with the surrounding air; it would, in fact, vary directly as the square root of the difference of density. The velocity of diffusion would vary inversely as the square root of its density, but would be nearly uniform. From calculations too long to be quoted here, I arrive at the conclusion that when an outlet is not more than 12 ft. from the floor the foul air will reach it in about ten seconds, during which time it will have been diffused in about forty-three times its volume.

This gives the amount of outflow at about 473 cubic feet per hour for each individual,—let us say an average 500 ft.—and this should be the allowance in ordinary dwellings. In the case of artificial lights, separate outlet tubes should be provided for gas brackets or pendants, or for any kind of light which is fixed. The products of combustion from candles which are carried about are too trifling to merit consideration; but it may be useful to remember that two candles are said to consume as much oxygen as one grown person.

As regards the capacity of outlet tubes, that must, of course, depend upon the velocity of the outflow, which is governed by the difference of temperature between the foul air and the surrounding atmosphere, and, in fact, varies directly as the square root of that difference. It is greater according to the length of the extraction-flue, provided that the foul air is not chilled in its passage. With an average difference of 3 deg. in a tube or flue 10 ft. long, the velocity will be about 5,000 ft. per hour; or an outlet of 1 ft. superficial capacity will extract sufficient for ten persons. An outlet 4½ in. by 3 in., or of about 14 square inches capacity, would, under these circumstances, suffice for one person; and this is the allowance which should be made. Of course, if we have any artificial means of extraction, much less will do; but such means are generally too expensive to be adopted in private dwellings. Natural ventilation,—that in which we depend for our extracting power upon the difference between the specific gravities of warm and cold air,—is that on which we must chiefly rely. It is well to remember that foul air is heavier than pure air

when both are at the same temperature, as we shall thus understand the danger of allowing the former to become chilled.

Probably a bedroom is the most difficult apartment to ventilate satisfactorily during the night. In an average room let us consider what happens. The air of the room is warmer than that outside, and consequently it ascends the chimney in a central column, while there is a certain amount of down-draught,—usually very little,—in the sides and angles of the flue. The air abstracted from the room is chiefly supplied through the crevices of the door, and as it comes from the interior of the house it is therefore very far from being pure. Unless the staircase windows are kept open, the house will be largely supplied with air from the lower part, that is, through the crevices of external doors. Such air will be impregnated with impurities, some of which will be drawn from the sewer gratings in the roads, through which authorities persist in allowing our streets to be poisoned. This air, such as it is, is chiefly available for ventilating our bedrooms, and it partially purifies the air up to the level of the fireplace opening, scarcely disturbing the air above it. Were beside the sleeper if his bed be above this level, for he will pass the night in a stratum of air which will continually grow more and more impure. Architects generally keep down the height of a fireplace opening to within a reasonable proportion of its width, and, as bedroom fireplaces are never very wide, we have in most houses some wretched little pigeon-holes to do duty as ventilators. If the sleeper's condition be generally bad in a room containing a fireplace, what must it be in a room which has none? We may safely assume that if it were not for cracks and crevices in imperfectly constructed windows and doors, many persons would be suffocated, and this is one argument in favour of "jerry" building.

There should be outlets in or near the ceiling. If you put your outlet at any level below the ceiling, you will have a constant stratum of foul air down to that level, and it will be liable to pollute the remaining air of the room. There may be any number of outlets, which may take the form of ornamental perforations, but they should all communicate by outlet tubes with one flue carried up the wall. If you have two or more extraction-flues to the same room there is always the danger of a down-draught being established in one of them, through differences of atmospheric pressure. In order to maintain a constant up-current in an extraction-flue, the flue must be carried down below the level where the foul air enters it, to some point where cold air can be admitted. This can easily be done in external walls by means of gratings. In internal walls, the flues may be carried down to a cellar in the basement, into which air can be admitted through tubes or gratings. We should then consider that a column of air, equal in height to the entire atmosphere, is pressing upon the opening at the lower end of the flue, while a column of the same height, minus the height of the foul air in the flue, is pressing upon the top, the result being an up-current. I have known extraction-flues closed at the top and provided with side gratings only. This I conceive to be a mistake, as the air blowing in through this grating may acquire a downward direction, checking the up-flow of foul air. There should always be a vertical opening, for there is no apparent reason why foul air should behave differently to smoke, and its upward passage may be assisted by means of louvred gratings let into the sides of a stack. Boyle's or other extractors are undoubtedly useful. Their operation depends upon the principle that a current of air blowing across an opening causes a partial vacuum which creates an up-current, as exemplified in the well-known apparatus for diffusing scent by means of two glass tubes; but of course no dependence can be placed upon these extractors in calm weather.

There is always a danger of foul air being retarded in its passage to an extraction-flue by the pressure of cold air already there. The difficulty has sometimes been obviated by conveying all the outlet tubes into one large foul-air chamber, say, in the roof. Thence the foul air is carried into the extraction-flue, and it is found that a steady outflow is better maintained through a tube, when it is backed up, so to speak, by the pressure of this large body of foul air behind it.

There are artificial aids to extraction which may be invoked in ordinary dwellings, the most



important one being heat. As I have before hinted, extraction by fan engines is too expensive to be adopted for small buildings, but I would suggest that it might be possible to design a terrace of houses with two towers,—one for extraction and one for supply,—which might be made pleasing architectural features. Sometimes extraction-flues have been carried up inside a large kitchen flue. When the kitchen is placed at the top of the house, as recommended by Dr. Richardson in his "Hygeia," the heat of the kitchen fire can be utilised for warming the upper extremities of the extraction-flues, and increasing the current in them. An outlet tube should never be conveyed into a smoke-flue, partly on account of the danger of the smoke being occasionally driven back into the room, but chiefly because the outlet tubes may become partially choked with soot. If the smoke-flues were carried down to a ventilation cellar in the basement, the up-current in them would be greatly increased, to the probable prevention of what is termed "smoky chimneys." The current could always be reduced, if necessary, by partially closing the register. The chimney could be swept from above with a sweep's brush let down by a rope, and all the soot would pass into the cellar instead of into the room. I am told that this plan is adopted in Berlin.

With regard to the introduction of fresh air into houses, this forms, perhaps, the most difficult part of our subject, on account of the dangers arising from draughts when no special means are adopted for warming the inflow. To ensure the greatest possible purity of supply, the air should not be admitted very near the ground; therefore, for ground-floor and basement rooms it is advisable to provide inlet-flues. Any tubes or gratings used for this purpose ought to be of galvanised iron, or some material not liable to rust, because, in the process of rusting, oxygen is absorbed from the air. We ought to consider the true nature of what is called draught in deciding how fresh air is to be introduced into a room. So long as the air is colder than the surface of our bodies, it will absorb heat from them; and while the air in contact with our bodies is continually being changed, it continually presents fresh capacity for absorbing heat. This is why air at, say, 60°, in motion, may really feel colder to us than air at 40° when at rest. If, therefore, there is to be a certain amount of motion set up in the air of a room, the more that motion is distributed the less will it be felt. Hence, if we place the outlets in the highest part of a room, we ought to place our inlets in the lowest part. Air will rush into a warmer medium with great velocity, and if we provide the same capacity for inlet as for outlet flues, we may be quite certain of being upon the safe side. The next thing is to provide for distributing the inlets inside our rooms. If the air is admitted from a flue or external grating, it may be conveyed by a pipe or channel under the floor to the opposite side of the room, where it can be carried behind the skirting. Where doors occur, the pipe may pass beneath them, and up again into the skirting. Holes should be formed in this pipe for the escape of air, and at the point where the pipe is first carried up behind the skirting, and where the air pressure is consequently greatest, these holes may be 9 in. or 6 in. apart, and of about 1 in. capacity, and their interspacing should rapidly diminish to 2 in. or 3 in., as they pass along the adjacent sides of the room. The object of this is, of course, to equalise the velocity of the inflow. Ornamental perforations should be placed in the skirting, and filled in with perforated zinc. By these means, the inflow is sub-divided into minute streams, and mingles with the air of the room, becoming warmed by it, and thus producing no violent change of temperature. Capt. Douglas Galton has stated that the velocity of inflow into a room should not exceed 1 ft., or at most 2 ft., per second, to avoid draught. I find it is easy to obtain inlet areas amounting to 80 square inches in capacity, in the skirting of a room 12 ft. square; and if 2,000 cubic feet per hour, which is enough for four persons, be introduced, the inflowing velocity will not exceed 3,500 ft. per hour, or less than 1 ft. per second,—a limit which I think safe.

Some means ought to be provided for controlling the supply, which is apt to rush in with too great a velocity when there is much difference between the external and internal temperatures. This may be done by means of a choke-valve in the main inlet-pipe, or by adjustable

louvers outside. By either of these means the inflow could be partially or entirely checked at will.

There are some other methods of introducing fresh air, to which I should like to call attention. We are all tolerably familiar with the simple device of putting a head of extra depth to a window-cill, which enables the lower sash to be raised so as to admit the air only between the meeting-rails. An ingenious contrivance has recently been patented by Mr. W. Pope for converting the cased frame of a sash into a ventilation-flue. The air is admitted between a set of louvers placed in the lower part of the pulley stile outside, and it enters the room through another set of louvers in the upper part on the inside. The outer louvers are so arranged that they can be partly or entirely closed by turning a small knob inside. Mr. Pope calls this "pulley-stile ventilation," and it is obvious that it could be introduced into any house without much difficulty or expense. A method of so-called ventilation by diffusion has been mentioned. It consists in fixing fine gauze in an opening, so that a constant interchange between the external and internal air is carried on, it is said, without perceptible draught. If a proper outlet is provided in a room containing a fireplace, it will be found that a considerable amount of cold air will rush down the chimney; and if there is any other means of supply, it may be advisable to close the register when no fire is lighted. Otherwise I would suggest the use of a species of chimney-board, which would be, in fact, a frame filled in with fine wire gauze or perforated zinc. By this means the inflow would be distributed, and its velocity diminished. When a fire is burning, a warmed supply might be obtained by converting the jambs of a chimney-piece into a species of Tobin tubes. I do not regard the Tobin system as thoroughly satisfactory. It appears to me that by directing the current of fresh air towards the ceiling, whence it is afterwards diffused, the inflow is at once mixed with the foulest air in the room, which it chills, condenses, and brings down with it. If the inflow does not maintain its upward direction, an unpleasant draught is felt by those who happen to sit near the ventilator. This is the case with hopper ventilators, or with top lights hinged to casement transoms, even when furnished with side gussets. I have seen hopper ventilators very artistically treated by having pictures or ornamental mirrors placed in front of them, and tilted forward at the required angle. This mode of decoration is applicable to the Sherringham ventilator, which can be partly or entirely closed at will. When the supply is warmed, such means of inlet are satisfactory enough, and might be made available for ventilating rooms from halls or corridors, where the air is tolerably pure, especially when the products of combustion from artificial lights are carried off by special tubes, as was done in the Sanitary House at the Health Exhibition.

The foregoing appear to me to be the principal means of ventilation at our disposal in private dwellings, where no special heating apparatus is provided. Where that is the case, the whole problem of domestic ventilation changes its complexion; for it can then be conducted upon principles which are also applicable to public buildings.

The Chairman, in opening the discussion, said that the ventilation of private dwellings was a subject of great difficulty, which Mr. Blagrove's paper seemed to confirm. The real conclusion, to his mind, was that it was impossible to get natural ventilation without draught, and this had been forced upon him by experience. There was certain to be draught in obtaining thorough ventilation, unless the cold air was heated artificially. He did not agree with Mr. Blagrove as to the results of the laws he had endeavoured to explain. The laws regarding ventilation were really as yet misunderstood and misapplied, for every system of ventilation adopted or suggested had as many defects as it had virtues. If cold air were introduced by Tobin's tubes, it was mixed with a certain amount of foul air when it descended on the head; while, on the other hand, if the air was introduced near the fire, the result was cold feet. Thus one had a choice of evils,—of being asphyxiated, or of catching cold. As to those who lay in bed with their heads above the fireplace opening, a great many people did this, and yet remained hale and strong. Mr. Blagrove had not enlarged upon the fate of the man who had no fireplace at all in his bedroom,

though doubtless he considered such a person's condition one of great peril. Now he (the Chairman) lived in an old house in the country, and had slept for five years in a room with no fireplace, without experiencing any bad effects whatever. So that when he heard of those tremendous laws, and yet found that the prophecies were unfulfilled, his faith in people's notions of ventilation was much shaken. Mr. Blagrove had said that there should be plenty of extraction openings, but he was inclined to think there should be plenty of inlets, allowing the air to find its way out as best it could.\* If air was introduced through the skirting, the result would be cold feet. Another terror which had been added to his life was to think that fresh air for warming a ground-floor should not be taken from near the ground outside, because of its impregnation with carbonic acid and Heaven knows what. If they were to be terrified with such fantastic notions, they might as well commit suicide at once. In fact, after hearing this paper, good as it was, his views were the same as before, and he would continue to adopt the same means for ventilating private houses, as hitherto, which was practically on Tobin's system.

Mr. Cole A. Adams proposed a vote of thanks to Mr. Blagrove, and considered that a series of costly experiments would be required before any successful result could be arrived at. In dealing with small houses, it was almost impossible to adopt anything very successful in the shape of ventilation, and one was driven back to the Tobin principle in some form or other. Fresh air might be brought in at the meeting-rails of the window-sashes without draught by a slight alteration, costing about 6s. per window. Tobin's shaft, again, might be used in a room with little risk of down-draught. As regards extraction, Tobin concluded that a fire-place was the best possible medium. In order to prevent the rush of chill air into a room from a hall or passage, it was well to have a gas-stove near the front door. He was in favour, also, of the warm-air grate, but it must be on a good principle, such as Boyd's; a large number of these grates had been used by Mr. Robson, in the London Board Schools. The admission of fresh air through the skirting had invariably been disappointing in practice. In the case of a bed-room, his plan was to sleep with the window slightly open. To have a house perfectly comfortable, the fresh air must be warmed.

Mr. John Slater did not agree with the Chairman that it was sufficient to provide inlets for fresh air: unless there was motion ventilation was impossible. It was, of course, true that if care was not taken the fresh air coming in would cause draughts, but the way to avoid that was to have several inlets. To have a house perfectly comfortable, as Mr. Adams had said, the fresh air must be heated, but the object of the paper seemed to be to show what could be done in an ordinary house without a warming apparatus. He remembered going into a small house where a good deal of pains had been taken with the ventilation, and where amongst other things a little slit had been made above the architrave of the room door. Thus there was always a connexion between the air in the hall and that in the room, and the arrangement acted extremely well. It was all very well to say that the air in the hall of a house was impure, but it would under ordinary circumstances be much purer than that of a sitting-room. The disadvantage, however, of this arrangement was that it diminished the privacy of a room. He agreed with Mr. Adams as to the advantages of Boyd's grates; he had used them himself, and he was bound to say they acted admirably. He had adopted the plan of having a little hit-or-miss grating on the window bar, connected with an air brick on the outside wall, so that the fresh air could be admitted at the level of the window-sill. He had frequently used this in the case of schools, and it had worked admirably. Mr. Slater seconded the vote of thanks.

Mr. F. R. Farrow thought it would be better to put the kitchen flue inside the extraction flue than vice versa.

Mr. Leonard Stokes remarked that the vitiating effects of gaslights had been almost left out of the question. In an ordinary sitting-

\* And pray how does Mr. Gotch suppose the inlets are to act in that case? It is much to be regretted that the chairman of a meeting of architects should have committed himself to such very crude remarks on so important a subject.—E.S.



room there would be at least two burners vitiating as much air as four people would. If a tube were used for collecting the vitiated air from the burners, and carrying it off, it would make a room occupied by four people twice as wholesome. The right way to get air into a room was to pass it through a warm-air grate, and a little expense in that direction should be indulged in.

Mr. H. D. Appleton (hon. secretary) would like Mr. Blagrove to explain what he meant in speaking of ventilation by means of a gauze and diffusion?

Mr. Osborne Smith agreed that heated air was a great aid to ventilation, and in winter the warm-air stove should be used; but then there was a time of year when it was too cold to open the windows, and too warm to light a fire. By arranging the Venetian blinds, draughts could be prevented even when the window was open, and if people would accustom themselves to this, they would solve the difficulty by cheap and ordinary means.

The vote of thanks was then passed by acclamation.

Mr. Blagrove in replying, said he was glad to find that the Chairman had survived after occupying for five years a bedroom without any ventilation, but no doubt it testified to a certain amount of "jerry-building," so far as cracks and crevices were concerned. It was, of course, impossible to have proper ventilation without artificial warming, but he had endeavoured to indicate some ways by which to overcome that as much as possible. Doubts had been expressed as to the application of some of the scientific laws which had been laid down. He had not arrived at these laws from any experience of his own, but had quoted them from the best authorities, and he would recommend his hearers to peruse an excellent book on ventilation by Mr. Charles Hood, which was of the greatest use to architects. The slit above the door mentioned by Mr. Slater was really on Tobin's system. Mr. Stokes had referred to a method of extraction by means of gas. In this way the products of combustion were carried up through a trumpet-mouthed tube from the gas-burners, while the rest of the foul air was extracted by a tube surrounding the other. As to ventilating by a gauze, chemists had experimented on the diffusion of gases with the object of ascertaining the rate at which one gas became diffused into another. He believed that a similar process would take place between the atmosphere outside, and the air inside a room, by filling in an opening with fine gauze. By the way, he might mention that a good deal of foul air would percolate through the ceiling, when all other outlets were closed.

#### OVERCROWDING IN LONDON.

At the meeting of the Association of Public Sanitary Inspectors held on the 5th inst., a suggestive paper on "The Dwellings, Habits, and Overcrowding of the Poor in the Metropolis," was read by Mr. Middleweek (Sanitary Inspector of Kensington). The chair was occupied by Mr. W. Rains (St. George's-in-the-East), and there was a large attendance of members. At the outset, the lecturer entered a vigorous protest against the omission of the Royal Commission on the Housing of the Poor to call upon any of the sanitary inspectors to give evidence, for their evidence would have rebutted much of that which was actually given, and would have tended to show that existing evils should not be entirely attributed to the property-owner, since it was in the majority of instances "the pig that made the sty," a strong if inelegant expression, indicating the extent to which the poor were themselves often to blame for the bad condition of their homes. Sensational writing, it was urged, had developed the question into a craze, but sanitary inspectors had known only too long and too well of all the evils existing, and had combated them with an amount of success revealed by a comparison of the vital statistics of the last few years with those of former periods. These proved that many of the diseases chronic in other cities had been reduced to a minimum in the metropolis, and that London had become one of the healthiest cities in the world. The work of the Commission was comparatively a failure, mainly because its attention had been directed rather to the condition of the houses of the poor than to the causes which produced that condition. In the education of the country

the elementary principles of sanitation, cleanliness, and industry had been ignored, and until the masses were influenced in that direction, but little hope could be entertained of giving them better homes. Nothing had been more amply verified by the long labours of their venerated President (Mr. Edwin Chadwick, C.B.) than the axiom that "where dirt was supreme disease would always be found." With regard to the recommendations of the Commission, exception was taken by Mr. Middleweek to certain points. The prison sites which had been recommended for the erection of blocks of barrack-like dwellings would be far better utilised, from the sanitary point of view, if reserved as recreation-grounds. The sanitary inspectors' objections to such blocks of dwellings were much strengthened by the comparatively high death-rate of some of these communities. In the Peabody Dwellings the death-rate was 19.1 per 1,000, or only 1.24 below that of the entire metropolis. Fresh air was unknown in many of the rooms, which, from their position, could never be cheered by a gleam of sunshine. The danger of the outbreak and spread of epidemics was aggravated by the absence of recreation-grounds or gardens, by the unsatisfactory position of water-closets and lavatories, and by the fact that the open staircases and passages frequently became the resort of vagrants, termed "happy dossers," who had no other sleeping-place, and who often left behind them traces of their unsavoury presence. In the recommendations which the lecturer would have made to the Commission had he been permitted, the necessity of increased locomotion held a principal place. He would add the tramway companies to the railway companies and make it compulsory on both to carry all classes of workmen at cheap fares and at convenient hours to and from homes in the suburbs. The term "workmen" should include not only those engaged in the building trades, who must be at their work at six o'clock in the morning, but clerks, shopmen, warehousemen, porters, machinists, printers, sempstresses, &c., who commenced work later, but who often had to appear respectable on a smaller income than that earned by the builder's man. If tramways were constructed by vestries and then leased to companies, these lines of locomotion would be under full control and by their profits they would lighten the burdens of the ratepayers. On some lines of railway there were already workmen's trains, but on others there were none, and where they existed they were inadequate. The necessity for the poor of living near the scene of their labours induced the haphazard conversion of buildings into dwellings regardless of sanitary requirements, and the laxity with which the provisions of the Building Acts were enforced permitted the continuance of the evil.

In the discussion which followed,

Mr. Sherwin expressed his opinion that the overcrowding of Board schools was a more prolific cause of the spread of epidemic diseases than the overcrowding of dwellings.

Mr. Alexander (Shoreditch), in proposing a vote of thanks to Mr. Middleweek, said that some of the most unfit dwellings he knew had been erected by well-meaning people who had been misled by some clever architect who could make, perhaps, a pretty picture, but possessed scarcely any other qualification which an architect ought to possess.\* He had in his mind one block erected by an architect of that kind, which did not contain a single room more than 8 ft. square. Though but scantily furnished, it was impossible to move in than except sideways, like a crab; and in the bedrooms there was not one position in which a bed could be placed without the occupant being compelled to sleep with the head close to a window, where cold on cold must be unavoidably induced. If there was one thing more than another which filled him with dismay it was the multiplication of model dwellings. They were often models of all that they ought not to be. Architects as well as other people required education. He could point to buildings in which the limited space for rooms had been still further reduced by thick party walls which, at a cost of from 200l. to 300l., had eventually to be taken away, to make the rooms at all tenable. Architects seemed to think they had an exclusive

\* Mr. Alexander, in common with some other people, has a peculiar notion of what constitutes "cleverness" in an architect. As we have often said, in effect, the man whose only title to the name of architect is that he can make "a pretty picture," is no architect at all, though he may be a clever draughtsman.—Ed.

privilege to construct dwellings,\* and that so long as they gave a room the 7 ft. of height required, they might make the other dimensions anything they liked.

The vote of thanks was seconded by Mr. Stace (Limehouse), and being supported by Messrs. Ponslow, Fairchild, Burrows, Mr. Legg, the Secretary, and other members, was put by the Chairman and carried unanimously.

Mr. Middleweek, in the course of a brief reply, pointed out that last year he had not a single case of typhus fever to report, a state of things which justified the remark that if London was bad, Edinburgh, to select an example of provincial towns, was far worse.

#### WANDSWORTH WORKHOUSE.

VISIT OF THE ARCHITECTURAL ASSOCIATION.

THE Architectural Association, at the invitation of Mr. Thomas Aldwinckle, paid a visit on Saturday last to the new Workhouse which has just been completed under his superintendence. The buildings are situated in the Garrett-lane, Wandsworth, on the Garrett Estate, near the Earlsfield Station on the South Western Railway. The general arrangement is as follows:—The entrance gateway has on each side buildings which are arranged for the reception of paupers and the careful subdivision, which is a strong characteristic of the whole plan, is carried out in these rooms, the male and female paupers being divided into two classes, good and bad, each class having separate apartments with their own conveniences. In addition to these rooms is a sample room, in which all stores that are delivered at the workhouse are examined and approved before being taken into the stores, by which means the storekeepers have no communication with the contractors, which is a great safeguard against corruption.

Passing by these buildings the administrative block is reached through a bold and effective arched vestibule. This block of buildings contains on the ground floor two dining-rooms for men and women, separated by means of a movable partition, which makes it available for entertainments. Beyond the dining-rooms is the kitchen, which is fitted with six copper boilers set in iron stands, which are open at the bottom for cleaning purposes. In addition to these is a Warrenizer for cooking meat, a kitchener, and gas-stove. The dining-rooms communicate with the kitchen by means of hatches. In the rear of the kitchen is the scullery, which is furnished with six large galvanised iron sinks for washing up and preparing vegetables. In connexion with these buildings are the stores and linen and sewing room, the store-room being on the east and the linen-room on the west. The buildings front N.N.W.

Over the dining-rooms and offices in front is placed the chapel, the chancel being over the vestibule. This is a handsome building with a wide nave and narrow aisles, which are used only for passages.

In the rear of the administrative block are various buildings, containing separate cells for corn-grinding for the men and washing for the women; these communicate with the yards belonging to each class. The workshops, engine and boiler houses, bakery, and laundry, are placed against the southern boundary of the site, the two large Cornish boilers being sufficient to do all the work of heating, cooking, and driving the machinery; the engine works the machinery in the laundry and shops, and pumps water from the well. At the west end of this block are a store for paupers' furniture, stables, and a detached building beyond for the mortuary. The general arrangement of the wards for the male and female paupers is exactly the same, the men being on the east and the women on the west side of the central block, the wards being arranged on the pavilion system, the aged and infirm wards being placed on the north, and the able-bodied south, the able-bodied wards being subdivided into good and bad. All these classes have perfectly distinct staircases, conveniences, airing-yards, and workshops. The day-rooms are on the ground-floor, with two stories of dormitories over, the

\* We have not met with many architects labouring under this delusion, and we are surprised that a sanitary inspector should be so ill-informed as not to know what is notorious to all who are conversant with the subject, viz., that probably not 5 per cent. of the dwellings of the people in London are erected from the plans or under the supervision of an architect. Quite 95 per cent. of them are the work of speculating builders, who have of late been turning their attention to dwellings in State.—Ed.



first floor communicating with the chapel by means of an open corridor. The dormitories are arranged with dwarf divisions down the centre, the beds being placed head to head, as well as along the walls. The aged wards have the bath-rooms on the same level, the able-bodied baths being on the ground-floor. The dormitories are so arranged that each ward is supervised by an officer's bed-room with a fixed light.

The latrines are placed in towers connected with passages, with cross ventilation, the horizontal soil-pipes being of lead inside the building, the down-pipes being of iron, trapped at the connexion with the drain, and carried up to the top of the tower, and finish with a ventilator, which acts as an exhaust and inlet; the other ends of the soil-pipes are also carried up to the top of the tower, and have exhaust cowl, the bottom of the pipes being left open: by this means it is impossible to syphon out the water in the traps of the closets. The ventilation of the drain-pipes is arranged in the manholes the drains all being laid in straight lines.

The principle adopted for the ventilation of the wards consists of tube-inlets fixed about 7 ft. from the floor, the outlets being arranged in four brick flues to each ward, which are finished at the top with Boyle's ventilators, the current being assisted by means of a conical gas-burner fixed in the flues.

The gas-pendants are also provided with ventilating-tubes carried into the flues, the tubes being laid with a slight incline towards the flue, to assist the current as the fumes cool.

The heating is done by hot-water pipes, the water being heated by steam from the boilers; there are in addition open fireplaces for the sake of cheerfulness.

The buildings are designed for 1,200 paupers, and the administrative block has been carried out completely; the wards at present built are intended for 620 only, the additional accommodation being left to be provided, if required, by extending the pavilions northwards.

The children are provided for in buildings which are kept quite apart from the adult inmates, and, as they are sent away to Anerley school, no provision for school-rooms has been made.

The casual wards are not yet built, but they will be placed away from the workhouse.

Mr. Aldwinckle kindly met the members of the Association and conducted them over the buildings, giving a very full and interesting description of the various arrangements; and great interest was exhibited in the various fittings, which have all been specially designed for the building, and which appear to be admirably suited for their various purposes.

#### BRITISH ARCHAEOLOGICAL ASSOCIATION.

The second meeting of the new session was held on Wednesday, December 2nd, Mr. Thomas Morgan, F.S.A., in the chair.

Mr. Cecil Brent, F.S.A., exhibited several curious Roman vases of Upchurch ware and Samian ware, found in excavating for a new gasometer near Canterbury Castle.

Sir Henry Dryden reported the discovery of a sepulchral slab in Moulton Church, Northants, with a curious but not unfrequent pattern of Medieval times, which has not yet been explained.

In the discussion which followed, one of the speakers considered that the pattern was intended for two bows of double curvature, a rectangular bar with barbed heads being intended for an arrow.

Mr. J. T. Irvine exhibited a large number of curious stones and crosses, mostly in Northants, of Saxon date. He described also a portion of a Roman column covered with leaf-pattern, which has been found built up as old material on taking down the central tower of Peterborough Cathedral. A Saxon funeral slab has also been found there in its original position on what was once the cemetery of a small early church, but afterwards enclosed by the larger building.

Mr. Loftus Brock, F.S.A., described a hand-made sepulchral urn, of Saxon date, found at Brixworth, in one of the several cemeteries that have been met with in recent years during the excavations for ironstone, and which point to the existence of a large population here in early times.

Mr. Edenborough exhibited a curious piece

of pottery representing a Norman horseman and horse, recently found in Old Broad-street, unlike several other figures of this class; the present example had not been a drinking-vessel.

The Rev. Prebendary Seath read a paper on the funeral stone with Greek hexameter verses recently found at Brough-under-Stanemoor. The history of this now famous stone, and of its various and varied readings being told, reference was made to the other Romano-Greek inscriptions which have been already met with, this being the seventh. The stone is now in the Fitzwilliam Museum, where its inscription of five lines in uncial characters can be studied. The inscription, following Professor Clarke's reading, which was endorsed by the lecturer, records the death of a certain Hermes, aged 16, who came from a district of Syria named, and who appeared to have been with Severus's expedition into Scotland.

The proceedings were brought to a close by a paper by Mr. Morgan, on the results of the recent Congress at Brighton.

#### CIRCULAR HOSPITAL WARDS.

SIR,—It has been my misfortune to be deluded into discussing the above subject with Mr. Burdett in the columns of three of your contemporaries, and in consequence of the persistent manner in which this gentleman continued week after week to base his arguments upon false statements and pretended extracts from my writings (which extracts were in reality simply the emanations of his own fertile brain), I have refused to continue the correspondence. He now makes his appearance in your journal, and, as I imagine, you would be sorry that your readers should be misled by the tabulated statement you published last week upon the faith of Mr. Burdett's name, I will forward for your inspection the following documents:—

First.—A letter from Dr. Monat enclosing documents obtained from a high official source in Belgium, stating that the accommodation for patients provided at the Antwerp Hospital is 382 beds, viz.:—

|                                                   |     |
|---------------------------------------------------|-----|
| 16 "Salles circulaires, vingt lits par salle".... | 320 |
| "Chambres d'isolement".....                       | 24  |
| "Chambres pour malades payants".....              | 38  |
| Total.....                                        | 382 |

Secondly.—Photographs of the working drawings of the building, signed by the architects, whereon are delineated the positions of every bed in the various rooms, and corresponding with the above statement as to the number of beds in each ward.†

Thirdly.—The printed reports of the "Conseil Supérieur d'Hygiène Publique," the body whose consent it was necessary to obtain before the building was allowed to be erected.

You will observe that in the first of these reports the Council refused to sanction so many as twenty-four beds being placed in the circular wards, and that the design was referred back to the Communal Administration at Antwerp for revision in this respect. Then that in the second and last report they say, in agreeing to the revised plans,—"The circular wards of the new project will certainly not have some of the inconveniences we have mentioned. Each of the rooms will not accommodate more than twenty sick in place of the exaggerated twenty-four, and each of the twenty beds will be found placed in front of a pier. In this manner the beds would be more distant and access will be rendered easy and commodious."

Fourthly.—If you will refer to the work "Hospital Construction and Management"† you will see that I state it to be intended that the building should provide accommodation for 380 beds.

Practically, then, all these statements are in accord. The architects who erected the building say, both by written documents and by their drawings, that the design for the building was made to accommodate, in round numbers, 380 patients, and the circular wards twenty beds each.

The Conseil Supérieur d'Hygiène refuse to allow more than twenty beds to be placed in a ward or more than 380 beds in the whole.

You will observe that Dr. Monat does "not feel at liberty to assent to your publishing the name of his informant without first obtaining authority to do so, and there is not time now for this." He says, moreover, that "if the accuracy of the figures should be questioned he will procure the necessary permission."

These we have examined, and they agree with Mr. Snell's statement. Ed.

† London: J. & H. Churchill, 1883.

establishment, and I have stated in my work that the authorities having charge of the erection of the building at the time of our visit assured Dr. Monat and myself that these were the numbers it was intended that the building should accommodate.

Yet Mr. Burdett in the face of this first assertion that the architect told him the building was erected to accommodate 400 patients, and now he produces the document published by you last week, which purports to show that it holds 468 beds.

Of course it is possible that this document is a true statement of the existence of gross overcrowding in the wards of the establishment, but what bearing can this have upon the question at issue?

It may be that in the future 1,000 beds will be placed in the building, but it would not alter the fact that it is only capable of properly accommodating the 380 patients assented to by the Conseil Supérieur d'Hygiène. Let anyone look at the plan of the wards, showing the position of the beds and windows, and observe how impossible it would be to place more than twenty beds in the large wards without entirely upsetting the scheme upon which the building was designed, viz., that there should be "a bed between each window and opposite to each pier." Then, again, notice the plan of the isolation wards, shown by the architects to hold one bed only, but by Mr. Burdett's document said to contain in the larger rooms two beds each, thus giving 78 superficial feet only per patient as against the 149 ft. per patient for which the larger wards are designed.

I need hardly remind you that isolation wards are, for obvious reasons, always designed with larger superficial space per patient than that of the large wards, and, therefore, the placing of two beds with an area of 72 ft. only in these wards is quite out of the question.

You have only to look through the correspondence to see that the following statement of Mr. Burdett is utterly incorrect:—"Mr. Snell has maintained throughout the discussion which has followed the reading of his paper before the Sanitary Institute at Leicester, that 368l. per bed was a correct statement of the cost of the Antwerp Hospital."

I have never stated that 368l. a bed was any more than a rough estimate of the cost founded upon the information given to Dr. Monat and myself during the erection of the building, and when no one was able to say positively what would be the ultimate outlay. I repeated in detail exactly the information that was given to me and no more.

If after examination of the inclosed papers and the published correspondence that has passed between Mr. Burdett and myself you think it right to publish any other letters or documents that he may send to you upon this subject, I can only follow the same course that I have adopted with other journals in refusing to take any notice of such communications.

H. SAXON SNELL.

#### LOWEST TENDER.

SIR,—What should be done in this case? Invited to tender for the extension of the London and County Bank at Brixton, I did so with the following result:—

|                   |        |   |   |
|-------------------|--------|---|---|
| Rider & Son.....  | £1,128 | 0 | 0 |
| Higgs & Hill..... | 1,088  | 0 | 0 |
| Parsons.....      | 1,081  | 0 | 0 |
| F. Higgs.....     | 1,080  | 0 | 0 |

Expecting to hear about the work, I inquired two days afterwards of the architect, Mr. C. V. Hunter, who had that morning received an instruction from the Bank to accept the tender of Mr. Parsons. I accordingly wrote to the General Manager and asked the reason of my non-acceptance, and received the following reply:—

"When we saw the tenders, and found that yours and that of Messrs. Parsons were practically the same, the Directors having recently had experience of the manner in which Messrs. Parsons did their work expressed preference for the employment of those gentlemen. In doing this, the Directors did not intend to express any reflection on you, nor do they think they did so."

Will it become necessary to inquire before accepting an invitation to tender for any works, whether in the event of one's tender being lowest (even by a pound) it will be accepted, should the proposed works be executed?

Comment on the morale of the transaction is needless.

Of course, the bills of quantities contained the usual proviso, "not to be frequently abused," the lowest or any tender not necessarily accepted.

FREDK. HIGGS.



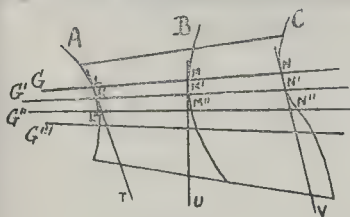


Fig. 211.

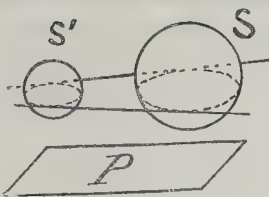


Fig. 214.



Fig. 218.

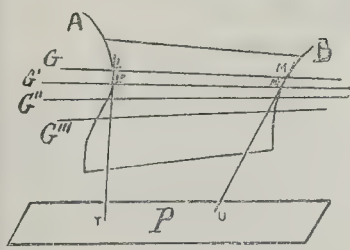


Fig. 212.

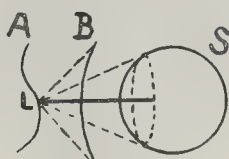


Fig. 215.

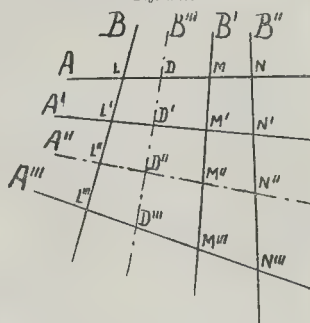


Fig. 219.

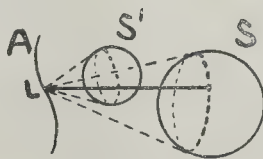


Fig. 216.

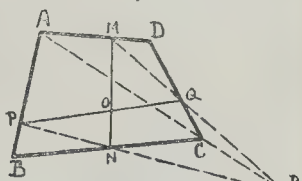


Fig. 221.

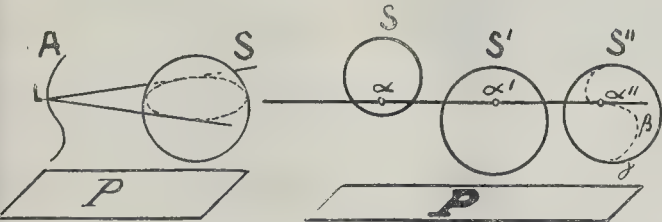


Fig. 213.

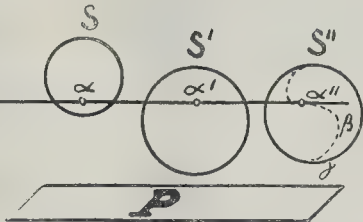


Fig. 217.

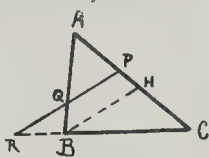


Fig. 220.

## The Student's Column.

### DESCRIPTIVE GEOMETRY.—PART II.

XXVIII.

#### SKREW SURFACES.

ALL surfaces engendered by the motion of a straight line are ruled surfaces. These surfaces are divided into two categories,—the one developable surfaces, which we have studied; the other skew surfaces, which often occur in masonry, and require our readers' most earnest attention.

Skew surfaces are described by the motion of a straight line, but two consecutive generators, however close, are not contained in the same plane. This is the essential feature which differentiates skew from developable surfaces.

Before showing how we can produce surfaces the generators of which realise the above condition, we beg to observe that, as a result of that condition, the elementary portion of such a surface comprised between two neighbouring generators is not a plane, but a skew surface. For (see fig. 211), in all the curves A, B, C . . . you may delineate on the skew surface, the linear elements L L', M M', N N', which are straight lines, having each one point on G the other on G', cannot be in one plane if the generators G and G' are not themselves in one plane. Besides this, as the tangents L L', T, M M', U, N N', V . . . prolongations of the linear elements of the curves are not in one plane, it is evident that the tangent planes G L T, G M U, G N V . . . which are tangent to the skew surface in the points L M N . . .

of the same generator, are distinct different planes, although they all contain the generator G.

From the above we conclude also that with skew surfaces every plane, such as G L T, although really tangent to the surface in the point L (this means, containing the tangents to all the curves drawn on the surface through this point), yet cuts the surface in every other point which the plane and the skew surface may have in common. It cuts the surface first along the generator G itself, and secondly along another line which passes through the point L, a line which may be straight or curved according to the shape of the skew surface given.

We shall now show how Skew Surfaces can be produced.

The motion of a straight line is not determined by the line being bound to touch one or even two directing curves; for (see fig. 211) from any point L of the curve A we can produce an infinite number of lines that will touch the curve B. These lines will all be the generators of a cone that has the point L as vertex and the curve B as its base, but beyond that their position is not defined. Two curves are, therefore, not sufficient to direct the motion of a generating straight line; but if a third condition, which the line shall be bound to fulfil, is given, the three conditions can be only satisfied by a limited number of lines, and this defines the position of each generator that passes through the points L, L', L'' of curve A.

In fig. 211 a straight line is made to slide along three curves, A, B, C, and we shall see that this obligation is sufficient to determine completely the motion of the straight line

which thereby generates a skew surface. For, if we imagine two cones with both their apexes in the point L, and, the one having the curve B for base, the other the curve C for base, these two cones will cut one another along a limited number of straight lines, which, like the line G L M N, will, of course, touch the three curves, A, B, C. These lines are, therefore, the positions which the generator will take when, in sliding along the curve A, it reaches the point L. The same operation could be done for other points L', L'', . . . , and we should get thereby a series of generators of a surface.

A surface engendered as above will nearly always be skew; for when the generator passes from its position, G L M N, to the neighbouring position, G' L' M' N', it may be considered as sliding along the tangents, L T, M U, N V, which are the prolongations of elementary portions of the curves. Now, if these three tangents are not in one plane, neither can the two generators G and G' be in one plane. We see, therefore, that in general the surface described by a straight line sliding on three curves is skew. It may happen that in a certain position of the generator the tangents M U and N V be in one plane; in that case, there will be a plane element to the surface all along that generator, and the tangent plane will be tangent all along that line, but this will be an exceptional case. In fact, the skew surface will not be a skew surface along that one generator.

Cylindroids (fig. 212) are surfaces engendered by a straight line which slides along two given curves A and B, and which remains always parallel to a given plane P, called the Directing Plane. To produce a series of generators of the cylindroid we have only to cut the two

curves A and B by a series of planes parallel to P; joining the points of section we shall get the generators G L M, G' L' M', &c. Such a surface is skew, because the tangents LL'T, MM'U, &c. on which the generator slides, when passing from position G to position G', are not in the same plane.

In every ruled surface, the directing curves may be replaced by directing surfaces. For instance (fig. 213) a cylindroid may be engendered by a straight line sliding on a surface S and on a curve A, but remaining always parallel to a plane P. If we make in the surface S a series of sections parallel to the plane P, the tangents to those sections will be the generators of the cylindroid.

Also (fig. 214) two surfaces S and S' and a directing plane P may be given; the generators will form again a cylindroid, and be found by sections as above.

When no directing plane is given, we can still obtain ruled surfaces generated by having either (fig. 215) two directing lines, A and B, and one surface, S, which the generators are bound to touch; or (fig. 216) one directing line, A, and two surfaces, S and S'; or (fig. 217) three directing surfaces, S, S', S''. In fig. 215 generators will be found at the intersection of two cones of apex L, the one having the curve B for base, the other being the cone circumscribed to the surface S. In fig. 216 the generators are also the intersections of two cones of apex L, and both circumscribed to the surfaces S and S'. In fig. 217 we suppose that we have found a line, G, which touches the three surfaces in a, a', and a''; and have produced a cylindroid by sliding that line G over the surfaces S and S', the line G remaining always parallel to a plane, P, selected at *libitum* parallel to its first position; this cylindroid will cut the third surface S'' along a line a''' β''' γ''' but in the point a''' the generator of the cylindroid will be, according to the supposition we started from, contained in a plane tangent to the surface S''. This generator is also according to the law of ruled surfaces contained in the plane tangent to the cylindroid; it is therefore the intersection of these two tangent planes, in other words, it is tangent in a''' to the curve of intersection a''' β''' γ'''. Hence the following method of producing the generators of the surface: select any plane P, produce a cylindroid circumscribing the two surfaces S and S', find the intersection of the cylindroid with the third surface S''. A tangent to the intersection parallel to the plane P will be a generator of the skew surface which circumscribes the three surfaces, S, S', S'' given.

Other skew surfaces can be produced on two curves only with some additional condition, such as the generator being bound to make a constant angle with one of the directing lines, or that the length of the generator between the directing curves be made to remain always the same.

A skew surface may be formed by a line sliding on one directing curve only delineated on a surface, S, with the proviso that the generator be bound to remain always normal to that surface. All these modes of generation can be brought back to the general case of a skew surface with three directing curves, and need not be specially studied.

As a subdivision of cylindroids the name of conoids is given to skew surfaces which have a directing plane and two directors, of which one is a straight line, whereas the other may be either a curve or a surface. A right conoid (fig. 218) is one in which the directing straight line is perpendicular to the directing plane P.

When both directing lines are straight the conoid formed is called a hyperbolic paraboloid.

When the surface has no directing plane, but three straight directing lines, it is called a hyperboloid of one sheet. Both these last surfaces are called skew surfaces of the second degree, because they are the only skew surfaces which can be represented by algebraical equations of the second degree. As they possess remarkable properties which serve to solve the problems on all other skew surfaces, we shall study these two surfaces first.

**THE HYPERBOLOID OF ONE SHEET.**

In fig. 219 a hyperboloid of one sheet is engendered by a straight line, A, which slides on three given lines, B, B', B'', which are not all three parallel to any one plane, and any two of which are not contained in one plane. We find the generator A as follows:—Through a point L of a director, B, we produce two planes, of

which one contains B', and the other contains B''; the intersection of these two planes will be the generator A required. (The same result can be also obtained by producing a plane through the point L and the director B', and finding its intersection N with the line B''). In this way we could produce a series of generators A, A', A'', A''', &c. passing through points L', L'', L''', &c.

The surface described above is necessarily skew; for any two generators, A and A', could belong to one plane, only on condition that the directors B, B', B'' be also in one plane, which, as said before, they are not. This argument is not limited only to the two neighbouring generators, but applies to any two generators; and, therefore, in the hyperboloid no two generators whatever belong to one plane.

The hyperboloid of one sheet has a very remarkable property, of the highest importance for finding planes tangent to skew surfaces in general, viz., it admits of a second mode of generation in which the generators A become the directors, and the directors B become the generators. We mean that, if a line B is made to slide on any three of the lines A, A', A'', A''', &c. the line B will describe the same hyperboloid as the former line A.

We cannot show this important property without demonstrating a few previous propositions of elementary geometry, and without using some very simple algebraical calculations. The readers who cannot follow these calculations need only accept as proved the results which they will find further on, and then they can pass to the practical applications thereof.

**First Proposition** (fig. 220).—When across a triangle, A B C, you carry any straight line, P Q, which cuts the three sides of the triangle, or the prolongations thereof, you form thereby six segments, and the product of the non-contiguous segments is equal to the product of the three others as in the formula (a) below:—

$$(a) \quad A P \cdot C R \cdot B Q = A Q \cdot B R \cdot C P$$

For, if we produce a line R P parallel to P Q, we shall have the following proportions:—

$$A Q : Q B :: A P : P H$$

$$C R : B R :: C P : P H$$

By the first proportion we have—

$$P H = \frac{A P \cdot Q B}{A Q}$$

By the second—

$$P H = \frac{C P \cdot B R}{C R}$$

Therefore we get the equation—

$$\frac{A P \cdot Q B}{A Q} = \frac{C P \cdot B R}{C R}$$

and multiplying each side by divisors we get the formula (a) as above.

**Second Proposition** (fig. 221).—A skew quadrilateral is one the sides of which, like the edges of a warped drawing-board, are not contained in a plane. It may be considered as delineated on two planes which meet one another along a diagonal of the quadrilateral. Now, if in a skew quadrilateral A B C D we produce two straight lines, M N and P Q, which touch the opposite sides of the quadrilateral, and cut one another in the point O, the product of the four non-contiguous segments is equal to the product of the four other segments, as in the formula (y) below:—

$$(y) \quad A P \cdot B N \cdot C Q \cdot D M = A M \cdot D Q \cdot C N \cdot B P$$

If the two cross-lines M N and P Q cut one another, they are in the same plane, a plane which will also contain the lines P N and M Q. The lines P N and M Q will therefore cut one another in a point, R, on the diagonal, A C, intersection of the two planes A B C and A D C, on which the skew quadrilateral is delineated. From this observation we get that, to obtain in a skew quadrilateral two cross-lines, which cut one another, we can draw one line *ad libitum*, and also select a point, P, of the other; then draw P N and the line R M, which will intersect the quadrilateral in the point Q. The point Q is the other end of the cross-line P Q.

From the first proposition we know that the triangles A B C and A D C crossed by the lines P N R and M Q R give the following equations:—

$$A P \cdot B N \cdot C R = A R \cdot C N \cdot B P$$

$$C Q \cdot D M \cdot A R = C R \cdot D Q \cdot A M$$

Multiply both equations and strike out the factors common to both sides and you get the formula (y),—

$$A P \cdot B N \cdot C Q \cdot D M = A M \cdot D Q \cdot C N \cdot B P$$

which can be written,—

$$\frac{A P}{B P} \cdot \frac{C Q}{D Q} = \frac{A M}{D M} \cdot \frac{C N}{B N}$$

or in arranging the letters in a consecutive order as formula (z) below—

$$(z) \quad \frac{A P}{B P} \cdot \frac{C Q}{D Q} = \frac{A M}{D M} \cdot \frac{C N}{B N}$$

**Third Proposition.**—Reciprocally, if two cross lines, which cut the opposite sides of a skew quadrilateral, A B C D, satisfy either the formula (y) or (z) we can conclude that these two cross lines are in a plane.

**Fourth Proposition.**—Through any two lines you can produce two parallel planes; for, from any point of each line we can produce a parallel to the other line, and the planes which contain each pair of lines will be parallel.

**Fifth Proposition.**—Parallel planes cut all straight lines in proportional parts (fig. 222). Let the distances between the planes be x and y; by considering the triangles formed on the left-hand line we have:—

$$A B : B C = x : y,$$

and for the same reasons the second line gives the proportion:—

$$D E : E F = x : y,$$

which gives, therefore, the proportion:—

$$A B : B C = D E : E F.$$

The same proportion would apply to any number of lines cut by the horizontal planes.

Now (fig. 219) we can show the double system of generation of the hyperboloid by proving that any line B''' which meets any three of the generators, A, A', A'', will meet also all the generators of the system A. As a consequence thereof it will follow that the line B''' will belong to the surface of the hyperboloid constructed on the three directors, B, B', B'', and that, therefore, the lines B can describe the hyperboloid by sliding on any three lines of system A.

As in the first system of generation, the lines A, A', A'', meet the lines B, B', B'', the quadrilateral L N, N''' will give according to formula (z) below—

$$(1) \quad \frac{L N^I}{L' N^I} \cdot \frac{N^{III} N^I}{N^I N^I} = \frac{L M}{M N} \cdot \frac{N^{III} M^{III}}{N^{III} L^{III}}$$

As the line A''' meets the directors B, B', B'', the quadrilateral gives again:—

$$(2) \quad \frac{L L^I}{L' L^I} \cdot \frac{N^{III} N^I}{N^I N^I} = \frac{L M}{M N} \cdot \frac{N^{III} M^{III}}{N^{III} L^{III}}$$

As the line B''' cuts also the lines A, A', A'', the quadrilateral gives again:—

$$(3) \quad \frac{L D}{D N} \cdot \frac{N^{III} D^{III}}{D^{III} L^{III}} = \frac{L L^I}{L' L^I} \cdot \frac{N^{III} N^I}{N^I N^I}$$

According to equation (1), the second members of equations (2) and (3) are equal, and therefore we have:—

$$(4) \quad \frac{L D}{D N} \cdot \frac{N^{III} D^{III}}{D^{III} L^{III}} = \frac{L L^I}{L' L^I} \cdot \frac{N^{III} N^I}{N^I N^I}$$

which is, according to our third proposition, a proof that the lines A''' and B''' meet one another in the point D''.

Observe that the second members of the equations (1) and (2) are equal to a fixed quantity k, which does not vary when the five lines, B, B', B'', A, A'', are fixed. It follows therefore that for any new line, A', which meets the three lines B, B', B'', we shall have,—

$$\frac{L L^I}{L' L^I} \cdot \frac{N^{III} N^I}{N^I N^I} = k$$

or the equation (5):—

$$\frac{L L^I}{L' L^I} = k \cdot \frac{N^I N^I}{N^{III} N^I}$$

Now, if the three lines, B, B', B'', were parallel to the same plane, they would, according to our propositions four and five, divide the lines A' and A''' in proportional parts, so that we should have,—

$$\frac{L M}{M N} = \frac{M^{III} L^{III}}{N^{III} M^{III}}$$

The second member of equations (1) and (2) is equal to the fixed quantity k; substitute therein the value of  $\frac{L M}{M N}$ , and you have:—

$$k = \frac{L M}{M N} \cdot \frac{N^{III} M^{III}}{N^{III} L^{III}} = \frac{M^{III} L^{III}}{N^{III} M^{III}} \cdot \frac{N^{III} M^{III}}{N^{III} L^{III}} = 1$$

and, therefore, when the directors B, B', B'' are parallel, the equation (5) becomes:—

$$(6) \quad \frac{L L^I}{L' L^I} = \frac{N^I N^I}{N^{III} N^I}$$

a proportion which would prove, according to the fifth proposition, that the lines B and B''' were cut by parallel planes, which contain the lines A, A', A''. In short, if the directors B, B', B'' are parallel to a plane, then the generators,



$A, A', A''$  . . . are also parallel to a plane, but a plane different from that to which the directors are parallel. This law applies to the hyperbolic paraboloid.

Find a tangent plane to the hyperboloid (fig. 219).

As through every point of the hyperboloid there passes two generators, one of system  $A$ , and the other of system  $B$ , and, as these straight lines are their own tangents, it follows that the tangent plane to the surface in any point contains both the generators of the surface which pass through that point. Being given three directors,  $B, B', B''$ , of a hyperboloid and a point  $p$  on a generator,  $A$ , we find the tangent plane in that point as follows: Produce two other generators  $A'$  and  $A''$ , then adopting the lines  $A, A', A''$  as directors, find the generator,  $B'''$  of the  $B$  system; the tangent plane is that which contains the lines  $A$  and  $B'''$ .

If only the plan of the point  $D$  of the hyperboloid be given, the elevation is found by getting the section of the hyperboloid by a vertical plane, and carrying thereon the elevation of  $D$ .

#### The centre of the hyperboloid.

The surface of the hyperboloid has a centre, that is, there is a point in space which cuts in two equal parts all the straight lines which pass through it and end on the surface of the hyperboloid, as will be seen by the following demonstration (fig. 223).

$B, B', B''$  are three directors of the hyperboloid. Through  $B'$  and  $B''$  we take the two planes  $B'OC$  and  $B''OC$ , both planes being parallel to the third director,  $B$ . The line  $ACD$  intersection of these planes will be, of course, parallel to  $B$ ; or, what is the same thing, the line  $A$  can be considered as meeting  $B$  at an infinite distance. We can, therefore, say that  $A$  meets  $B, B', B''$ , and is a generator of the hyperboloid. In the same way, we shall find that  $A'$  parallel to  $B'$ , and  $A''$  parallel to  $B''$ , are generators of the hyperboloid; by which we see that every generator of the system  $B$  has a parallel generator of the system  $A$ . The six planes which contain the parallel generators shown above form a parallelepiped, the six edges of which are the lines  $B, B', B''$ , and  $A, A', A''$ . The centre  $O$  of this parallelepiped is evidently the centre of the hyperboloid; it will be found at the intersection of three planes taken through  $B$  and its parallel  $A, B'$ , and its parallel  $A', B''$  and its parallel  $A'', B'''$ ; for these planes are diagonal planes of the parallelepiped.

For the readers who cannot follow our calculations we sum up the results we have obtained, a summary sufficient for their practical purposes.

Firstly, There are two systems of generators  $A, A', A''$  . . . and  $B, B', B''$  . . . and each generator of one system meets all the generators of the other system (parallels are supposed to meet at an infinite distance).

Secondly, Two generators belonging to the same system never meet, and are never parallel.

Thirdly, Three generators belonging to the same system are never parallel to one plane.

Fourthly, The hyperboloid has a centre.

Fifthly, A straight line can pierce the hyperboloid in not more than two points.

We give in fig. 224 a plan and elevation of the hyperboloid of one sheet, and it will be found to coincide exactly with the hyperboloid of one sheet we described before (fig. 96, June 6, 1885). The mathematical proof of this we do not give, because it is based on the algebraical representation of this surface. It will suffice to say that any vertical plane tangent to the elliptical throat will cut the hyperboloid along two straight lines, and that the surface may be considered as generated also by a straight line sliding on three ellipses, the base, the upper ellipse, and the throat.

The limiting (prop. asymptotic) cone of the hyperboloid.

The cone with its apex in the centre,  $O$ , and its generators parallel to those of the hyperboloid, is the limiting cone of the hyperboloid, with properties similar to those we have already seen in hyperboloids of revolution (fig. 187, Oct. 17, 1885), by which we can know beforehand what kind of section any plane will make in the surface of the hyperboloid. The section of the hyperboloid will be an ellipse, a parabola, or a hyperbola according

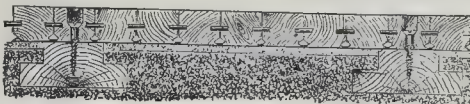
as the plane of the section is parallel to a plane which forms similar sections in the cone.

As there are always in the hyperboloid two parallel generators of opposite systems, a plane tangent to the limiting cone will cut the hyperboloid along two parallel generators. To find a generator of a hyperboloid parallel to a given plane, cut the limiting cone by a plane passing through its apex and parallel to the one given. The two generators of the cone found in that way are parallel to the plane given, tangent planes to the cone along these generators will intersect the hyperboloid along generators parallel to the plane given. By this we see that there are four generators of the hyperboloid parallel to any given plane.

To get a neat drawing where the generators of both systems have the same starting-points, as in fig. 224, draw a circle of centre  $O$  with its diameter equal to the major axis of the elliptical base, divide that circle in equal parts, and project them on the elliptical outline of the base; this gives us the starting-points of the generators required.

#### AN IMPROVEMENT IN WOOD-BLOCK FLOORING.

Messrs. M. C. DUFFY & SON, of Stork's-road, Bermondsey, have brought to our notice their patented improvements in wood-block flooring, which are worth the attention of architects and building owners, inasmuch as they are well calculated to ensure immovability, and therefore evenness and economy of wear. The salient feature of this method of flooring consists in the use of dowel-pins connecting the blocks together, the dowel-pins being differently disposed to suit different methods of laying,—for the blocks can be laid in a variety of herring-bone and interlacing patterns. The blocks are formed (as



shown by the section) with a  $\nabla$ -groove running longitudinally at the bottom of each side of the block. Before the blocks are laid they are dipped into a preservative adhesive compound, with which not only the under surface of each block becomes coated so as to form a hard-and-fast joint with the floated concrete and cement substructure, but the adhesive composition takes up and enters into the longitudinal  $\nabla$ -grooves before referred to, and thus an additional "keying" or "bonding" together of the whole system ensues.

This method of flooring, which is, we are informed, about to be adopted in the new additions at Harrow School (Mr. Champneys, architect), and at the new post-office at St. Alban's, is called the "Acme" system of solid wood-block flooring.

#### WHAT IS A "QUARRY"?

Sir,—May I beg a small space in the *Builder* to ask the following question,—What is a quarry? I mean a quarry as known among lead glaziers for, say, the last fifty years. What I wish to arrive at is simply the shape; I have always understood "a quarry" to mean a pane of glass having a point at top and bottom and on either side. I am told, however, that a small square (true square) when glazed in lead with two of its sides glazed horizontally and the two others, of a necessity, perpendicularly, becomes a quarry, and may be so termed correctly. This I dispute in toto. Am I right or wrong? I should add that I call a "square" a "quarry" if glazed standing on one of its points, or, to be more correct, corners.

TEN TO THE FOOT.

P.S.—Laxton and all other builders' Guides say "leading lights in squares or quarries." Are they also all wrong?

Lambeth, Dec. 8th, 1885.

\* In the literal meaning of the word, our correspondent is, of course, wrong. "Quarrel" or "quarry" is probably a corruption of the French *carre*, "a square," though Richardson's Dictionary gives it as from "quarres," "a little square." In either case it is more properly applicable to a square than to a lozenge pane. But custom seems rather the other way. Nicholson's "Dictionary of Architecture" gives "Quarrel" as a lozenge-shaped pane of glass; same as *quarry*. Gwilt says, "Quarrel, vulgarly quarry (French, *carre*): a square or lozenge-shaped pane of glass used in lead

casements." The "Glossary of Architecture" says "Quarrel: a diamond-shaped pane of glass, or a square one placed diagonally." Johnson says,—"Quarrel: square of glass." Worcester's Dictionary gives,—"Quarry: a diamond-shaped piece of glass." It thus appears that recent custom takes it to mean a diamond shape; but it is quite certain the word itself implies no such thing, and has only come to mean that, because, when it came into use, it was the habit to put the panes loosewise. If anything turned upon it in law, it would be a rather nice point to decide.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

11,517, Raising and Lowering Windows. J. Eaton.

The sash is provided with rollers at the top, which slide in grooves in the framing, and it is attached at its lower end to a string, which, passing over a roller, is fastened at its free end to a weight slightly heavier than the sash. The roller is acted upon by any suitable brake, which can be released from the inside; when this is done the weight falls and raises the sash.

12,689, Flush Handles, Rings, &c. J. Walker.

A broad flat blank, similar to a bow in shape, is stamped from sheet metal. The ends of the blank are pressed into a trough-like form, but the centre is of a circular shape. The pins or pivots on which the handle hangs pass through the sides of the trough.

14,324, Kiln for Cement. C. Dietzsch.

The kiln is divided into a cooling space, a burning space, and fire-heating chamber, a passage connecting the first two spaces. The chambers are oblong in shape, and the kiln is lined with basic material.

14,492, Scouring Sandbanks and Flushing Sewers. R. H. Thwaites and B. D. Hesley.

Powerful jets of water are caused to impinge against the sand, by the means of a distributing conduit provided with nozzles. For shallow water this conduit is arranged along the keel of a caisson, which is water ballasted to the right depth. A hose-

pipe, with high-pressure water for divers and for cleaning sewers is also claimed.

14,900, Furnace Roof. J. E. Bött.

The roof is constructed in removable arched sections, each consisting of suitable bricks clamped together, and lying loosely on the walls, by which means free expansion is allowed for, and the drawbacks for taking the thrust dispensed with. Leakage at the ends is prevented by loose sand placed on the walls of the furnace.

#### NEW APPLICATIONS FOR PATENTS.

Nov. 27.—14,553, W. Brierley, Manufacture of Bricks and Tiles.—14,559, R. Lee and J. Hodgson, Construction of Fireplace Pillars and Columns.—14,564, E. Wright, Improvements in Saws.

Nov. 28.—14,619, T. & J. Fawcett, Machinery for Pressing Bricks, Brickettes, Tiles, &c.—14,625, W. Smith, Surfacing Asphalt Roadway or Pavement to abate its Slipperiness.

Nov. 30.—14,674, W. Kimber, Prevention of Noise in Syphon-action Flushing Cisterns for Water-closets, &c.—14,695, C. Carson, Electrical Apparatus for Releasing Door and similar Fastenings.—14,707, M. Chubchoe, Improved Stove or Fireplace.

Dec. 1.—14,718, G. Thomas, Apparatus for Automatically Removing Water from Gas-pipes, &c.—14,725, R. Lee and J. Hodgson, Manufacture of Concrete Slabs, Blocks, Pipes, &c.—14,728, R. Lee and J. Hodgson, Manufacture of Concrete Fireproof Building Materials, &c.—14,730, J. Denny, Double Lock-and-Key Blocks for Fireproof Ventilating Ceilings and Floors (combined).—14,731, S. Pickering, W. Pickering, and J. Norton, Improved Door Check and Spring.—14,760, G. Haydon, Scutcheons for the Keyholes of Street Door and other Locks.—14,772, W. Lake, Manufacture of Nails.—14,775, R. Legg, Stall Boards for Shop Windows.

Dec. 2.—14,794, R. Anderson, Apparatus for Ascending Chimneys, &c.—14,815, F. Trier, Machines for Cutting, Dressing, Turning, Planing, and Shaping Stone.—14,815, L. White, Manufacture of Portland Cement.—14,816, C. Gumpel, Friction Clutch for Holding Window Sashes and Sliding Frames in any desired Position.—14,825, E. Brennan, Window-sash Fastenings.

Dec. 3.—14,866, R. Somers, Improvements in Fireplaces.—14,870, W. Hitchin, Holdfasts for Windows, Ventilator-Shutters, Window-blinds, &c.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

8,772, E. Webb, Attaching and Adjusting Door Knobs and Handles to Spindles.—12,706, J. W. and R. Green, Improvement in Kitchen or Room Fire-



grates.—12,903, S. Pitt, Manufacture of Lime-Cement, Applicable to the Production of Cements, Mortars, Hydraulic Concretes, and Artificial Stone, replacing Natural Stone.—12,991, W. Kinnaman, Sanitary Joint for Pipes.—13,194, J. Lockwood, Improvements in Cooking Ranges.—13,221, J. Boam, Improved Method of treating Iron Ores, Oxides of Iron, &c., to be used in the Manufacture of Paints, Colours, &c.—13,591, J. Sutherland, Apparatus for Preventing the Entrance of Wind, Dust, or Rain under Doors, &c.—13,722, F. Fidler, Improvements in Locks and Latches.—13,991, J. Freeman, Improved Water-closets.—14,065, E. Robbins, Improved Tesserae or Mosaic for Building Purposes, &c.—14,116, W. Rowe, Improvements in Water-closets.—10,087, J. Johnson, Fastenings for Window Sashes.—12,620, F. Morris and J. Fox, Apparatus for Securing Sliding Sashes.—13,173, W. Brewer, Devices for Fastening Windows, &c.—13,957, W. Aish, Improvements in Bradawls, Chisels, &c.—13,622, F. French, Fasteners for Window Sashes, &c.—13,675, F. Smith, Appliances for Ventilating Rooms and other Enclosed Spaces.—14,127, M. Opperman, Improved Mode of Producing Window Glass.—14,128, J. B. Spence, Preparation of Materials to be used in Making Paints.

#### COMPLETE SPECIFICATIONS ACCEPTED.

Open to competition for two months.

202, A. Boulton, Improvements in Stoves.—264, J. Walker, Cupboard and Other Door Fastenings.—609, E. Tomlinson, Ventilation and Treatment of Smoke, &c.—950, H. Walker and G. Clark, Improvements in Fire Grates.—1,148, A. Mackie, Door Check.—1,166, H. Walker and G. Clark, Improvements in Kitchen Ranges.—1,598, B. Wilson and Others, Improvements in Chimney Tops.—2,095, J. Doulton, Fireproof Floors.—2,160, E. Colton, Improved Wall or like Decorations, and Method of Manufacturing same.—5,097, S. Jackson, Concealed Outlet and Deep Flaming Closet.—8,182, A. Boulton, Safety Device for Screw Fastenings.—12,177, W. Benson, Improvements in Hinges.—15,857, H. Gardner, Surfacing Compound for Coating Buildings, &c.—16,821, J. Herbert and T. Colley, Sash Bar Cramp for Carpenters and Joiners.—12,605, G. Thornton, Preventing the Violent Closing or Slamming of Doors.—13,161, W. Doshering, Watchman Detector and Alarm Apparatus.—15,294, H. Lake, Preservation of Wood.—13,321, J. Simmons, Window Fastenings.

#### RECENT SALES OF PROPERTY.

| ESTATE EXCHANGE REPORT.                                                                |       |
|----------------------------------------------------------------------------------------|-------|
| Nov. 26.                                                                               |       |
| By THURGOOD & MARTIN.                                                                  |       |
| Lingfield, Surrey—Freehold cottage and $\frac{1}{2}$ acres.....                        | £410  |
| "Linkins" Meadow, $\frac{1}{2}$ acres.....                                             | 335   |
| Three freehold cottages.....                                                           | 395   |
| "Pollard's" Farm, and $\frac{1}{2}$ ac. 30p., freehold.....                            | 655   |
| "Jack's Bridge" Farm, and $\frac{1}{2}$ ac. 30p., freehold.....                        | 1,500 |
| "Rowland's" Farm, $\frac{1}{2}$ ac. 30p., freehold.....                                | 2,500 |
| Nov. 27.                                                                               |       |
| By WATFORD & WILKIN.                                                                   |       |
| Upper Norwood—46 and 47, Anerley-road, freehold                                        | 280   |
| By BAKER & SOX.                                                                        |       |
| South Africa—Forty-nine claims, and 49 Acres of Depositing Ground, with Plant, &c..... | 3,300 |
| By JONES, LANG, & CO.                                                                  |       |
| Milton-street, K.C.—Freehold Ground-rent of 78l. 16s. reversion in 35 years.....       | 2,420 |
| Peckham—121 and 123, Kimberley-road, 98 years, ground-rent 11l.....                    | 335   |
| Nov. 30.                                                                               |       |
| By L. FARMER.                                                                          |       |
| Maida Vale—1 to 4, Elgin-terrace, 76 years, ground-rent 24l.....                       | 1,455 |
| By G. PAAT.                                                                            |       |
| East Dulwich—2 and 3, Saratoga Villas, 53 years, ground-rent 10l.....                  | 450   |
| 8, Elizabeth-terrace, 98 years, ground-rent 6l.....                                    | 140   |
| Dec. 1.                                                                                |       |
| By C. & H. WHITE.                                                                      |       |
| Plaistow, Kent—19, Crescent-road, freehold.....                                        | 400   |
| By THURGOOD & MARTIN.                                                                  |       |
| Godstone—An enclosure of land, 11a. Or. 10p., freehold.....                            | 450   |
| "Brooklands" Farm, 34a. 2r. 37p., freehold.....                                        | 1,750 |
| Enclosures of land, adjoining, 28a. Or. 1p.....                                        | 1,300 |
| By HENDERSON & PATTENESS.                                                              |       |
| Homerton—53, High-street, 74 years, ground-rent 10l.....                               | 250   |
| By B. BROWN.                                                                           |       |
| Poplar—5, 6, and 7, Lodge-street, freehold.....                                        | 515   |
| 8, Perry's Close, 71 years, ground-rent 31s. 8d.....                                   | 380   |
| Bromley—29 and 31, Willis-street, 58 years, ground-rent 8l.....                        | 315   |
| 7, Gray-street, freehold.....                                                          | 165   |
| By DRENNHAM, FETTER, & CO.                                                             |       |
| City—29, Plough-court, and 1 to 7, Plough-place, freehold.....                         | 1,820 |
| Belgrave—184, Buckingham Palace-road, 16 years, no ground-rent.....                    | 480   |
| Dec. 2.                                                                                |       |
| By BRIANT & SON.                                                                       |       |
| Kennington—5, Farmer's-road, 40 years, ground-rent 4l.....                             | 185   |
| Chelsea—12, 13, and 14, Bury-street, freehold.....                                     | 1,620 |
| Battersea—111 and 113, High-street, freehold.....                                      | 630   |
| Clapham—81 to 87 odd, Mayrick-road, 84 years, ground-rent 37l. 10s.....                | 1,440 |
| Wandsworth—The lease of 80, Northcote-road, term 14 years.....                         | 760   |
| By R. J. COLLIER.                                                                      |       |
| Stoke Newington—85, Fairholt-road, 94 years, ground-rent 12l.....                      | 630   |
| 79 and 81, Fairholt-road, in carcase.....                                              | 660   |
| 60, 68, and 67 to 77 odd, Fairholt-road, in carcase.....                               | 1,250 |

By Mr. ROBERTSON.  
Camberwell—49, Cranwick-terrace, 57 years, ground-rent 34s. 9d..... £405  
Dec. 3.  
By HARDS & JENKINSON.  
Richmond—"The Princess of Wales" Beer House, freehold..... 490

#### MEETINGS.

SATURDAY, DECEMBER 13.

Association of Municipal and Sanitary Engineers and Surveyors.—Northern District Meeting, Town-hall, Gateshead.—Visits to Works, and the following papers:—(1) "On Iron Cylinder Foundations," by Mr. James Bower; (2) "On Disconnected Slopstone Pipes, with Suggestions of an Improved Method," by Mr. Cosmo C. Hooley. 10.30 a.m.

MONDAY, DECEMBER 14.

Royal Institute of British Architects.—Paper by Mr. William White, F.S.A., entitled "A Week at Wisby in Gothland," 8 p.m.  
Royal Academy.—Professor A. H. Church on "Colour and Colours,"—IV, 8 p.m.  
Architectural Section of the Philosophical Society of Glasgow.—Mr. A. Lindsay Miller on "Fireplaces and Chimneys," 8 p.m.

TUESDAY, DECEMBER 15.

Institution of Civil Engineers.—Further discussion on Mr. John Ingham's paper on "High-Speed Motors" and on Mr. Gilbert Kapp's paper on "Continuous Current Dynamo-Electric Machines and their Engines," 8 p.m.  
Statistical Society.—Mr. Thomas Scrutton on "The Preventable Loss of Life at Sea," 7.45 p.m.

WEDNESDAY, DECEMBER 16.

Royal Academy.—Professor A. H. Church on "Colour and Colours,"—V, 8 p.m.  
Society of Engineers.—Annual Dinner, Guildhall Tavern. 6 p.m.  
Civil and Mechanical Engineers' Society.—Mr. G. Eades Eadus on "The Ventilation of Sewers," 7 p.m.  
West London School of Art.—Sir P. Cunliffe Owen will distribute the Medals and Prizes gained by the Students, 8 p.m.  
Parkes Museum.—Ordinary General Meeting of Members to receive Report from Council, &c. 6.30 p.m.  
Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting, 8.30 p.m.  
Society of Arts.—Mr. Holt S. Hallett on "Burnah, Present and Future," 8 p.m.

THURSDAY, DECEMBER 17.

Society of Antiquaries.—Professor Boyd Dawkins on "A Bronze Hoard from Eaton, near Norwich," 8.30 p.m.  
London Institution.—Captain Abney, F.R.S., on "Light and the Atmosphere," 7 p.m.  
York Architectural Association.—Mr. S. W. North on "The Sites of Houses as affecting Health," 7.30 p.m.  
Edinburgh Architectural Association.—Mr. David M. Westland, C.E., on "Foundations," 8.30 p.m.  
Dundee Institute of Architecture.—Mr. George Macdougald on "Smoke Consumption," 7 p.m.

FRIDAY, DECEMBER 18.

Architectural Association.—Mr. J. A. Gutch on "English Houses of the Seventeenth Century," 7.30 p.m.  
University College.—Professor G. T. Newton, C.B., on "Greek Myths illustrated by Fictile Vases and other Monuments,"—III, 4 p.m.  
Royal Academy.—Professor A. H. Church on "Colour and Colours,"—VI, 8 p.m.  
Society of Medical Officers of Health.—Dr. E. C. Seaton on "The Recommendations of the Royal Commission on the Housing of the Working Classes as they affect the Status of the Medical Officer of Health," 7.30 p.m.  
Institution of Civil Engineers (Students' Meeting).—Mr. F. George Howard on "The Propulsion of Tram-cars and Launches by Secondary Batteries," 7.30 p.m.

#### Miscellaneous.

**Awards for Architecture at the Royal Academy.**—The following awards were made on Thursday evening last:—Gold Medal and Travelling Studentship in Architecture, subject "A Town House," Thomas MacLaren; architectural drawing, subject "The North Porch of St. Paul's Cathedral," 1st, Silver Medal, F. W. Troup; 2nd, Silver Medal, Lionel Littlewood; set of architectural designs, Upper School, E. Guy Dawber; set of drawings of an architectural design, Lower School, W. Leock; Silver Medal for perspective drawing, not awarded. We will give the awards for Painting and Sculpture next week.

**A Non-freezing Solution for Heating Apparatus.**—In the *Builder* of October 3 we printed part of a paper read at the Leicester Sanitary Congress by Mr. E. C. Robins on "The Ventilation and Warming of Chemical Laboratories," in the course of which Mr. Robins said of the Bristol school heating apparatus, that "to prevent accidents by frost, the pipes were filled with a non-freezing solution of chloride of calcium." We are asked to state that the application of the solution in question is a patent of Mr. William Stainton, of King's-cross-road.

**The London Pavilion Music Hall.**—We are asked to state that the sliding roof at this music-hall was supplied and fixed by Messrs. Rownsdon, Drew, & Co., who also furnished the structural ironwork for the building.

**Another Architect Elected M.P.**—Mr. Banister Fletcher, F.R.I.B.A., has been elected M.P. for the Chippenham Division of Wiltshire.

**The Plumbers' Company.**—On the 4th inst., under the presidency of the Master (Mr. G. Shaw), a Livery dinner of the Plumbers' Company was held at the Albion, Aldersgate-street, and the attendance was one of the largest and most representative that has ever assembled under the banner of this ancient Company. "Sanitary Science and its Institutions throughout Great Britain" was proposed from the Chair, the Master referring with evident satisfaction to the conference which had been held under the auspices of the Company, and at which a system of registering master plumbers and journeymen as a means of benefiting the craft, was determined upon. He said it was an undoubted fact that a bad workman was an evil not only to the craft, but to himself, his neighbours, and the public at large. After much discussion, the scheme was now almost completed, and a second meeting would shortly be called to consider it. Assistance and co-operation had been promised by Lord Portesbury and other members of the two Houses of Parliament in any step that the Company might take. It was his hope that the day might come when the Plumbers' Company would be recognised as one of the chief sanitary institutions of Great Britain. Professor de Chaumont and Dr. Ernest Hart, who responded, devoted their remarks to reviewing the progress which had been made of late years in sanitary science, the latter remarking that for the past twenty years 8,000 lives a year had been saved. Dr. Vacher, who also replied, urged how important it was to the public to secure the execution of plumbing work by competent craftsmen. With the toast of "Architecture and the Building Trades," the names of Mr. Ewan Christian, F.R.I.B.A., Mr. George Godwin, F.R.S., and Mr. E. C. Robins, F.S.A., were coupled. The toast of the Company itself was received with enthusiasm, it being mentioned by the Lord Mayor that Mr. G. Shaw had been Master of the Company for three years in succession, and that the scheme of regeneration in the work of plumbing had been nearly if not wholly brought about by him.

**Trade Inquiry Agencies.**—The case of Part v. Wilson was an action heard in the Derby County Court on Monday last, before Judge Woodford. Mr. Oswald E. Part, cement manufacturer, Derby, sued E. P. Wilson & Co., of London, to recover the sum of 31. 3s. for a subscription paid to the defendants on their representation that they could make inquiries as to the solvency of proposed customers. The plaintiff called upon them to make such inquiries and they declined to do so. After hearing the evidence, his Honour said he regretted that he was compelled to give the verdict he was about to do, because the country was inundated with people who were forcing themselves upon the attention of the public, and getting up all kinds of plans for every sort of purpose. The defendants induced the plaintiff to enter into this so-called association, because it was a similar firm to Messrs. Stubbs's, a well-known firm. It was a stupid thing on the part of the plaintiff to employ a man on his mere statement that the business was the same as Messrs. Stubbs's, but he did employ him without taking the trouble to make inquiry. The plaintiff allowed himself to be decoyed into the payment of the subscription, but what he did he did with his eyes open. He was sorry he could not help him, and he was equally sorry to assist such an association. There would be a verdict for the defendant without costs.

**Extensive New Sewerage Works.**—We are informed that the tender of Messrs. B. Cooke & Co., of Battersea, has been accepted for the construction of the whole of the sewers in the Friars Barnet Sewerage Works, the amount of the contract being 22,820l. The same firm are constructing the outfall works at Silvertown for the West Ham Local Board, the contract amount being 10,464l.

**The Late General Earle.**—Messrs. Jones & Willis, of Birmingham, have been entrusted with the execution of a memorial brass, which is to be erected in memory of the late Major-General Earle, who was killed in the recent Sudan campaign. The brass is to be fixed in the English church at Alexandria.

**The Parkes Museum.**—The ordinary general meeting of the members of the Parkes Museum will be held in the Museum Library, No. 74a, Margaret-street, Cavendish-square, London, W., on Wednesday next, December 16, at 5.30 o'clock p.m., to receive the report of the Council, and to transact other business.





**LEICESTER.**—For the construction of a main sewer, with bellmouths, side entrances, flushing arrangements, manholes, lampholes, &c., for the New Gas Works and Aylestone-road. Quantities by J. Gordon, C.E., Borough Surveyor.

|                                      |             |
|--------------------------------------|-------------|
| Kennington & Garth, Sheffield.....   | £5,894 13 6 |
| Thomas Smart, Nottingham.....        | 5,630 10 3  |
| Currall & Lewis, Birmingham.....     | 5,688 11 10 |
| Hy. Hughes, Dudley.....              | 5,459 11 6  |
| James & Ward, Birmingham.....        | 5,456 0 6   |
| B. W. Ward, Woburn.....              | 5,419 1 0   |
| E. Tempest, Keighley (accepted)..... | 5,184 19 2  |
| S. W. Pilling & Co., Manchester..... | 4,947 18 0  |

**LONDON.**—For alterations and additions to No. 55, Foley-street, Oxford-street, for Mr. Brangan. Mr. E. C. Robins, architect, John-street, Adelphi:—

|                                 |          |
|---------------------------------|----------|
| Watson.....                     | 2785 0 0 |
| Cooper.....                     | 759 0 0  |
| Searchfield & Son, Clapham..... | 762 13 0 |

**LONDON.**—For re-building "The Cock" tavern in the new street leading from Piccadilly to Bloomsbury, for Mr. W. Knight. Messrs. Wilson & Long, architects, King William-street, Strand. Quantities by Mr. Arthur W. Saville, Strand:—

|                                |            |
|--------------------------------|------------|
| S. R. Lambie.....              | £2,989 0 0 |
| E. Belham & Co., London.....   | 2,987 0 0  |
| John Anley.....                | 2,975 0 0  |
| Ward & Lambie.....             | 2,969 0 0  |
| W. Shurmer.....                | 2,880 0 0  |
| Spencer & Co., London.....     | 2,807 0 0  |
| Benjamin Cook.....             | 2,761 0 0  |
| John Walker.....               | 2,718 0 0  |
| John Beale.....                | 2,700 0 0  |
| William Oldrey (accepted)..... | 2,694 0 0  |

**LONDON.**—For erection of stables, Union-street, Oxford-street. Mr. H. H. Stoneham, architect:—

|                     |          |
|---------------------|----------|
| Wood Bros.....      | £473 0 0 |
| Colley.....         | 545 0 0  |
| J. Morter.....      | 530 0 0  |
| Steel Bros.....     | 497 0 0  |
| Jackson & Todd..... | 489 0 0  |
| W. Shurmer.....     | 488 0 0  |
| G. Johnson.....     | 485 0 0  |

**LONDON.**—For building five houses in Herne-place, Dulwich-road, for Mr. George Monk:—

|                                 |            |
|---------------------------------|------------|
| W. D. Palmer, Dulwich-road..... | £1,400 0 0 |
|---------------------------------|------------|

\* Accepted.

**LONDON.**—For alterations at the "Duke of Wellington," Nile-street, Hoxton. Mr. W. Miles, surveyor:—

|                     |          |
|---------------------|----------|
| E. T. Lyne.....     | £210 0 0 |
| W. Shurmer.....     | 180 0 0  |
| Jackson & Todd..... | 163 0 0  |

**SHOREDITCH.**—For erection of stables for Messrs. Rotheman & Co., Shoreditch. Messrs. Hovenden, Heath, & Berridge, architects:—

|                            |            |
|----------------------------|------------|
| Clarke & Bracey.....       | £5,664 0 0 |
| G. H. & A. Bywater.....    | 5,497 0 0  |
| W. Holland.....            | 5,288 0 0  |
| Asby & Horner.....         | 5,170 0 0  |
| E. Conder.....             | 4,898 0 0  |
| Servroux & Co.....         | 4,683 0 0  |
| Prestage.....              | 4,581 0 0  |
| Patman & Fotheringham..... | 4,971 0 0  |
| W. Shurmer (accepted)..... | 4,793 0 0  |

**SOUTHWARK.**—For new warehouse at rear of No. 213, Blackfriars-road, for Mr. R. Morgan. Mr. E. R. Hewitt, architect:—

|                           |            |
|---------------------------|------------|
| H. Baguley.....           | £1,210 0 0 |
| J. Holloway.....          | 1,095 0 0  |
| J. H. Mills.....          | 1,890 0 0  |
| E. C. Scott.....          | 1,775 0 0  |
| Holloway Bros.....        | 1,632 0 0  |
| J. Hoare & Son.....       | 960 0 0    |
| W. Downes (accepted)..... | 992 0 0    |

**TORQUAY.**—For additions to Broadlands. Mr. John Watson, architect. Quantities by Messrs. J. Mullins & A. Watson:—

|                       |            |
|-----------------------|------------|
| Goss.....             | £1,015 0 0 |
| Chubb.....            | 1,000 0 0  |
| Emmerson.....         | 987 17 0   |
| Matthews.....         | 931 0 0    |
| Vanson & Mumford..... | 894 10 0   |
| Wyatt.....            | 821 0 0    |
| Watson Bros.....      | 907 0 0    |
| Teo (accepted).....   | 699 18 0   |

**WINCHMORE HILL.**—For iron fencing, &c., for Metropolitan Asylums Board, Winchmore Hill. Messrs. Pennington & Bridges, architects and surveyors:—

|                              |          |
|------------------------------|----------|
| George Bell.....             | £621 0 0 |
| Baylis, Jones, & Baylis..... | 519 13 3 |
| Wall Bros.....               | 515 0 0  |
| Abbott & Co.....             | 518 0 0  |
| Rowland Bros.....            | 491 0 11 |
| Hill & Smith.....            | 486 12 0 |
| Johnson Bros.....            | 488 0 0  |
| Rowell & Co.....             | 486 8 8  |
| E. C. & J. Reay.....         | 432 18 0 |

**YARMOUTH.**—For sea-water works for the Great Yarmouth Corporation. Mr. J. W. Cockrill, Borough Surveyor. Quantities supplied by Borough Surveyor:—

|                                                               |            |
|---------------------------------------------------------------|------------|
| W. J. Botterill, 110, Cannon-street, London.....              | £4,973 0 0 |
| Charles Lewis Witham, Essex.....                              | 4,742 2 0  |
| H. J. C. Keymer, Goringham.....                               | 4,675 0 10 |
| J. F. W. Bray, Yarmouth.....                                  | 4,612 0 0  |
| G. H. Spraggall, Yarmouth.....                                | 4,500 0 0  |
| C. & S. Freese & Co., 8, Suffolk-lane, London (accepted)..... | 3,987 0 0  |

[Surveyor's estimate, £4,230 0 0]

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# The Builder.

Vol. XLIX. No. 2327.

SATURDAY, DECEMBER 19, 1885.

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### Micro-organisms and London Water.

**IR FRANCIS BOLTON'S** last report of the water supplied to London by the several Metropolitan Companies contained a letter addressed to the Local Government Board by Dr. Percy F. Frankland, which has given rise to somewhat varied comment in the columns of the London dailies. Dr. Frankland's letter refers to the results obtained from the examination by the gelatine method of the water supplied by the different companies, with a view to discover the organic impurities existing in each. This biological examination was carried on for a short time by the late Dr. Angus Smith, though in a somewhat different manner. Sir Francis Bolton proposes to issue the results obtained by Dr. Frankland from month to month. Before inquiring into the revelations of the gelatine method, it will be interesting to glance at the reports issued for the first half of the present year by Professor Frankland, F.R.S., and Messrs. Crookes, Odling, and Tidy, which afford, according to Sir Francis Bolton, the most reliable information obtainable respecting the quality of the London water supply. The question of the purification and filtration of the river is one of perennial interest. The amount of literature which has been contributed in this connexion is appalling, and yet it is still practically limitless. We see no reason to anticipate any alleviation in this respect until a more equitable base of operations has been arrived at. Much has been suggested and much has been done, but the limit of possible improvements seems to be exhaustless. The Metropolitan Board of Works is doing its share (though very late in the day) towards solving the problem. At the last meeting (December 11th) the Works Committee recommended the expenditure of 3,260*l.* in respect of the deodorisation works for the treatment of sewage in progress at Crossness Pumping Station. Returning to the matter of chemical analysis, Messrs. Crookes, Odling, and Tidy found that out of 1,049 samples of water collected from the mains of the seven companies taking their supply from the Thames and the Lea, the whole were "clear, bright, and well filtered," attributing any increase in the proportion of organic matter to the effects of occasional storm rainfalls. They found that the mean quantity of organic carbon present in the Thames-derived water examined during the six months was 0.153

part in 100,000 parts of water, or about a quarter of a grain of organic matter per gallon. February and March produced samples in which the organic carbon exceeded 0.20 part in 100,000, whilst 0.256 part, or less than half a grain, represented the organic matter per gallon. They assume that this result establishes the fact that the amount of organic impurity present is infinitesimal, and they then refer to the report of the last Royal Commission on Water Supply, where it is concluded that the presence of organic matter in small quantities is not necessarily prejudicial to health. Messrs. Crookes, Odling, and Tidy are inclined to be somewhat apologetic in reference to the present state of matters when they advance the doubtful argument that, "by the authority of the Legislature, and after full inquiry by Parliamentary Committees and Royal Commissions, upwards of 90 per cent. of the water supply to London is at the present drawn from river sources." Professor Frankland points out that even the minimum presence of organic matter is no guarantee of the non-existence of the germs of zymotic disease, and that the treatment which the companies have yet adopted will not insure the removal of such morbid matters. It has been recently demonstrated that no system of filtration has been discovered which would effectually prevent the access of those lower forms of animal life which are known to simulate the organisms causing zymotic disease. On this account alone it has been proposed by several of the water companies to ultimately abandon the rivers Thames and Lee as sources of water supply, and with that object in view they have sunk deep wells into the chalk, believing in the utilisation of subterranean waters which have undergone natural filtration through great thicknesses of gravel and sand. It will be well before leaving this part of the subject to consider briefly how far subterranean sources are likely to meet a large demand in that direction, should river-derived water eventually become unpopular.

In the south-east of England, chalk is the chief water-bearing bed. It is not so porous or permeable as some of the sand-beds; but its extent of outcrop and thickness render it of the most importance. Mr. Charles E. de Rance, secretary of the British Association Water Committee, in his work on "The Water Supply of England and Wales," shows that "the rainfall which this country receives is more than sufficient to meet all the requirements of human consumption, manufacturing interests, and the purposes of canalisation; and yet," he remarks, "with these resources, large districts still suffer from all the ills due to a polluted water-supply." The danger from pollution in the case of wells is not sufficiently understood, and the present

state of the law in regard to this matter is capable of considerable improvement. Mr. W. Whitaker, of the Geological Survey of England, in an interesting paper on "Chalk as a Source of Water-supply," alludes to the case of *Ballard v. Tomlinson*, where, by a recent legal decision, the judgment of Mr. Justice Pearson, it has been declared lawful for any one to pour filth or noxious matter down an unused well, without regard to the fact that he may thereby pollute the source from which his neighbours draw their supply. Mr. Whitaker remarks, "It would be a work of no great difficulty, therefore, to utterly spoil most well waters, and this might not only be done by inadvertence, as in the case alluded to, but apparently of malice aforethought." These remarks apply equally to all water-bearing beds. Besides the above danger, there is another equally to be guarded against at a time when alterations are being made upon deep wells. The force of this remark could not be more clearly demonstrated than by reference to the numerous cases of typhoid fever which occurred several years ago in Caterham, and in the town of Redhill, eight miles distant, which were afterwards shown to be the effect of the excrements of a workman suffering from the disease, gaining access to the well at the first-named place.

Of 144,592,772 gallons supplied during a recent year by the eight companies to the inner circle of the metropolis, 9,567,634 gallons were from deep wells in the chalk, and the remainder, consisting of 71,710,878 gallons from the Thames, and 63,314,260 gallons from the Lea, of which the water drawn from the Lea, and distributed by the New River and East London companies was found to be of uniformly better average than that of the Thames. Prof. Frankland found on an analysis of water taken regularly throughout the year from the mains, at places recommended by the companies themselves, that while the river waters were open to objections, the water from the deep wells in the chalk was of uniformly good quality. It will have been observed by many resident in London,—visitors have frequently remarked it,—that during the summer months, while the water in one part of the metropolis is agreeably cool, in another it is warm and unpalatable. Very few, however, know the reason of this. It is to be found in the fact that the former is deep-well water, while the latter is derived from the rivers. The proportion of organic matter present in the deep-well water, taking an average on the last ten years, was little more than one half that existing in water derived from the Lea, and much less than one half that obtained from the Thames. Though small quantities of vegetable organic matter are not objectionable



in drinking-water, organic matter in river-water which receives sewage is another consideration. In one of the reports of the Royal Commission on Water Supply, it is concluded "that, when efficient measures are adopted for excluding the sewage and other pollutions from the Thames and the Lea, and their tributaries, and for ensuring perfect filtration, water taken from the present sources will be perfectly wholesome, and of suitable quality for the metropolis." It has been urged since that the expense attached to such a scheme, and, indeed, any scheme for the entire exclusion of all sewage from rivers, is so great as to render it a practical impossibility. Irrigation and intermittent downward filtration are the methods which have been tried in the towns of the Thames basin. Chemical treatment has obtained comparatively poor results. These methods of purification have greatly improved the appearance of the river-waters, and yet, we have it upon the highest authority, that not one of these processes, executed with the greatest nicety, offers any guarantee against the admission into the Thames and the Lea of noxious matters capable of giving rise to zymotic diseases. Advocates of an improved preventive system have only to consider the details of the drainage system which obtains in the majority of small towns and villages, where the sewage is often allowed to collect in cesspits, the overflow from which too frequently communicates with the nearest water-course; and again, the case of street-drains conveying sewage matters into the streams hard by. Here, again, the superiority of the deep-well over the river water is again brought into prominence; for, as we have before argued, the natural filtration undergone by deep-well water in passing through a great thickness of porous strata, renders it extremely improbable that any suspended particles, usually considered to be prejudicial to health, should have escaped removal.

In order to obviate the difficulty which presents itself during the winter months with regard to the frequent turbid condition of the Thames and the Lea, the companies have provided subsiding reservoirs, where the water is stored before it is delivered into the filter-beds. The capacity of these reservoirs is such that, in the case of stormy weather, the works can be carried on for some time without the necessity of obtaining a further supply, and in that way avoid undesirable conditions of the river water. It need not be added that the subsidence which has taken place in these reservoirs, greatly facilitates subsequent filtration. Sir Francis Bolton considers that 540 gallons per square yard of filter bed, or  $2\frac{1}{2}$  gallons per square foot per hour, is a sufficient rate for filtration to take place with efficiency. Before leaving the question of filtration, we may with advantage refer to the impression which exists in the minds of a large number of people, that where sand and gravel alone are used in filter beds, the process of filtration is a purely mechanical one, whereas, it is quite as much a chemical operation. Decomposition of organic substances as well as straining are being carried on at the same time. Everybody knows that loose particles of sand and gravel are surrounded by condensed air (oxygen and nitrogen), and when the water comes in contact with so much concentrated oxygen, the organic impurities existing in it are at once seized hold of, and rapidly decomposed. Besides filtration, there is another process, immediately associated with it, which is attended with a considerable reduction of organisms; it is the process introduced by Clark, and which is now obtaining very large attention because of the excellent results which have followed its adoption. It has for its object the softening of water, and consists merely in the addition of a small quantity of slaked lime. Soft water is always required for domestic purposes, and if it is not soft, a large amount of carbonate of soda and soap require to be used in consequence. It has been estimated that the increased expense entailed thereby to the consumer is 80 per cent. greater than if it were done on a large scale by the company. Water obtained from deep wells

contains a proportion of solid matter consisting of mineral salts, which render it hard and therefore less suitable for washing and manufacturing purposes. The hardness of the water from the public wells near Liverpool, being nearly 15°, was one of the strongest arguments which Mr. Bateman urged against the suggestion to supply Liverpool by water obtained from subterranean sources. The good results obtained by the use of Clark's process are clearly illustrated in the case of the Colne Valley Company's water, where it is adopted, and which was found to contain only one-third of the amount of solid matter discovered to exist in the water furnished by the Kent Company and by the Tottenham Local Board of Health, although obtained from the same source.

We come now to the consideration of the gelatine method for the discovery of micro-organisms in water. This question obtained a large share of the attention of the members of the Royal Society at their meeting, on June 18th of the present year, when Dr. Frankland introduced the system which he seems to be gradually identifying with his name. Taking a number of small 3 oz. bottles, which, after having been sterilised by submission to a heat of 150° C. for three hours, are kept tightly stoppered, and the water to be examined is then allowed to wash down the outside, when the stopper is removed and replaced immediately the bottle is nearly filled, and the examination of the water is at once proceeded with. Koch was the first to devise the method which has been improved upon, or at least modified, by Dr. Angus Smith and Dr. Frankland. The object is to determine the number of organisms present before and after treatment. A known quantity of water is mixed with sterilised nutritive gelatine, and then poured out upon a glass plate, when, after the expiration of a few days, the "colonies" derived from the individual centres of life can be counted with the assistance of a lens, and from the data thus arrived at the number of organisms present in any volume of water can be deduced. Dr. Frankland obtains his nutritive gelatine in the following way:—One pound of lean meat is finely minced, and after infusion with half a litre of water for one to two hours, is strained off through linen; then, 100 grms. of white French gelatine are soaked in another half-litre of water; to this the extract of meat is added, the whole boiled for a few minutes, when 10 grms. of peptone and 1 gm. of common salt are put in, and afterwards a little carbonate of soda. The addition of the contents of two or three eggs is then beaten up, and the whole being boiled completes the respective operations of reaction, neutralisation, and clarification. Ultimately a yellowish-brown transparent jelly is obtained, which is poured into clean test-tubes, kept tightly plugged with cotton wool, and which are sterilised by straining them for half an hour on three consecutive days. The glass plates, upon which a film of gelatine is to be afterwards placed, are sterilised by heating for three hours to 150° C. The glass dishes destined to receive the plates are placed in a porcelain tray containing a solution which is sufficient to complete the disconnection of their interior from the outside air, which process effectually prevents the ingress of organisms during incubation. The gelatine in the test tubes is next melted, and then a given number of drops of the water to be examined are introduced with sufficient care and quickness to obviate the possibility of the entrance of organisms from the air, the water and gelatine being well agitated are then quickly poured on the sterilised plate, the conditions of which transference being such as to render the slight exposure to the air comparatively no moment, and after the gelatine has set, which takes about ten minutes, the dishes are then maintained at a temperature of 20° to 25° C. The process of incubation lasts from three to six days, when the organisms make their appearance, and may be readily detected with the assistance of a lens. A black ground, ruled in squares, enables the counting to be done with considerable facility. The following are the latest results obtained by Dr. Frank-

land in his examination of the various waters supplied to the metropolis, in which the relative freedom from organic life is arranged in order. It ought to be observed that the number of micro-organisms found at the same time in one centimetre of the unfiltered Thames water was 714, which affords a very striking illustration of the remarkable efficiency of the filtering operations carried out, when this number is compared with the following statement:—

|                      | Organisms per cubic centimetre. |
|----------------------|---------------------------------|
| New River .....      | 2                               |
| West Middlesex ..... | 2                               |
| Kent .....           | 18                              |
| Southwark .....      | 24                              |
| Lambeth .....        | 26                              |
| Chelsea .....        | 34                              |
| Grand Junction ..... | 40                              |
| East London .....    | 53                              |

## NOTES.



CONSIDERABLE opposition is being organised to the proposed Sewage Disposal Scheme for the Richmond Union. The Duke of Devonshire, a large owner of property at Grove Park, Chiswick, opposite to which it is proposed to establish the Sewage Works at Mortlake, is making preparations to oppose the scheme, while meetings have been held at Kew and Mortlake in opposition to it. An alternative scheme will be submitted by the opponents to the proposed works. This alternative scheme is that of Mr. F. Wentworth Shields, who proposes to convey the sewage by gravitation to a site at Greenford, near the sewage works of North Ealing, and about  $3\frac{1}{2}$  miles north of the River Thames. It is argued that this scheme will take the sewage outside of the Union to a rural and thinly-populated district, where land can be had at a low price. It is stated that the Ecclesiastical Commissioners have offered a site there of 507 acres for 150l. per acre; and that the scheme is designed to fulfil the following conditions:—The recommendation of the Local Government Board (in their letter to the Thames Valley Main Sewerage Board of 26th of March last) that some scheme of moderate cost for the disposal of the sewage outside their district should be adopted; also the recommendation of the Royal Commission on Metropolitan Sewage Discharge (in their Report of 1884) that some process of deposition or precipitation should be used to separate the solid from the liquid portion of the sewage; and that the sewage should be further purified by application to land. The rival scheme is estimated to cost 207,783l., with annual charges representing a rate of 7½d. in the pound. The effluent would be delivered into the river Brent, which runs by the southern side of the proposed sewage works site, and which ultimately discharges into the Thames five miles above Teddington Lock. The Richmond Vestry have intimated their determination to proceed with their Mortlake scheme, and a Local Government Board inquiry will be held shortly to consider the matter.

IN reference to the maintenance of the former site of St. Paul's School as an open space, Mr. Ewan Christian writes to the *Times* of Thursday to urge the importance of not letting this opportunity slip of securing open ground near the east end of St. Paul's Cathedral. Mr. Christian observes:—

"Even if no more could be done than the surrendering of the school site as an open paved space, that would be very valuable; but the whole area down to Watling-street is now clear, and long may it remain so. And would it be too much to expect, if these plots were saved, that ultimately the whole block between St. Paul's-churchyard and Old Change might be thrown in? Then, indeed, London might be said to have done its duty."

I say nothing of cost, or of the duty of the premier City Company to whom the land belongs; but surely in the richest city in the world that ought not to be matter for consideration in comparison with the care which it should exercise in regard to its noblest monument. Probably in no city in the world is there a more glorious architectural view than that from Fleet-street of the western front of its grand cathedral. Is it too much to hope that something may now be done for the view,—less important



it is true, but still very beautiful,—of its eastern end?"

What we have said from the first is that the architectural gain would be immense, and worth paying very highly for, if in securing the site of St. Paul's School we were also securing the commencement of a general ultimate clearance of the ground at the east end of the cathedral, and this Mr. Christian seems also to contemplate. Without that general clearance the mere securing of the St. Paul's School site would do little or nothing for the view of the cathedral from the east; it would only afford opportunity for widening a cramped thoroughfare. The proposed scheme must be regarded as part of a larger one, or it is barely worth what it will cost.

**THE** Hon. Secretaries of the Competitions Committee of the Institute of British Architects (Messrs. Cole A. Adams and Aston Webb) have sent a circular to their local hon. secretaries, asking for the names and addresses of "Mayors, Town Clerks, Borough Surveyors, and other public functionaries" of their respective districts to whom they may send a circular, stating the objects of the Committee, so that its recommendations may be brought before the promoters of public competitions in the initial stage of a competition. The circular proposed to be sent to such functionaries emphasises the following points: that the knowledge and skill of a specialist are necessary to weigh the merits of the various designs, especially in regard to cost, observation of the conditions, and practical appropriateness; that a great number of architects are now pledged not to compete unless a professional assessor is appointed; that promoters would find great advantage in securing the services of the professional assessor from the first in assisting to draw up the conditions; that the selection of the assessor should be determined by the nature of the competition, "the object being to obtain the services of men most conversant with the requirements of the class of building contemplated." These are all very important points, and it is to be hoped that they will receive due consideration from those to whom the recommendations of the Committee may be addressed. It would be exceedingly desirable, we may observe, to have the help of a professional adviser in drawing up the conditions of a competition; we see very few such documents which are not exceedingly deficient in clearness and practical completeness in their method of stating the requirements. The Committee does not offer to advise on the selection of an assessor, referring on that point to the President and Council of the Institute of Architects, or to any well-known architect of established reputation (not necessarily a member of the Institute of Architects) who is not a competitor. The Committee does not express any opinion on the competition system; only that if it is to exist, it should be under such conditions as are suggested.

**LIEUT.-COL. JONES** and Mr. Bailey Denton have forwarded to us a letter, which they have addressed to each individual member of the Metropolitan Board of Works, in reference to what may be termed their "Canvey Island scheme" for dealing with the sewage of London, to which we referred some time since in a "Note." We have not space to print the letter, but the substance of it is that the scheme of the writers has been shelved without the reference to any independent and competent authority which they asked for; that there exist special properties and conditions appertaining to Canvey Island which render it the best and cheapest site for dealing with the sewage of London, and that it can be purchased for a cost which will only charge the ratepayers with half a farthing in the pound; that whereas the Board of Works have offered 500l. for the best design for a steamer to take out to sea 1,000 tons of "settled" sludge daily, the cost of an inquiry into Col. Jones and Mr. Denton's scheme would not involve half that outlay; which is very likely true. We have our doubts about the Canvey Island

scheme, but we should like to see a formal inquiry into it. The promoters or inventors of it point out that the steamer capable of carrying away 1,000 tons of sludge is only dealing with one-sixth part of the daily deposit; but that is wide of the mark: the Board offered their premium for a design for a steamer of the kind and capacity described. They never proposed, having obtained their model steamer, to confine themselves to building one only of the pattern: they might build a score.

**THE** Simplon tunnel, which will very shortly be commenced, is another, and the most formidable of the gigantic railway connexions undertaken of late years to facilitate the communications between Italy and the rest of Europe; and the project suggests a comparative note on the existing Alpine tunnels. At the present time the Alps are pierced by three remarkably long tunnels, entering Italy from France, Switzerland, and the Austrian Tyrol respectively, and called, according to the mountain chains that are traversed, the Mont Cenis, St. Gothard, and Arlberg tunnels. Of these, the Mont Cenis, which connects Chambéry with Turin, is seven miles and three-quarters in length and between 3,000 ft. and 4,000 ft. above the sea. Its cost was 75,000,000 francs. The St. Gothard tunnel, which connects Lucerne directly with Lakes Maggiore and Como and so to Milan, is nine miles and a quarter in length, and cost 57,000,000 francs, the diminution in expense being owing partly to the softer strata, but principally to the more rapid progress of the work by improvements in the drilling machines. The Arlberg tunnel is shorter than either Mont Cenis or St. Gothard, being only six miles and a half, although its summit level is nearly 1,000 ft. higher. By this tunnel a communication is given between Innsbruck in the Austrian Tyrol and Zurich. The last and most formidable rival will be the Simplon tunnel, by which the existing line from Geneva to Martigny and Brig will be carried through the mountain to Domo d'Ossola and so on to Pallanza or Stresa on the Lago Maggiore. As this tunnel will be commenced at a much lower level than any of the others, it will necessarily be longer, the rough estimate being twenty kilometres or twelve miles and a half, and the estimated cost somewhere about 100,000,000 francs. The difficulties of ventilating so long a tunnel, which were once thought insuperable, have been pretty well disposed of by the experiences of St. Gothard, which is lighted by lamps placed at intervals of 1,150 yards; and, although the temperature is certainly somewhat high (about 75° Fahr.), the traveller feels no discomfort, while the freedom from smoke is far greater than in the shorter tunnels. There are fifty-six of these latter, extending over an aggregate of twenty-five miles, and some of them are so peculiarly spiral that the traveller performs an unconscious corkscrew course underground, emerging in an entirely opposite part of the defile to that at which he entered.

**THE** experiments which Admiral Selwyn is conducting in Middle Scotland-yard should be known to all those who are interested in steam navigation. The Admiral has set up a marine boiler on a piece of waste ground, and is ready to exhibit his results to those who pay a visit to the spot. He uses a combination of steam and oil. It is in this manner that those important results have been obtained from petroleum refuse, which bid fair to effect a revolution in marine warfare, and to some extent in commercial navigation. But the best of the matter as it comes from the hands of Admiral Selwyn, who has been for fifteen years at work upon it, is, that the material from which the oil that he uses is made is all to be obtained within our own shores. We cannot, of course, be expected either to check or to verify the statements made of the large pecuniary saving to be effected in steam navigation by Admiral Selwyn's discoveries. But we can have no hesitation in saying to all persons concerned in the economy of steam-power, "Go and see for yourselves."

**SOME** members of Lincoln's Inn and others have drawn up a petition against any further demolition of Gate House-court (or Old Buildings), including Sir Thomas Lovell's gateway of 1518. At a largely-attended meeting of the Society of Antiquaries on Thursday night, the 10th inst., this petition was signed by the President, by direction of the Society, and by all the other members present, including the Earl of Crawford, Messrs. Board, Franks, Freshfield, Martin, Parker, Wheatley, &c. Being couched in a style more original and piquant than is customary with such protests, the petition was heard with much interest and amusement. After indicating the historical associations of the remaining chambers, the signatories point out that Old Buildings (or Square) has never suffered from the numerous fires that broke out from time to time in the Inn; and notably in New-square, considerably its junior in years. This immunity is ascribed to the employment of oak for all the timber work. The portions just demolished plainly showed how substantial was their construction.

**THE** subsidence in the Metropolitan Railway tunnel, and thence in the portion of Euston-road immediately over it, between King's-cross and Gower-street, is too serious a matter to be made light of; but the report of the engineers to the company seems conclusive to the effect that there is no actual or immediate danger to be apprehended. There seems no doubt that the subsidence has arisen from the clay foundations of the tunnel walls becoming saturated with moisture,—from what source does not seem clear as yet,—and from the pressure on the bed of clay exercised by the recent buildings for the Midland Railway Goods Department in the neighbourhood. The engineers of the railway charge the accession of moisture on the leakage of "the parish sewer," which is, at all events, a not impossible explanation. A concrete invert which has been built beneath the tunnel, is now nearly completed; and this will probably put an end to further subsidence. "Constant observation," the engineers add, "has shown that no movement has taken place since these works were commenced."

**WE** learn that it is proposed to form a club for men engaged in the study and practice of architecture and the fine arts and engineering, the club being apparently, from the terms of the circular forwarded to us, intended specially for the junior members of the three professions. We rather doubt the amalgamation of engineers with architects and artists for a club of this kind; engineers and artists do not tend to "mix," as a rule, though perhaps it would be better for both if they did. As the promoters of the club refer to "the facilities which it will afford to members residing in the country by placing at their disposal accommodation for business transactions with clients," we presume the objects of the proposed club are as much practical as social.

**FAIR** progress is being made with the addition to the Patent Office Library in Southampton-buildings. This was originally built over a portion of the rooms on the first floor until lately occupied by the Chancery Registrars. When completed eastwards the enlarged Library will cover the whole of that floor. The increased accommodation should prove of considerable convenience to patent agents, inventors, and others, many of whom probably remember the old state of things when all the reference-books were piled up in a long dark passage below.

**SOME** few months ago, the antiquation world at Rome was greatly interested by the discovery of a mausoleum outside the Porta Salara, in the grounds of a Signor Bertone, who has been most active in clearing it out and exposing it to the light of day. It proves to be a mausoleum of great size, larger than the one to Cecilia Metella, near the Porta St. Sebastiano. An inscription has been found very recently, which tells us that it was built



by Marcus Lucinius Petus, a prefect of horse, for his sister Lucinia and himself; and it is hoped that fresh excavations will reveal the sepulchral chamber and the bodies of the inmates. What gives rise to this hope is the fact that a columbarium has been discovered intact near the mausoleum, and there is every reason to suppose that no disturbance of the ground has taken place since that date. The whole of this district, which forms a triangle bounded by the Via Pinciana, Via Salaria, and the city walls, abounds with antiquarian remains, one of the latest finds being a marble plate on which was engraved an edict relating to the building and situation of storehouses.

THE biennial supper in which the students of the Royal Academy are in the habit of indulging after their efforts in the competitions for medals or prizes (which competitions, by the bye, seem to increase in number almost yearly), took place at Willis's Rooms on Monday night. Sir Frederick Leighton and many of the Academicians were present, and the hall was well filled with students and their friends. The architectural profession had the honour of providing the chairman on this occasion in the person of Mr. Leonard Stokes, and had reason to be well satisfied with their genial representative.

BARON HUDDLESTON has again delivered judgment against the ventilation of the Law Courts, having stated on Wednesday that Court No. VI. was no longer tenable for him, and Court No. III. being empty, adjournment was made to that. The complaint does not seem to be that there is too little, but too much ventilation, or at least that it is accompanied by "draughts of cold air." The engineer, according to the reports in Thursday's papers, had assured the learned Judge that, owing to the peculiar construction of Courts VI. and VII., it was impossible to prevent the mischief there. We fear there is considerable room for complaint about the practical arrangements of our Temple of the Law; but at the same time, as it appears to be always the same learned Judge who complains, we may perhaps assume that he is specially sensitive to draughts,—a matter in which individuals differ very much.

#### THE FULHAM VESTRY-HALL COMPETITION.

THE bewildering display of designs now exhibiting in the Chapel Ward of the Fulham Infirmary has resulted from the invitation of the Fulham Vestry for plans for their proposed Vestry-hall. Sixty-three architects have responded to the call, and some of them have sent duplicate sets, to show an alternative treatment of the problem. So that nearly four hundred elaborated drawings have been furnished for the selection of the committee and its advisers.

This is a case in which sketch plans might reasonably have been asked for in the first place; for the site is very irregular, and the first thing to be settled is the principle upon which the various buildings,—and more especially the large hall and vestry-hall,—shall be disposed. The axis of the rear portion of the site forms an obtuse angle with a central line at right angles to the main frontage in the Fulham-road, and the utmost ingenuity has been displayed in concealing the awkwardness of the junction of the rearward portion of the structure with the front block.

The designs range themselves under the following heads:—(a) Those which on plan have all their lines perpendicular to the main frontage, the several apartments running on to the margin of the site as they may, their abutments being variously canted off or rounded so as to avoid the acute angles which would otherwise result from this system of plan.

(b) Those which endeavour, by providing a circle, octagon, or other regular figure, at the head of the axial line, to disguise the fact or mitigate the defect.

(c) Those which virtually detach the rear building, and occupy the triangle between its front and the rear of the main block by an open court or courts.

The large hall is, as may be supposed, variously placed by different competitors. If at the back, and ranged parallel to one or other of the sides of the plot, its access is more or less difficult. If, as some prefer it, it occupies the first floor of the front block, the lighting of the rooms, halls, corridors, &c., which underlie so large an area, suffers. There are many inherent difficulties which would try the skill of the most expert contriver, and everything points to the desirability of first agreeing upon the principle of the relation of the main apartments before passing to the consideration of the details of the plan or the style of the elevation; it cannot, therefore, but be a matter of regret that this course was not taken, to the saving of much fruitless labour and no inconsiderable expense, and very considerable disappointment.

The difficulties of the problem have been further aggravated by the insufficiency of the funds allotted for the work, supposing that anything more than a mere building is desired. This part of the affair the perplexed competitors have dealt with variously; some have boldly ignored the condition altogether, relying upon the captivating influence of their designs to overrule the inconvenient restriction. Others have made strenuous efforts to bring their scheme down to the level imposed, and have produced results which will, it is feared, stand no chance beside their handsome rivals.

Others, again, have perforce resorted to that lowest of all expedients, the provision of a mere barn of a building hiding away behind a veneer of a "façade." It would almost appear as though some fatality attached to vestry-hall architecture, which the future historian of styles will inevitably describe under the head of "Pretentious Palladian."

Without adopting any classification of the designs, and taking them *seriatim* as they appear on the screens, we have noted the following points.—In "Suivez Raison" the inconvenience of the broken axis is almost surmounted by the provision of a transverse corridor, called on the plan a municipal hall, handsomely lighted by bowed ends, and joined on to the front building by a flat curve in the middle of its length. On the ground-floor the several offices open out of a central corridor, and the large hall is placed over them at the rear. As is the case generally with this exhibition, an unusual amount of thought has been expended upon the planning, and the exercise it has afforded cannot be altogether unprofitable. The elevation is of a simple Palladian type.

In "1885" the rearward buildings are at right angles to the main frontage. The Vestry-hall is at the further extremity of a corridor more than 100 ft. long, lighted almost exclusively by borrowed lights. [Mem. There is another design with this "motto."] The author submits two elevations,—one Gothic and one Palladian,—which is in itself an unconscious satire upon his plan.

"Ionic" has an ingenious plan: the large hall running along one side of the rearward land; the main entrance being at one extremity of the Fulham-road frontage, a central entrance being provided for the offices. The site is so fully occupied that part of the building would, we fear, be but indifferently lighted. The style is a somewhat massive but not unpleasant Palladian.

"Each Bird Its Nest esteemeth best," is noticeable for two things, to wit,—a complete absence of attempt at ornamental planning, and a statement in the memorandum accompanying the design that a good bold effect has been sought in projections, whereas, in fact, the principal front is an almost unbroken plane.

"Ars et Labor" sends a well-designed and well-drawn scheme. The planning throughout is of a superior order,—the junction of the two blocks of building cleverly met, and the elevation, if of a somewhat obsolete character,—the principal order running through more than one story,—is stately.

"Ecce Signum" is the motto of another well-drawn design, the buildings covering the whole site. The elevation a reticent Anglo-Italian not out of keeping with the object.

"Central" employs a circular hall at the head of the axial line of his plan; the whole is arranged with much care and skill, and many of the interior effects would be charming. The style is a quiet French Renaissance with high roofs and dormers,—some too large and out of scale. Two carefully-drawn sheets of detail show this architect to be a competent designer,

whose work would be in every way of creditable quality.

"Octagon" has adopted a similar expedient with a difference. His public hall has a semi-circular end, and is approached through an irregular octagon. The style is French Renaissance, skillfully treated.

"Red Cross" sends an Italian Renaissance design, with an elaborate louvre surmounting a high-pitched roof, and, by way of showing how thoroughly he has "felt his part," he has given large-scale sections of Buchan's trap for intercepting the drainage of the building and venting the sewers.

"Semper Paratus" sends a Gothic design in which there are some good points, which suffer somewhat from a rather weak form of draughtsmanship. The entrances and staircase halls absorb an enormous proportion of the site. An alternative design is not quite so satisfactory.

"B's" design is remarkable for the unpromising plainness of the rearward buildings.

"Compact" enters his large hall through a canted end,—another instance of the ingenuity which this problem has called out. The elevation is late Tudor or Stuart, not ineffective, and which would probably look better in execution than upon paper.

"Faith."—A very florid Italian design, quite outside the prescribed sum, even if it were suitable, which it is not. What have mermaids and cherubs and winged horses and satyrs, and we know not what fabulous animals besides, to do with grave vestrymen? It is a lively design, certainly, but surely *mal à propos*.

"Montgomery's" plans are unfortunately separated from his elevations. It is a straightforward design with an artistic elevation.

"R.I.B.A." sends a Flemish Gothic design, with high roofs, double dormers, and angle spirelets, more satisfactory than the alternative design in attenuated Palladian.

"Utility" gives the cubic contents of his scheme, which would show a probable cost of 16,000.

"By Help of Square and Compasses" is the motto of a somewhat heavy Palladian design, not too pure in detail. No attempt at handsome planning has been made.

"Light and Air" is seen at a glance to be one of the best designs in the room; stately in plan and picturesque in elevation, and not too free Classic, well proportioned, and well drawn. The upper wings of the central block are a little lacking in interest, and if the interior of the hall is to be as has been designed, the Vestry must dip a little deeper into their pockets, we fear.

"Donnez-moi" is to be commended for the cheerful naïveté of his motto; a merit he shares with "Wisdom, Strength, and Beauty."

"Bee" has an enormous entrance-hall, which would not be altogether an advantage. No plan, however, could stand the weight of so indifferent an elevation. The speculating-builder variety of Queen Anne is, we take it, the lowest form of contemporary art.

"François I."—A remarkably palatial plan, full of striking interior effects, but too costly, we fear, for the purpose. The exterior is full of fancy, but is not quite equal in merit to the plan.

"Stet" accompanies his plans by very satisfactory and well-drawn elevations, French Renaissance in style.

"Let Fulham prosper" provides a well-drawn set of plans with the hall placed in the centre of the main frontage, and running at right angles thereto. The façade is elaborate, the rear building which it conceals quite mean. An alternative plan has a much superior elevation.

"Order."—A Georgian design in brick and stone, high tiled roofs, and dormers; the rear elevations in grey stock with red quoins, &c. The whole well proportioned and detailed, and, in our opinion, suited to the occasion. A quiet, honest structure, which really reflects the architecture of the day. It strikes the happy mean between meretricious display and sordid ugliness, and has the virtue of being consistently designed throughout,—a virtue nowadays rather rare.

"Ripley."—We can think of no single epithet which would describe this most original design. It is undoubtedly clever, although its appropriateness may well be doubted. A central lofty tower is crowned with battlements at the foot of a steep roof, and, lower down, is broken into semi-elliptical side turrets with a kind of machicolis arch between them,—a strange design, full of somewhat irrelevant merits.



"Suitability" might, perhaps, justify the motto as to plan, but we cannot admire the elevation, a Free Italian with terra-cotta or stone vases on parapets and Mac Farlane & Co. on the ridges.

"The Mikado" has inclined his rear building at an angle so great as to be parallel with the side of the ground, and has furnished a plan which, without being unduly extravagant, cannot prove not unsuitable. The elevations are in a French Renaissance with circular arc turrets and a large louvre on the highest roof. The whole is picturesquely and informally grouped.

"Sigma" gives an elliptical form to the entrance end of the large hall, which is a novel treatment, and sends elevations in a sort of aristocratic variety of the School Board manner, effective and not unsuitable for a parish building.

"Avis" sends a bold and original design, recalling certain French examples with a mixture of English Renaissance. Of the companion turrets closing the main façade, one is covered with a spirelet and the other has a flat roof, almost the only departure from a symmetrical scheme. The elevation has the advantage of clearly expressing the great hall, a very pleasing design.

"Experientia" is a clever Anglo-Dutch design, with an enormous central gable, broken into curves and volutes, and filled up with shallow pilasters and panels *à la mode*. There are reminiscences of Norman Shaw, Ernest George, and others about it, and it has many of the merits and all the defects of those artists.

"Red Star," a vigorous Gothic design, after the manner with which Mr. Brooks has familiarised us. The large hall is in this plan entered at the side.

"Beta" has an effectively-grouped French Renaissance design, though somewhat weak in detail.

"Argus."—Another Anglo-Dutch elevation in its way. The plan is a little extravagant in the matter of halls, &c.

"Wa la Galibilla Allah."—The gentleman who has chosen this astounding motto has not scrupled to give up the whole of the main frontage on the ground-floor to an entrance-hall and two side staircases.

"Ad Rem" makes one of the most ingenious attempts to overcome the break in the line of axis by the interposition of a curved slanted vestibule.

"Adelaide" has a large walled octagon hall on the first floor, which is only expressed below by slender iron columns.—a fault in construction which will be sure to tell against his chance of success.

The remaining plans are not mentioned separately because they do not possess special features, and not because they are without merit. It has, indeed, rarely been our duty to inspect a collection of designs in which the average level of merit has been so high, or the residue of indifferent work so small. It will be a difficult matter, all things considered, to award the palm; for the best designs will prove, we fear, too costly, and the designs which could be carried out for the stipulated sum will fail to please.

#### ENGLISH IMPRESSIONS OF AMERICAN ARCHITECTURE.\*

THAT we judge others by ourselves is true, perhaps, of architects as much as of any other class of men, and it is not an unnatural thing that the work of others should be measured by comparison with our own, as the latter, whatever its merit or otherwise, is probably the most familiar scale by which we can try the merits or demerits of other things, and hence I shall, to a large extent, compare America with our own country. In attempting to fairly judge American architecture at the present day, it is needful, perhaps even to a greater extent than with us, to consider the various phases through which it has passed, and a criticism which was written in 1853 strikes very close to the root of the matter. Speaking of an exhibition which was projected about the time of our 1851 Exhibition, and took place in New York in 1853, the criticism mentioned says:—

"America is a new country: the energies of its people have all been unceasingly directed to pro-

gress. It has had, therefore, the disadvantage consequent on all this, of a want of experience in the finer qualifications of art study, which belongs to the Old World and its older institutions. It is no discredit to our Transatlantic brethren that this is the case. They have had other things to do, and well have they done them! They have had a vast territory to reclaim from savage life, a vast government to organise, a vast commercial system to ripen to maturity. They have done this work so thoroughly and well that they have good reason to congratulate themselves and their country upon the position they hold in the world. Having effected all that commerce may require and prosperity achieve, the fine arts will doubtless obtain a greater share of attention, without which they cannot attain maturity. Such thoughtful works as we see in the Old World may be designed in the New, but not without the appliances and means to boot" which they have had from their cradle in Europe."

Again, the opinion expressed by a well-known architectural critic points to the same fact, but puts it, perhaps, less sympathetically, and looks with less clearness of foresight over the ten or twelve years which have passed since its publication. The words are:—

"An American has a great deal too much to do, and is always in too great a hurry to do it, ever to submit to the long patient study and discipline requisite to master any one style of architecture permanently. Still less is he likely to submit to that amount of self-negation which is indispensable if a man would attempt to be original. Why should he stop to design each detail to the place it is intended to occupy? Why should he try to proportion every part harmoniously, or to apply each ornament appropriately? Why submit to all this drudgery, when Classic pillars and Gothic pinnacles stuck on *ad libitum* get over all difficulties and satisfy himself and his employers? The perfection of art, in an American's eyes, would be attained by the invention of a self-working machine, which should produce plans of cities and designs for Gothic churches or Classic municipal buildings, at so much per foot super, and so save all trouble and thought."

We have here two opinions upon American art,—one is the hopeful view which now bids fair to be realised; the other is the somewhat cynical view of a great critic, who in his criticism rather overlooked, I think, the possibilities of the then immediate future.

Let us glance briefly at the historical aspect of the subject, noting first that we have now to deal, not with the Spanish types of architecture and of race which prevail in Mexico and South America, but only with the works of the Anglo-Saxon race which overran the Northern part of the Continent; in other words, we are concerned now with the United States, and, to limit it even more closely, it should be stated that at the present time, though to a diminished extent, the architectural work of the Eastern States or, near the Atlantic shows more merit than that inland —with the exception of such cities as Chicago, for instance, which, however, is comparatively far West. This comparison is to be noticed in artistic work rather than in construction, which is only natural, seeing that as national progress has gone forward each city further West has in turn had to fight with nature for a place and for prosperity.

The national elements, therefore, with which we have to do to-night are the Dutch and the English.

Prior to the year 1676, Spain had long overrun Mexico and Peru, and daring English fishermen had visited Newfoundland. At or about the year named, English adventurers attempted to colonise different portions north of Boston. An expedition sent by Sir Walter Raleigh named and partly explored Virginia, but the first permanent settlement under John Smith kept its foothold in Virginia from about 1606. Then in 1620 the historic *Mayflower* landed the pilgrim fathers in Plymouth, Mass. From this time matters at varying pace progressed steadily; rapid growth followed by the emigration of thousands of Puritans from Charles I.'s persecution in England. From these two centres the colonies grew and gradually touched. New York by the war with Holland passed with its Dutch colonists into English hands. Penn emigrated to Pennsylvania; other districts were opened up by other men, and gradually, partly by climatic influence, partly through custom (inherited from old English aristocratic families) and the influence of slavery, the South with Virginia separated in tastes and type from the North. The architectural elements (the Dutch element round New York and the English in other

parts) from the beginning each worked at first chiefly in the fashion prevalent in its old home, but had little time in the press and trial of securing its position to think of architectural developments. So it came to pass that, when firmly established, the new nation after the War of Independence (hindered, however, again by the war of North and South), gradually found time for artistic work, and after a period of artistic depression before the comparatively recent revivals worse perhaps than ours, bids fair now to have a place of its own in the architecture of the world, and that place by no means a humble one.

Taken as we take it here, the phrase "examples of old work" has but little meaning in America,—at all events, in an indigenous form. There was, we may safely assume, from what we know of history, a time in the early colony days, when good work was done in a quiet, homely way, which has a charm for those who appreciate in a building the simple expression of purpose. Dotted here and there, in a wide radius around Boston, particularly are many examples of work dating from that time. The forms current upon this side of the Atlantic at the time are found on the other, treated in a manner often quite its own. They show a close connexion, and a considerable unity of thought and feeling between the mother country and what was then her colony. In a recent number of an American monthly magazine we find the following:—

"There was a distant time when building as a fine art was in our country the rule and not merely the exception. While our fathers were colonists or very young republicans they built very well,—sometimes beautifully, and almost always honestly, intelligently, appropriately, and with a simplicity of aim and manner that was the very reverse of affectation or vulgarity. But the years which lie between their times and ours were dead indeed to art,—were characterised at first by a helpless sort of ignorance, and later on by crass vulgarity and barbarous display."

The outbreak of the War of Independence must have cut the tie that bound her art to ours, and left her to seek for guidance elsewhere. The result was a long period of blind groping after light leading up to the beginning of this century with its revival of Greek forms, followed by the various phases through which we ourselves have passed, the Gothic revival with its various ramifications, French, Venetian, &c., and even Queen Anne. In all these different fashions, however, there has always in American work been a more or less defined character.

The Gothic revival did not find the same enthusiastic reception among our brethren as it did here. Types less usual with us found most favour there, and were in some cases not so conscientiously carried out, or, shall I say, so thoroughly understood as with us. The Queen Anne work, there shown in fewer examples, and those of a less eccentric type, follows suit. In fact, what a recent writer says of the Queen Anne work there applies equally well to all the fashions (perhaps it is an uncharitable word) which had their origin here and their repetition there.

The words used are these:—

"All these successive phases in English work were imitated here in more or less faithful and more or less successful ways. As to the Greek fashion, it reigned for a time as wholly as it did in England, though with variations due to our lesser wealth and our different materials. The Gothic movement, however, was not quite so cordially endorsed on this side of the water as upon the other. English Gothic forms found little favour except for ecclesiastical and collegiate work."

The French influence which I have already mentioned is also a noticeable feature in their work, much of the French verve and refinement of manner crops out in the detail of their buildings, and coupled with the sturdy directness, so to speak, of the English feeling, has produced a result which is in many cases an advance upon the characteristics of both the constituent elements.

That better technical education means better architecture is a truism for which it would be necessary to apologise, were it not that I think we have something to learn from the Americans in this direction, and a few words on this may not be out of place.

Here in England, though we have much to be proud of in our modern architecture, it is very possible that, unless we pay more attention to this point, our architectural brethren on the other side of the Atlantic may outrun us,

\* "History of the Modern Styles of Architecture," p. 469.

\* A paper read before the Leeds and Yorkshire Architectural Society on the 23rd of November, 1885, by Mr. A. J. Gale, A.R.B.A., first holder of the Godwin Bursary.



notwithstanding our European advantages of study.

I believe I am correct in stating that the system of pupillage is practically unknown as we have it here. Young men *there*, taking the average architectural beginner, as to length of pocket and social standing, have, up to the point of their entering the profession, a wider education and one more complete, though perhaps not of better quality were it as short as ours.

They more often go to college, and are at the end of even a somewhat short college course better able to appreciate what is put before them as architectural pabulum than if coming straight from school.

Architects in America are much indebted to Professor Ware, now of New York (late of Boston), for the unceasing interest he has taken in professional education, to which he has of recent years, as Professor, first at the Massachusetts Institute of Technology in Boston, and latterly at Columbia College, New York, contributed largely.

Young men, after spending a year or two in an office subsequently to their college career, or some such preparation between school and office, have in many cases spent periods varying from six months to two years or more at one of the institutions named above.

The range of subjects taught is considerable, and I have gathered from conversation with both professor and students that it is efficient, and appreciated when its results are used in actual work.

There is much advantage in a course of education which provides, first, on entering the profession, better general knowledge than that of the average school-boy; secondly, some experience of an office before theory undiluted with practice is attacked; and thirdly, an architectural collegiate course, just at the time when its practical bearings can best be appreciated.

The above may be taken as fairly typical of the student whose education does not include, at all events till much later on, a visit to that goal of American students of all kinds, Europe, with its Old-World knowledge, and its artistic wealth of all ages.

Professor Ware's efforts have been mainly directed to bringing to the American students,—to their very doors, as it were,—the information and atmosphere of thought of the Old World. To this end he has twice at intervals spent a considerable time in Europe, travelling both in the North and South, and obtaining books, casts, drawings, and other helps to study.

The result of this and of a careful investigation of methods prevailing in professional study, here and elsewhere, has been the building up, first in Boston and now in New York, of schools which give a capital education at no very great cost, and one to which the student can, and indeed must, devote his daytime rather than simply his spare evening time.

The payment of value for work done in all grades of the scale of assistants enables many to lay by the necessary funds for a shorter or longer architectural college course; and thus if he cannot afford to leave his own country, a student may at all events approach very near to making up the deficiency.

Travelling studentships are, if not very numerous, at all events well worth holding, and, without attempting to give a list, the Rotch Studentship for European travel is intended to assist students to study for two years in Europe. The conditions are liberal, the examination by which it is obtained a real test, and the benefit certainly very great.

The comparatively large number of men who come to Paris to study at the Ecole des Beaux Arts shows the estimation in which European study is held, and it shows also the fact that, as between England and France, the latter is chosen because of its facilities for a systematic course of study, such as we cannot boast of here. South Kensington's elaborate machinery does not seem to meet the case, and other systems are conspicuous by their absence. It surely is not because we do not need something of the kind.

Put briefly, in both nations there is no lack of energy, as well as talent, but the American, we may surely say, has found out that something more is required than apprenticeship to a good office for three, four, or five years after leaving school, even though this be supplemented by a vigorous course of evening study, private or associated with others.

Even in the matter of a visit to Italy, to take

one country as an example, the study of the works of the ancients is, in proportion to their numbers and accessibility, far more general among American architects than it is with us, near as we are.

Turning, for a general view of American work, to the cities, as more indicative of a nation's architecture than the lesser towns, a peculiarity very noticeable to an Englishman's eye is found in the prevalence of rectangular setting out of the streets.

I do not think this to be so greatly a disadvantage, even from an *extreme* artistic point of view (if we may so speak), as is frequently urged; indeed, only the other day a letter appeared in a professional journal, deprecating the abolition of the straight symmetrical rectilinear completeness of one of our main London streets, on the ground of the loss in impressiveness which results. Perhaps it may

dom of touch which will overcome the bareness of a too rigid symmetry, are by no means small.

Passing in review the more prominent of those cities which I visited, it will be seen from an inspection of the plans which are exhibited that New York, Philadelphia, Baltimore, and Washington and Chicago are chiefly planned upon the rectangular principle.

Boston is chiefly planned or rather has grown up on the opposite method.

The order in which I have named them is that in which they were visited, and, I am inclined to think, that had there been (from rectangularity) in the buildings of the former so great an absence of architectural fitness and suitability as seems to be sometimes thought it must have struck the eye of even a very casual observer, when followed by a visit to Boston.

"THE BERKSHIRE"  
NEW YORK CITY  
CARL PERFFER ARCHT



A New York Street House.

be urged that there are fashions, even in fundamental laws of taste, such as this, and there is much to support the view that in a Renaissance-loving epoch, such as we live in now, symmetrical balanced groupings are likely to prevail. Yet it may surely be maintained that, even in general effect of grouping, there is much to recommend a plan, rectangular in its general distribution of main lines, broken up suitably, let us say, at corners, with forms calculated to afford relief to the bareness of straight lines.

My own observation, in America, the home of this system, leads me to say this, and to venture the opinion that with due regard to the balance and breaking up of masses, street architecture should not, and, properly treated, does not, suffer in effect by being placed in such circumstances. The gain in convenience of plan is great, and the opportunity of treating a building, in its masses as well as general detail, with a free-

On the contrary one of the chief points that struck me in Boston was the difficulty with which a building could be appreciated, owing partly to the narrowness of many of the streets and even more to the crookedness of them.

Another point which impressed me while on this question may be noticed. A glance at the plans of the cities referred to will show that, putting Boston aside as almost entirely an irregular-shaped city, the remainder have all some point or points at which a main thoroughfare cuts diagonally across streets otherwise regular in plan. It is to my mind precisely at these points that American street architecture appears at a disadvantage, while I can call to mind numerous instances in which a good use of rectangular surroundings has resulted in a pleasing effect.

In New York, Broadway cuts diagonally across the city, and in Philadelphia, Baltimore, and Chicago similar instances occur. Washington



is a law unto itself, and in addition to several diagonal streets, all planned with a certain adherence to symmetry of effect, it has an almost unique effect in the converging lines of its fine avenues all meeting at the capital.

It is to be remembered in judging this question that architecture in its highest sense hardly means mere prettiness, that picturesque detail while infinitely precious in some of the most charming works of antiquity, is a good servant but a bad master, and that some of our most successful buildings, viewed from an artistic standpoint, are those which, in spite of their symmetry (to use a too common phrase) command our respect and admiration.

As the Continental critic, Carl Vosmaer, says in his novel, "The Amazon,"—

"If the eye is sufficiently trained and cultivated to be open to things not merely pleasing; if we acknowledge that the beauty of architecture does not by any means consist in the accessories, in profusion of ornament, in the childish toywork of fantastic moulding and carving, but in the proportion of great and small, of principal and subordinate forms, of straight and curved, of horizontal and vertical lines; if, in short, we know that it is mathematics become poetry, then alone can we possess a true feeling for architecture,—then alone we learn to delight in it."

The general aspect of the cities is, when weighed in the architectural balance, found wanting in effect when compared with ours. There is, however, more open space, as a rule, and more fair play is given to their buildings in the way of a chance to be seen. As a rule, more restraint characterises American city buildings, a restraint which, a few years ago, often expressed itself, it must be admitted, in very ugly forms, and frequently does so still. Compare, however, the majority of our works with the majority of theirs, and it will soon be seen that both have much that can be improved, and that it is the few that are really works of art and not the many.

American work is, moreover, much helped by the tastefulness in general grouping which distinguishes the public monuments. There is a general attention to grouping in these which stamps them at once as the result of thoughtful work. The only work of the kind which I have seen to compare favourably with them is that of some French monuments, and I think there can be little doubt that this good feature is the result of the influence, not, I fear, of England, but of France. American sculpture is and has been, as is frequently noticed, carving out for itself a peculiar path of its own, and the quality above referred to is closely allied to the forcible nervous work seen in their sculpture.

One of the finest pieces of what may be called perhaps monumental grouping is to be seen in the new Public Buildings in Philadelphia, situated as they are at the junction of four wide streets in the centre of a large open square. These squares abound in the cities, and they are generally well planted with trees, and form pleasing features.

There is no doubt that while paying the just tribute of praise to American architectural talent, as it at present stands exemplified in recent buildings, one must admit the poor character of much of the work still standing, and in some cases still being built, and the effect of the streets in some cities is much impoverished thereby.

While a great deal of attention has been paid to the massing and grouping of recent buildings, and some notable examples have been erected within the last few years, the same care has also in the best recent work been devoted to the detail, and much work has been done of a very interesting character, both of Gothic and Classic feeling, yet with a character of its own in each case.

It has been customary to call the Americans a utilitarian people, a nation too busy to think of art; the first they certainly are, the second they are not in any marked degree.

I may say at once that for architectural thoroughness in all departments the Americans seem decidedly our equals in most points, our inferiors in few, and in some our superiors.

The wave of what may be called "Art in the Home," for want of a better name,—that fondness for carrying art touchings in more or less perverted forms into our houses which has come upon us during recent years as a people, even more than on neighbouring nations, and of which the origin may be traced back through South Kensington teachings to the 1851 Exhibition,—has touched America very largely. It seems to be admitted also there that in matters of

every-day life as well as in those with an artistic bearing the influence of French examples has now somewhat diminished, and that English inspirations and ideas are taking their place, or perhaps one ought rather to say are being grafted upon the old stock.

The result is a combination of many of the good qualities of the national characteristics of both in recent detail and in general design.

Utilitarianism most undoubtedly the Americans are, but recently it is more often than not a union of the useful with the artistic. I presume, because their clients require a spur of no mean power.

As implied by the word "utilitarian," we chiefly find extreme examples of this quality in cases where interest, pecuniary or otherwise, prompts to a very careful attention to the fitness of a building for its purpose: this occurs mostly in towns where the pressure of business makes the smallest items of importance. In the country places a little more attention to artistic effect is allowed often to be accompanied by slight laxity in regard to utility.

The Americans are, perhaps, above all things looked upon by those whose knowledge of them has been gained by contact in that sphere, as a nation of prompt, keen, business-like men. What wonder, then, in the development of their country from a wilderness to one of the most complicated social systems in existence (a development accomplished, too, with unexampled rapidity), they should have grown careful and attentive to all the niceties of fitness for purpose in a building.

In the past,—that is, until their buildings began to improve in taste,—all this utility was accompanied by a vast amount of *gaucherie* in design and detail, but in most modern instances this has now given way to a keen artistic sense of the fitness of things; and while, on the one hand, the usefulness and fitness of their buildings has increased, at even a greater speed has their artistic expression increased, on the other hand.

Turning our glance to our own land, I doubt if we can say quite the same of ourselves. Granting that our artistic perception and expression have increased concurrently with theirs, can we say that our ability to meet given requirements is as great as theirs? In this comparison, as in others which I have drawn, or may draw, I refer rather to works a little superior to the average (by which, after all, a nation must be judged), than to the mediocre or to the most celebrated examples.

One or two examples of the attention paid to convenience may be worth noting. *Lifts or elevators* are very carefully considered in all the newer buildings in the chief cities; New York and Chicago are pre-eminent in this respect. All the large office buildings, apartment-houses (or houses in flats), and hotels are fitted with one, two, three, four, or even more elevators. In these buildings, particularly the office buildings, large numbers of people in continuous streams pass in and out to all floors the whole day long, and with a view to assist this traffic to upper floors, several elevators are required. Some run express to particular floors, others are on the principle of stopping trains, so that staircases are little used; but the top floors fetch rents as good as or better than the lower ones.

Systematic heating of the large buildings above mentioned is almost universal, and included in the tenant's rent, being worked from the central heating furnaces. Fittings generally are very carefully worked out, and anything found to cause the slightest trouble is revised and improved in the next building put up, and even if found to work well it is almost certain soon to be left behind by some new improvement.

The apartment houses, or houses in flats, most of which are of recent date, are designed upon principles which give the utmost economy of space and labour (the latter always a difficulty with houses in flats) and the greatest convenience, and much luxury is noticeable throughout the upper classes of the chief centres of population.

The building materials available in the United States are, of course, more diversified than those we have in England, owing to the vast network of railways which enables materials to run from one end of the Union to the other without transshipment.

Bricks, in great variety and of excellent quality, are obtainable. Stone of many kinds, suitable for delicate ornamental and carved work, or for coursed rubble, which latter has been

used with good effect in many buildings near and far from Boston, as a centre, by Mr. H. H. Richardson; marble of good colour, tiles, slates, iron, and terra-cotta particularly, which has become, from small beginnings, quite an extensive industry in America, particularly in the construction of fireproof floors by hollow arch blocks on iron girders, and in other ways. Iron is also largely used in forms which frequently show questionable taste in detail, for the fronts of buildings,—in many cases for towers and mansard roofs, and frequently for internal door-lings and staircase-finishings, particularly in public buildings.

Painted tin, copper, brick, tar pavement, and other materials are used for roofs, both flat and of other shapes.

Many constructive subjects are, of necessity, omitted from this paper, and subjects such as plumbing, drainage, ventilation, warming, hospitals, more detailed notes of Government buildings, of houses in flats, and other particulars, of some of which drawings or diagrams are upon the screens. Any one anxious to get a clear insight into the views of Americans as to their own architectural history and present position cannot do better than read the articles which have appeared from time to time in the *Century Magazine* during the past few years.

[The lecture was illustrated by drawings and lantern transparencies.]

### THE CHURCHES OF WISBY IN GOTLAND.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE third ordinary meeting of the Institute for the present session was held on Monday evening last, Mr. Ewan Christian (President) in the chair.

The President announced that it was the intention of the Council on Monday, the 1st of February next, to nominate a gentleman to be recommended to the Queen as the Royal Gold Medallist for 1886. Any member desirous of making a suggestion thereon should do so on or before the last day of this month.

Mr. William White, F.S.A., then read a paper entitled "A Week at Wisby in Gotland." The visit, he said, had been a pleasant surprise to him, as he had no idea of finding in Gotland so good a field for the study of Gothic architecture, and so many interesting Medieval remains. The island is eighty miles in length by twenty-five miles in breadth, and is studded with numerous villages, but in Wisby,—the capital of the island,—he found enough to interest him without stirring outside the town.

The general appearance of Wisby is remarkably quaint and picturesque, rising on a steep slope from the sea, and being surrounded by a continuous stone wall, its line broken by bastions, gateways, and towers at short intervals, except on the side towards the water. There was little about the construction or detail to denote the date of the walls, which were said to have been built at the end of the thirteenth century, on the site of still earlier walls, but there was evidence of their being thickened and raised subsequently to their first erection. The walls were in a good state of preservation, and, although they could not compete in magnitude or character with those of ancient Chester, yet the whole was remarkably complete. No passage-way was left on the top of the wall behind the parapet, but a wooden gallery was projected inside for defensive purposes. The towers were square in form and open on the side towards the town; several were saddle towers, being corbelled out on the wall equally on each side. Wisby, which now had a population of only 4,000, had probably as many as 20,000 inhabitants in the Middle Ages, and the churches were, doubtless, constructed by its wealthy merchants. There was now a singular sense of desertion and quiet in its irregular and roughly-paved streets, and the chief interest of the place centered in its churches, of which only ten remained, all of them being ruinous with the exception of St. Maria, which survived as the Cathedral Church. Mr. White exhibited some sketches and plans by Sir Henry Dryden and himself, and drew attention to the fact that these churches had been planned on a somewhat imposing scale. St. Gertrude, called the Church of the Netherlands Merchants, was built about 1167; it appeared to have been a simple chapel, 61 ft. in length by 19 ft. in breadth, the side walls being nearly 4 ft. thick. Of the church of St. Olof little more than a bit of the tower and



the base of a pillar remained. It had a fine western portal, and, as in the case of the other churches, staircases were carried up in the thickness of the walls in a direct line from doorways in the nave. The first bay of the nave was narrow, and the tower was vaulted with undressed stones. The Church of St. Clemens consisted of a nave of three bays with aisles, a chancel of two bays, a transept aisle on the south-west, and a western tower 26 ft. by 25 ft. inside, with walls 8 ft. 8 in. thick. The interior dimensions of the nave within the walls were 58 ft. by 54 ft.,—the proportions of a moderately-sized English parish church,—while its whole interior length was 145 ft. 9 in. The Church of the Helige-Ande, or Holy Ghost, was the Hospital Church. Its form was that of an octagon of 48 ft. by 45 ft. diameter, somewhat irregular in its setting out; the chancel being a little longer than square. This church had an upper and a lower nave, both commanding a view of the high altar. St. Nicholas's, the church of the Dominicans, was of considerable dimensions and vast proportions; the pillars rose to a height of upwards of 30 ft., and the central vaulting was lofty. This church was 64 ft. in breadth and 170 ft. in length, exclusive of 25 ft. or 30 ft. for the apsidal termination of the chancel; the walls being 4 ft. 11 in. thick. St. Katarina's, the church of the Franciscans or Grey Monks, was originally of the Romanesque period, remodelled into the Pointed, many indications of the earlier style still existing in blocked windows and fragments of detail. In the nave the lines of pillars were far from straight; the general width of the nave was about 23 ft., and that of the aisles from 12 ft. to 13 ft. The Dom Kircha, or Cathedral of St. Maria, was built by the Lubeck merchants. Its interior effect could hardly be considered interesting or attractive, a prevailing coat of whitewash covering it, and being fitted with cumbersome pews and doors with large locks. The pulpit was spacious, and had an elaborate staircase. There was also an hour-glass with silver settings, besides subsidiary glasses for the half-hours and quarters on the same frame, so as all to turn at once. The building consisted of a nave and continuous chancel each of three bays of 31 ft., of the same height and general treatment, and there was an additional narrow bay next the large central western tower. There was also a chapel of three bays against the three western bays of the south aisle; this was a good model of the Pointed style, and now served as a vestibule to the cathedral. Mr. White explained at some length the details of this building, stating that it was a great puzzle if compared with the Romanesque or Norman work of our own country. Its character was distinctly equivalent to that of our own work a century earlier. Fergusson spoke of its erection as dating about the year 1100, of its being burned down in 1175, and rebuilt in 1225, but in this case they should conclude that the whole was rebuilt, but that it was only so far reconstructed as to change its appearance and character externally. The Church of St. Lawrence was said to date from 1040. It might be termed cruciform in plan, having a square nave, with small aisles at the four angles. Including the aisles the nave measured 50 ft. by 45 ft., while in the north-west wall was a singular recess or chamber, 12 ft. long by 3 ft. wide. The contiguous Church of St. Drotten formed nearly a square. The arches carrying the vaulting were Pointed; the apse was of a rude and early character about the windows and the corbel-table. The last church described was that of St. Hans, styled by Baedeker an insignificant ruin. It certainly was a ruin, but at the same time it was that of perhaps the most significant of these churches, and enough remained to tell of the grandeur of the first building and its re-construction. Was it insignificant to have the west wall of the nave 3 ft. 3 in. thick, with a window-jamb 23 ft. high? Was it nothing to have moulded corbels, admirably treated in proportion, with a projection of nearly 20 in. to carry ribs for a nave with a span of 43 ft.? The real insignificance must be in the eye which, in the absence of the complete building, was unable to grasp the indications of grandeur so clearly displayed by the fragments now remaining. According to our mode of computation, this work should date about 1100 or 1200, with an earlier church of the eleventh century. The remains were not many, but they were large and massive, and of an interesting character. Mr. White, next quoted from Laing's

"Tour in Sweden," published in 1839, in which Wisby was mentioned as "the Rome of modern architects who would deal in Gothic." The lecturer then summed up the characteristics of the buildings he had been describing. There was great thickness of wall, and numerous intramural staircases, with easy access to upper stories and roofs, and in several of the churches were dual staircases, apparently one for ascent and the other for descent. There were evidences of dignity, grandeur, and artistic finish. The walls were mostly rough, but with substantial stone quoins and dressings, and importance was given by a dignified and handsome entrance doorway. Great simplicity of treatment had generally been followed, though with carefully-considered detail in the more important parts. Then there was the peculiar double-splay in the windows, which had been handed down through the Romanesque and Pointed periods alike. The material generally was a hard limestone, or a coarse description of marble, varying in quality and irregular in appearance. Some of the stone consisted of a conglomerate of pebbles and broken pieces. In the work equivalent to our Norman, there was the same finely-dressed and squared masonry. Among the peculiarities of detail was the splay of the windows, outside as well as inside. In the middle of the wall, between the splay, was built up a slab of marble, forming the jamb to the tracery. The wonderful preservation of the ruins for so many centuries must be attributed to the fact that the churches were vaulted. Many of the vaults had fallen, but the substantial walls required in the first instance to carry them had resisted the storms and frosts of successive winters. No walls had been pushed out by rotting beams; on the other hand, some had suffered from the want of proper abutments to the arches. There was nothing to indicate the nature of the watershed, but it probably consisted of shingles. Mr. White concluded by saying that he could not remember a week spent with more interest in art research except in Rome and Florence, and he might endorse the quotation he had already given that Wisby was the Rome of the modern architect who would deal in Gothic.

The President, in inviting discussion, thought Mr. White had shown conclusively how to enjoy a holiday to the best advantage. A communication had been sent in by Mr. Carpenter on the same subject, but time did not permit of its being read that evening. He would call upon Mr. Haig, a well-known authority on Swedish antiquities, for a few remarks.

Mr. A. H. Haig expressed his admiration at the amount of work which had been got through by Mr. White in so short a time. The architecture of Wisby was certainly very rude, but it was extremely instructive, and therefore well worth studying. There were four towers on the city wall towards the sea; one was a semicircular tower of strong construction standing at the north-western corner of the wall towards the shore, while there was another about 150 yards from it, called the Maiden Tower, which was very interesting. The walls were constructed in two periods. The first part was built about 1280 by peasants employed by the citizens, but was found to be too low, and another portion was built inside. There were four gates to the town walls, which were about 80 ft. high, and, in some parts, 8 ft. thick. It was necessary to be cautious in accepting the dates given by the chroniclers. For instance, when it appeared from these that a church now existing was built in 1050, it might be set down as being a century later in date, because it was known that Christianity was only introduced into Gotland in 1023, by Olaf the Saint. As the first churches were no doubt of wood, and lasted probably about 100 years, the stone churches could not have been known before the beginning of the twelfth century. Many conjectures have been made as to the reason for making Helig-Ande a double church, but the most probable solution was that this particular part of the town was much crowded before 1450, and it was therefore necessary to build the church in two stories. St. Maria, now used as the parish church, was a building of many dates, commencing with 1225, the chapel being an interesting work of Late Pointed character. There were some ninety churches altogether in the island, all of which were more or less interesting. They were generally small, some being divided into a nave and two aisles, while others were divided into two aisles with a row of columns down

the middle. These churches were mostly square in plan, the walls being pierced on the south side, as the north side was usually the coldest, and was utilised for decoration. Indeed, in many of these old churches a great deal of wall-painting remained under the whitewash. The towers were, as a rule, too high in proportion to the churches; they were used for defence, and only in later periods were they of a different character. Towards the end of the fourteenth century it was found that many of the churches were too small, and then the old chancel was pulled down and a large one commenced. The means, however, did not readily come in, and they were obliged to stop at the chancel. The churches, therefore, presented the curious appearance of having naves greatly lower than the new chancels. The architecture, as a rule, was made, and it would be wrong to say that it had gone before the architecture of similar styles in other countries. It must have been carried there from other lands, and was of later date than buildings of corresponding style found elsewhere.

Mr. Alexander Payne drew attention to what he regarded as the very remarkable plan of the Church of St. Lawrence, which was very similar to that of a Greek cross. In Athens and Byzantium dozens of churches of a similar plan were to be met with. Could there have been any connexion between Gotland and Greece?

Mr. Aston Webb proposed a vote of thanks to Mr. White. He had noticed that, in many of the plans exhibited on the screen, the chancel was wider than the nave, while the priests' door in the chancel seemed to be rather far west.

Mr. Charles Fowler, in seconding the vote of thanks, observed that there was a church of St. Nicholas in almost every town of Northern Europe. Along the Rhine were to be found a number of picturesque churches which might be termed Romanesque, and which might at a first glance be put down as of the same date; but they were really of the same date as our Early Pointed churches. This might easily be the case in a place so far north as Gotland, and would doubtless partly explain the style; its being started later, and its continuing longer.

The vote of thanks was then put, and was cordially received.

Mr. White replied, adding that he hoped some day to visit the country churches of Gotland. In reply to Mr. Payne's question, he said he had been told that there was some likeness in the design of the Greek and the ancient Swedish ships. The Phoenicians had spread over the whole of the old world, and as the Greeks were also a maritime power, they might possibly have taken their ideas along with them. The cruciform plan referred to was apparently Byzantine in its origin, but as the two larger pillars at one side partly carried the tower, there would not be room for a cupola to come over the centre of the church, in the same way as if the western portion were lower. He had purposely refrained from going into the question of bisected naves, but examples of these were to be found in England. A small village church in Hampshire, for example, had a bisected nave, but he believed it was a mere matter of construction,—opening the chancel more fully to the whole body of the worshippers, than if the pillars were on the two sides.

Before the meeting closed, the President submitted a communication from Mr. Wyatt Papworth, asking whether the Institute intended to consider the subject of the rebuilding of the premises at the east end of St. Paul's Churchyard, which to his mind was more important than the opening up of Whitehall and the Mall. Mr. Papworth drew attention to a letter from Mr. Penrose which had appeared in the *Times*, and he enclosed a block plan of the locality. The whole block he considered should be taken down, not only for facilitating the traffic, but for insuring the safety of the cathedral. The President, in submitting this communication, invited the opinion of the members present upon the subject. It would be a great advantage if the whole block could be removed, thus opening up the eastern end of St. Paul's, but it was very doubtful whether the Institute could do anything in the matter. Mr. Penrose alluded specially to the danger to the cathedral from the erection of a lofty building at its eastern end.

Mr. Edward Woodthorpe thought that if they could not get the whole building thrown back,



they might at least move for a limitation of the height of the buildings and the depth of basement. As to getting the ground, he believed that was impossible; as the Government had done nothing in public improvements, it was perfectly useless to apply to the City Companies. While foreign Governments moved in these matters, ours would do nothing, and it was the duty of this Institute to show how incapable the Government was in regard to improving the public taste.

Professor Kerr considered that the Institute was bound in duty to take up this subject in some shape or other. When the Institute's Departmental Committees were established, it would be the function of one of those committees to deal with such matters. In the meantime, however, the Council, in conjunction with a few gentlemen acquainted with the subject, might draw up a report, which should be made public. If it had no practical effect, it would at least open the eyes of the public to the views of the profession.

Mr. l'Anson agreed with Professor Kerr that the matter should be left to the Council, who would certainly do their best to call public attention to it.

It was unanimously agreed in the end to leave the matter in the hands of the Council.

The meeting was then adjourned to the 18th of January, when a business meeting will be held.

#### SHERBORNE ABBEY CHURCH.

THE restoration of the tower, now completed, brings to a close a work which was commenced thirty-five years ago, when, under the late Mr. R. C. Carpenter, the nave and aisles, with the transepts, were restored at a large cost. The late Earl Digby was a large contributor. After Earl Digby's death, his successor, Mr. G. D. Wingfield Digby, took in hand, at his own cost, the restoration of the magnificent choir, under the late Mr. W. Slater. It involved the re-construction of the fan groining, and included reredos, stalls, and stained glass in all the great windows. The Norman piers of Bishop Rogers's date were built in the "sham" way in which those of Peterborough and Chichester were found to have been built, and were in such a state that Mr. R. C. Carpenter, in 1853, after erecting a great timber centre and supports, took out, piece by piece, the whole of the earlier piers, replacing the shell and rubbish with hard Ham stone masonry. He also repaired the western piers. When, therefore, in 1883, it was determined to restore the upper part of the tower, the architect, Mr. R. Herbert Carpenter and Mr. B. Ingelow, found that they had good solid legs on which to work; the western and eastern arches had, however, sunk very much, causing great fissures, and the walls of the belfry-stage inclined to the east, under the pressure of the great "Wolsey" bell. Prof. Wilkins, in 1828, had reported on the tower, and afterwards his suggestions, in principle, were carried out by introducing great timber supports under the bell-beams, to throw their weight on the northern and southern walls.

In 1883 a scaffolding was erected, and Mr. Carpenter marked each stone of the tower which was to be renewed or repaired. It was found necessary to construct a strong brick arch, resting on the solid piers and tied by iron, to carry the east wall, which was taken down and rebuilt,—the Norman work being replaced. A somewhat similar treatment was necessary to the west wall. The parapet is new, and the pinnacles, long lost, have been reproduced on their old bases.

All new masonry is in the hardest bed of Ham Hill stone, the decay of the tower being due to some extent to the use of inferior local stone. The builder is Mr. Bolton, of Sherborne; and the clerk of works is Mr. Smith. The tower and its pinnacles are now protected by a system of lightning conductors by Messrs. Sanderson & Co.

The bells have been re-hung in a new oak frame by Messrs. Warner & Sons, using Goslin's patent, and the Wolsey tenor bell can now be rung by one man instead of requiring three men as before. A few days ago, for the first time in their history, a "grand sire triple" was rung by the "College Youths," and the bells were "fired," so as to test in every way the stability of the new work.

The church itself is now completed, but it is possible that ere long the beautiful Early English Lady-chapel may be rebuilt. One of

its bays is still preserved entire in a house, with its old painting, carving, and gilding, and also the chantry chapels added as aisles in the fifteenth century. Further works are in contemplation for the King's Schools, including a restoration of part of the great Gate-house of the Abbey, formerly a three-storied building in the type of the "Ely Porta" of the Ely Monastery, and also the repair of the original schoolroom of Edward VI., now the dining-hall of the "school-house."

#### AWARD OF MEDALS AND PRIZES AT THE ROYAL ACADEMY.

THE following awards for Painting and Sculpture were made on Thursday evening, the 10th inst.:—Historical painting, subject "A Scene from Hamlet," Gold Medal and Travelling Studentship, H. B. Fisher (the grave scene); Turner Gold Medal and Scholarship, subject "The Mountain of Clouds," from the "Arabian Nights," C. A. Wilkinson; Croswick Prize, subject "A Stagnant Pool," Miss M. Taylor; Armitage Prize, subject "Joseph discovering Himself to his Brethren," Bronze Medal and 30l., W. H. Margeson; 10l. premium, S. Paget.\* Painting of a figure from the life, First, Silver Medal, W. Dickson; Second, Silver Medal, P. F. Bell. Painting of a head from the life, First, Silver Medal, A. J. Foster; Second, Silver Medal, A. T. Nowell. Copy of an oil painting, subject "Portrait of the Painter, by Sir Joshua Reynolds," First, Silver Medal, S. G. Enderby; Second, Silver Medal, not awarded. Design for decoration, subject "Peace and Plenty," R. A. Bell. Drawing of a head from the life, First, Silver Medal, Miss A. Sheriff; Second, Silver Medal, Miss B. M. Latham. Set of three drawings from the life, First, Silver Medal, Miss B. M. Latham. Set of three drawings from the life, First prize, G. Hutchinson; Second, H. Copping; Third, C. W. Bartlett; Fourth, G. S. Knowles. Drawing of a statue or group, Miss H. Coombe. Perspective drawing, Silver Medal, E. A. T. Scott. Cartoon of a draped figure, subject "Grief," Silver Medal and Prize, Miss M. A. H. Simpson. Prize for a line engraving, no competition. Gold Medal and Travelling Studentship in Sculpture, subject "Cain the Outcast," F. W. Pomeroy. Set of two models of a figure from the life, First prize, A. G. Walker; Second, W. G. John. Model of a design in the round, subject "Mercy pleading for the Vanquished," First prize, W. E. R. Stephens; Second, A. G. Walker. Model of a statue or group, subject "Charity"; on the reverse, "Clothing the Naked," John Rhind. Design for a medal, Silver Medal, not awarded.

The Awards for Architecture were given in our last, p. 846.

#### WEST LONDON SCHOOL OF ART.

THE annual presentation of prizes to the students of this Institution took place on Wednesday evening last at the Steinway Hall, Lower Seymour-street, when, as on former occasions, a number of the best productions of the students were exhibited.

Mr. George A. Thrupp, who presided, expressed gratification with the past year's work, the good attendance of the pupils, and the great benefit they had derived under the able instruction of their new head-master, Mr. George G. Simpson, whom he called upon to read his report, which stated that during the past year 427 students attended the school, showing a slight increase on the number attending during the previous year. The fees amounted to 951l. 1s. 9d., being 67l. 8s. 5d. in excess of the amount received during the preceding twelve months. The claim of the school upon the Government for the grant on results was 457l. 7s. 3d., being slightly less than in 1884. The Travelling Studentship of the value of 50l., offered to the West London School by Mr. List, through the Painters' Company, was this year awarded to Edward Ingram Taylor. The trustees of a fund provided by the Owen Jones Memorial Committee, for the encouragement of decorative art, offer six prizes annually for the six best designs in furniture, decoration, &c. Each prize consists of a bound copy of Owen Jones' "Principles of Design," and the Bronze Medal of the Society of Arts. Two prizes out of the six were awarded to students of this school.

Sir Philip Cunliffe Owen, in addressing the

\* Disqualified on account of having received the same reward previously.

company, expressed the gratification it afforded him to be able to say that now the West London School, which had always striven to maintain its efficiency, stood very nearly foremost amongst kindred institutions in the metropolis. It was of the utmost importance that England should not only maintain, but should strenuously endeavour to increase and strengthen, her hold upon the commerce of the world, and this would best be accomplished through her schools of art. It used to be the common expression, "They do things better in France"; perhaps that was true many years since, but he had visited that country on various occasions in recent years, and thought that we in England did things just as well,—even somewhat better in the present day than our Continental friends. The idea had long prevailed that if we wanted really good artistic designs, we must go abroad for them. It was not so in the present day, and if only our young people would be sufficiently patriotic to attend schools of art we need not fear foreign competition. We should never have obtained the leading position we now occupy but for the enthusiasm which the flower of the nation had evinced, and we could not maintain our present eminence either in arts or manufactures unless these institutions were adequately attended by young men and women who took a lively interest in their studies. He would like to see guilds established like those in France, where masters, foremen, and workmen met together for the purpose of deciding how they could best promote and further the interests of their respective trades. Since the Exhibition of 1878 these Parisian guilds had been duly recognised by the Government; there had been juries appointed, who examined the various classes of manufactures, but only one report, he regretted, had hitherto been published, and that was unanimously in favour of an English firm. South Kensington had a precious collection, valued at two millions sterling, which adequately contributed to twenty-five or thirty exhibitions annually throughout the country, and he hoped that ere many years had passed every municipality throughout the kingdom, through the encouragement thus afforded it, would foster the arts and manufactures by having an institution of its own.

Sir Philip then distributed the prizes, the most successful students being warmly applauded. Among the prize-winners we may name Edward Ingram Taylor, who took the Gold Medal for his design for the interior decoration of a building; Edgar H. Turner, who took a Silver Medal for his design for the decoration of a frieze; Agnes W. Guest, to whom was awarded a Bronze Medal for designs for wall-tiles; Herbert G. Cane, who took a Queen's Prize for a design for a wrought-iron lamp and bracket; Florence E. Hannam, two Queen's Prizes, for designs for tiles and a design for a plate; and Janet Hayley, Queen's Prize, for design for interior decoration. The winners of the Owen Jones Prizes, referred to in the Master's report, were Maud Johnson and Edgar H. Turner.

Mr. J. H. Donaldson, in moving a vote of thanks to the head master and his assistants, remarked that as a large manufacturer he considered it a matter of inexpressible importance to England,—to manufacturers and artisans alike,—that we should make determined progress, since much yet remained to be done in that direction.

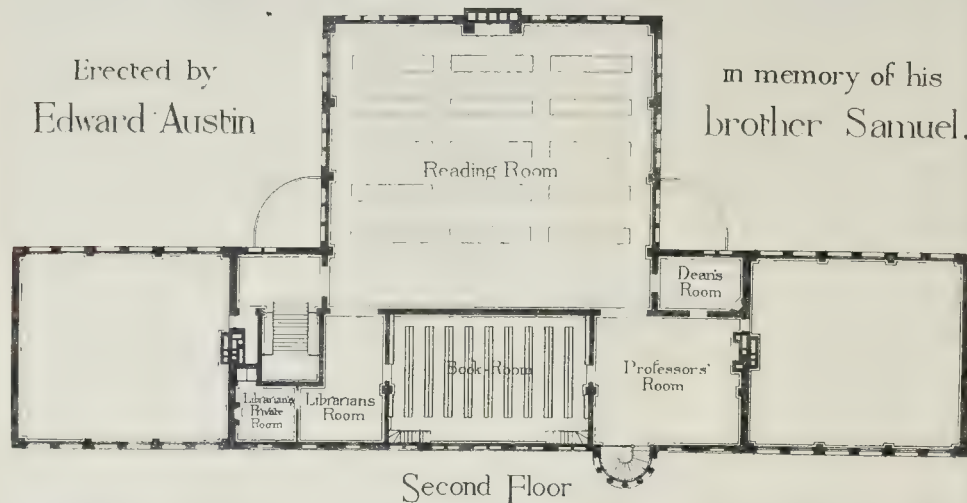
Mr. L. Aumonier (of the firm of Messrs. Woolfams & Co.), in seconding the vote, remarked that twenty-five years ago the greater number of the designs for wall-papers were purchased from foreigners,—principally from Frenchmen,—but now foreign designs did not amount to one per cent. and he had not purchased a foreign design for seven years, the whole of his having been obtained from past or present pupils of that school. Seeing some of these on view, he explained their merits, and stated that it was his intention to give two guineas per annum for five years to the student who produced the best design for paperhangings of artistic merit.

A vote of thanks to the Chairman concluded the proceedings.

**Artists' Volunteer Corps.**—The annual dinner of C Company of the Artists' Volunteer Corps (Capt. W. Spiers) took place at the Holborn Restaurant on Tuesday evening. The company is composed almost exclusively of members of the architectural profession.

Erected by  
Edward Austin

in memory of his  
brother Samuel.

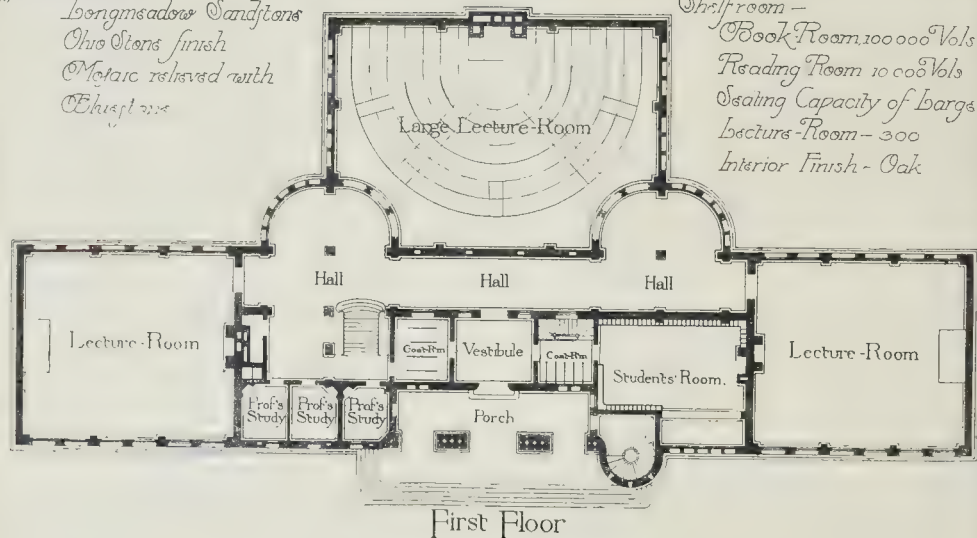


*Materials*

*Longmeadow Sandstone  
Ohio Stone finish  
Metalic relieved with  
Chisels*

*Approximate Cost, \$145,000*

*Shelfroom -  
Book Room, 100,000 Vols  
Reading Room 10,000 Vols  
Seating Capacity of Large  
Lecture Room - 300  
Interior Finish - Oak*



## Austin Hall, Harvard Law School. Cambridge Mass.

FEET 0 10 20 30 40

### Illustrations.

#### AUSTIN HALL, HARVARD LAW SCHOOLS, CAMBRIDGE, MASS.

**T**HE columns this week contain an interesting paper by an English architect on the artistic qualities of American architecture, in the course of which it is argued that architecture in America is at this moment far more advanced in the path of picturesqueness and originality than critics of a few years back held that it ever would or could advance. There could hardly be a more pointed comment on this opinion than is furnished by the illus-

tration we give of the Austin Hall at Cambridge, U.S., built from the designs of Mr. H. H. Richardson.

If it were true a quarter of a century ago that American architects took no thought for design save to invest their buildings in a more or less orthodox clothing of Classic columns or Gothic buttresses, this criticism has to be revised now. There may be differences of opinion as to the beauty of Mr. Richardson's designs; there can be none in regard to its force, vigour, and originality. Of course, in regard to the latter point, the decorative treatment is based on Byzantine and Romanesque types, but there is hardly anything of mere imitation in it.

The rough finish of certain portions of the

masonry, especially noticeable in what must be called "the frieze," when we should rather expect a finished surface, is one of the means of gaining force and variety of expression which appears to be a good deal adopted by some American architects now: as applied in the frieze here it appears to us an eyesore, and gives the impression of the stone having decayed; it appears, in fact, rather like a caprice. The plan of the building, accompanied by some brief particulars, is subjoined.

The illustrations are reproduced (by permission) from a fine portfolio of photographs of the building, forwarded to us under the title "Monographs of American Architecture." We shall be very glad to see more such monographs.







Surrey Gardens  
Mission Hall  
Walworth



Wyman & Sons Photo Litho





S. Anne's Mission Hall  
Bermondsey

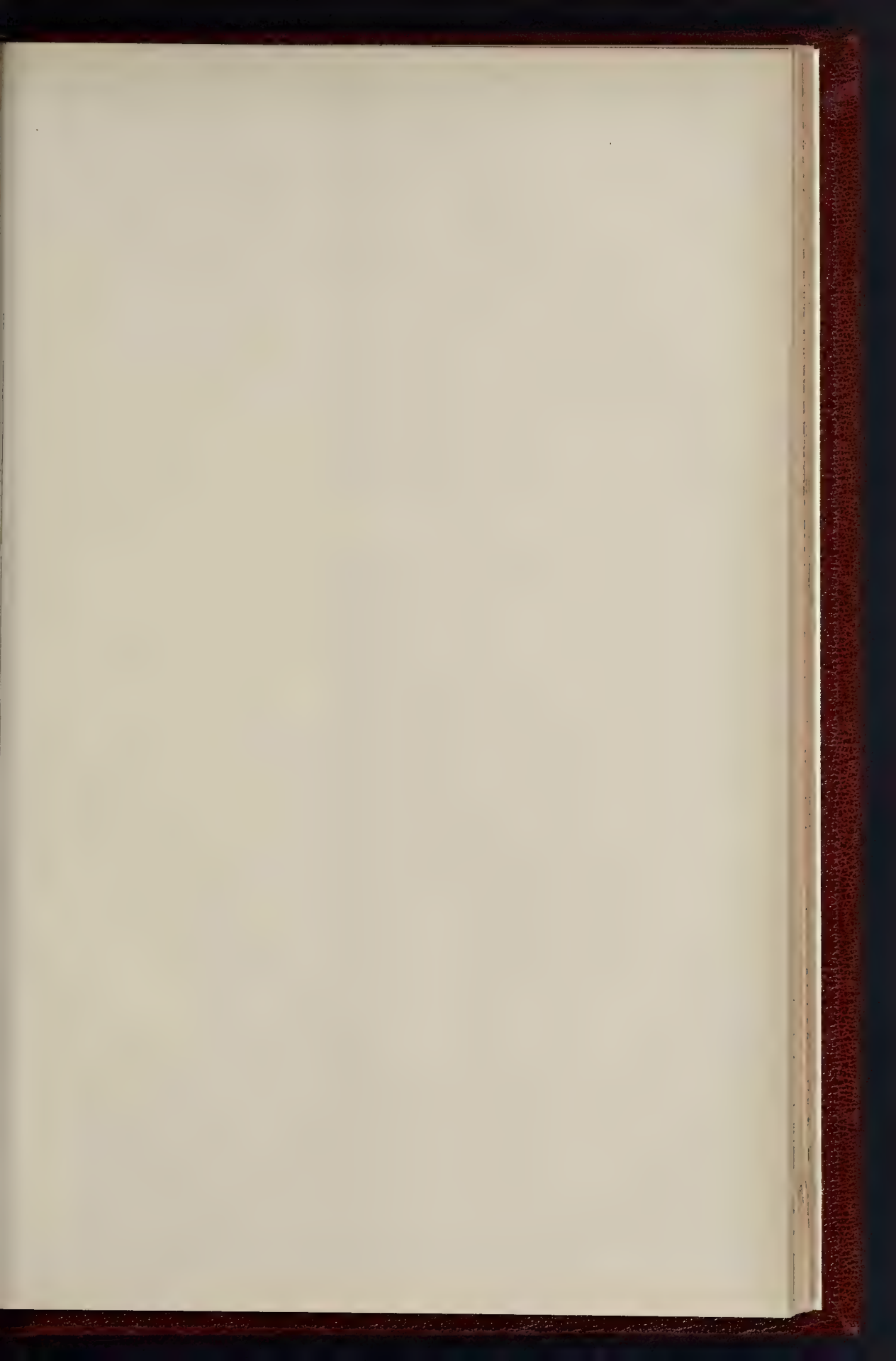


Interior

Westcombe Park  
Mission Room.







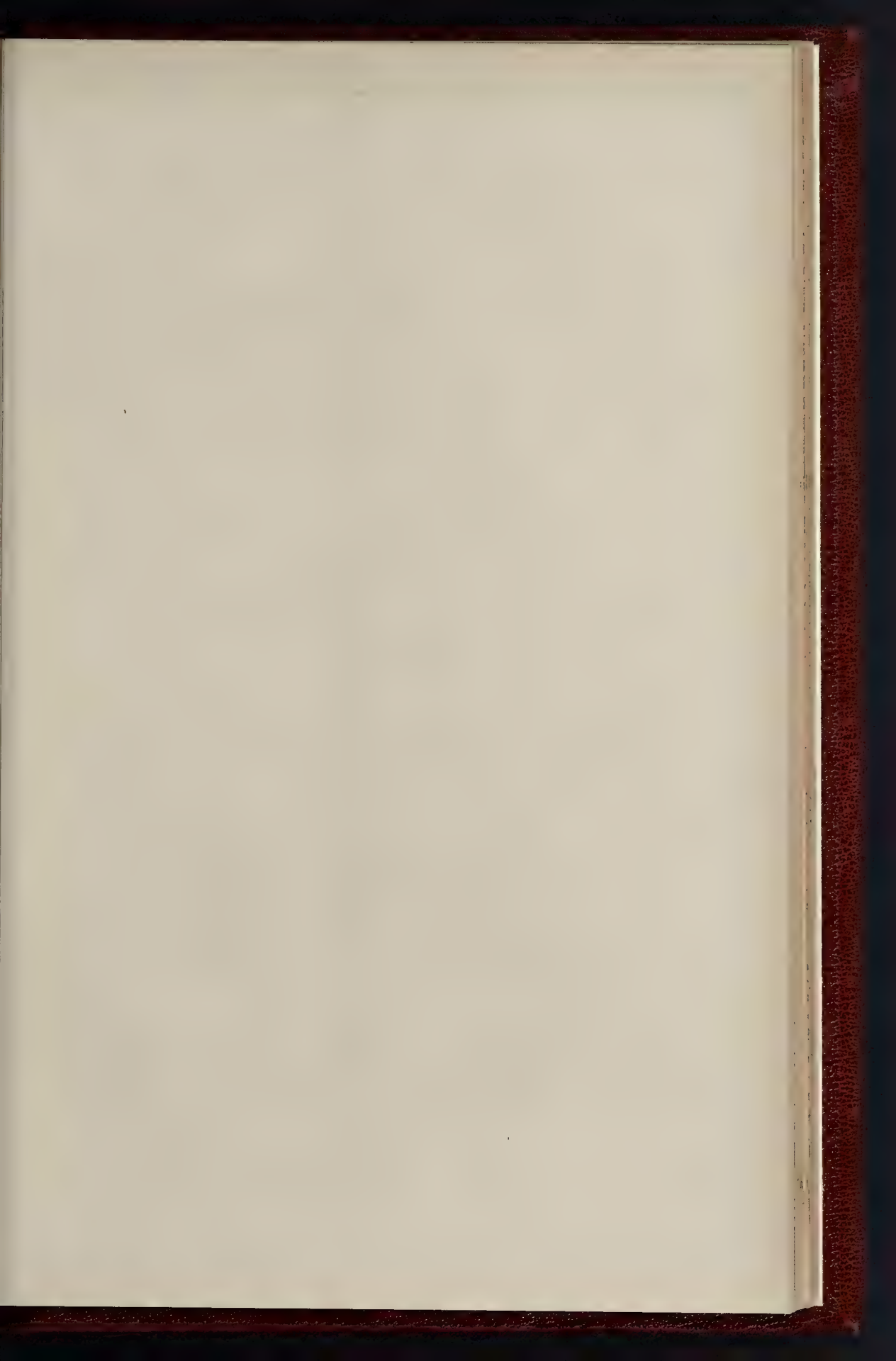


Arman & Sons Photo litho.

O'Queen St London WC

INDEPENDENT CHURCH, STAND, NEAR MANCHESTER. — MR. J. P. PRITCHETT, ARCHITECT.





THE BUILDER, DECEMBER 19, 1885.

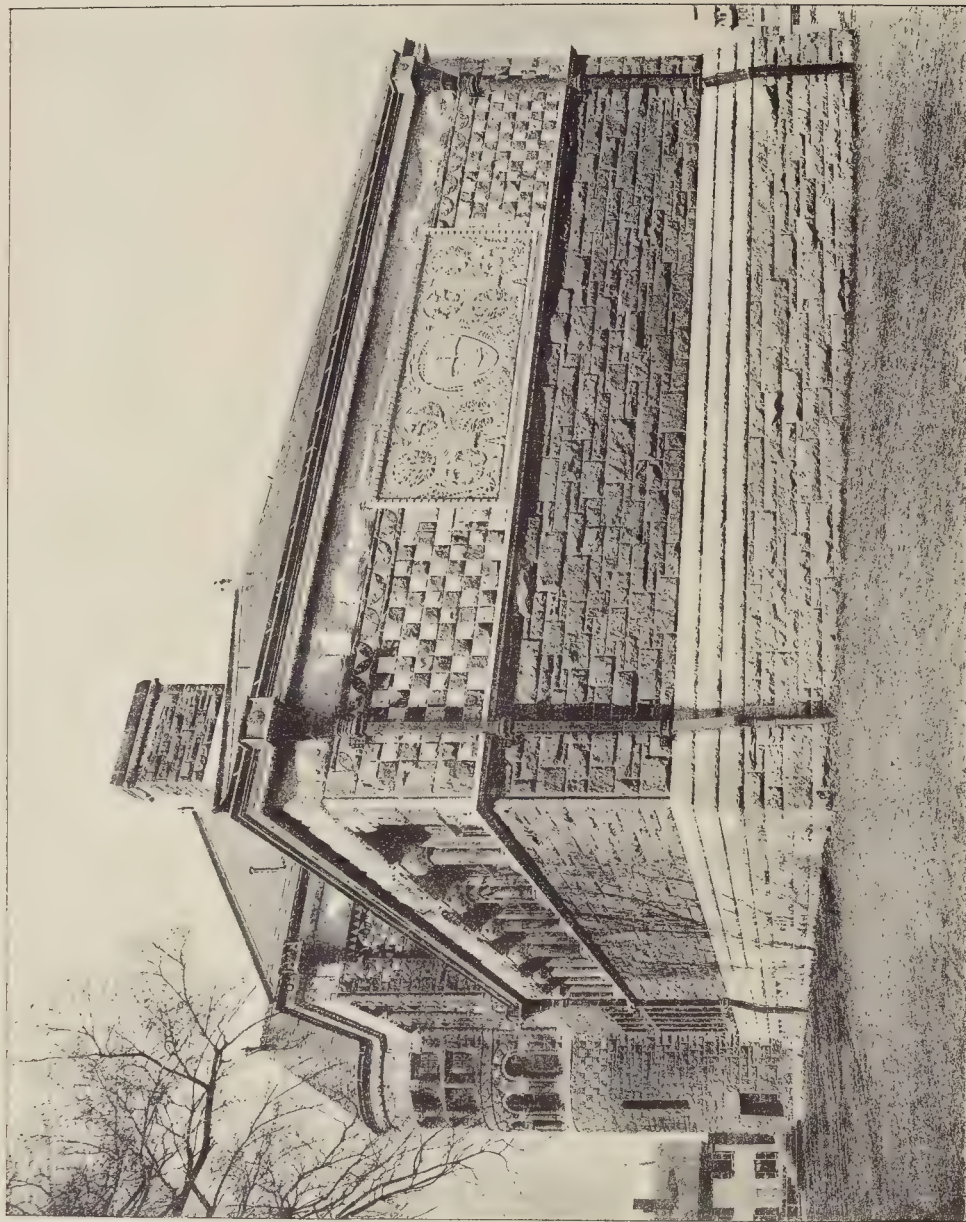
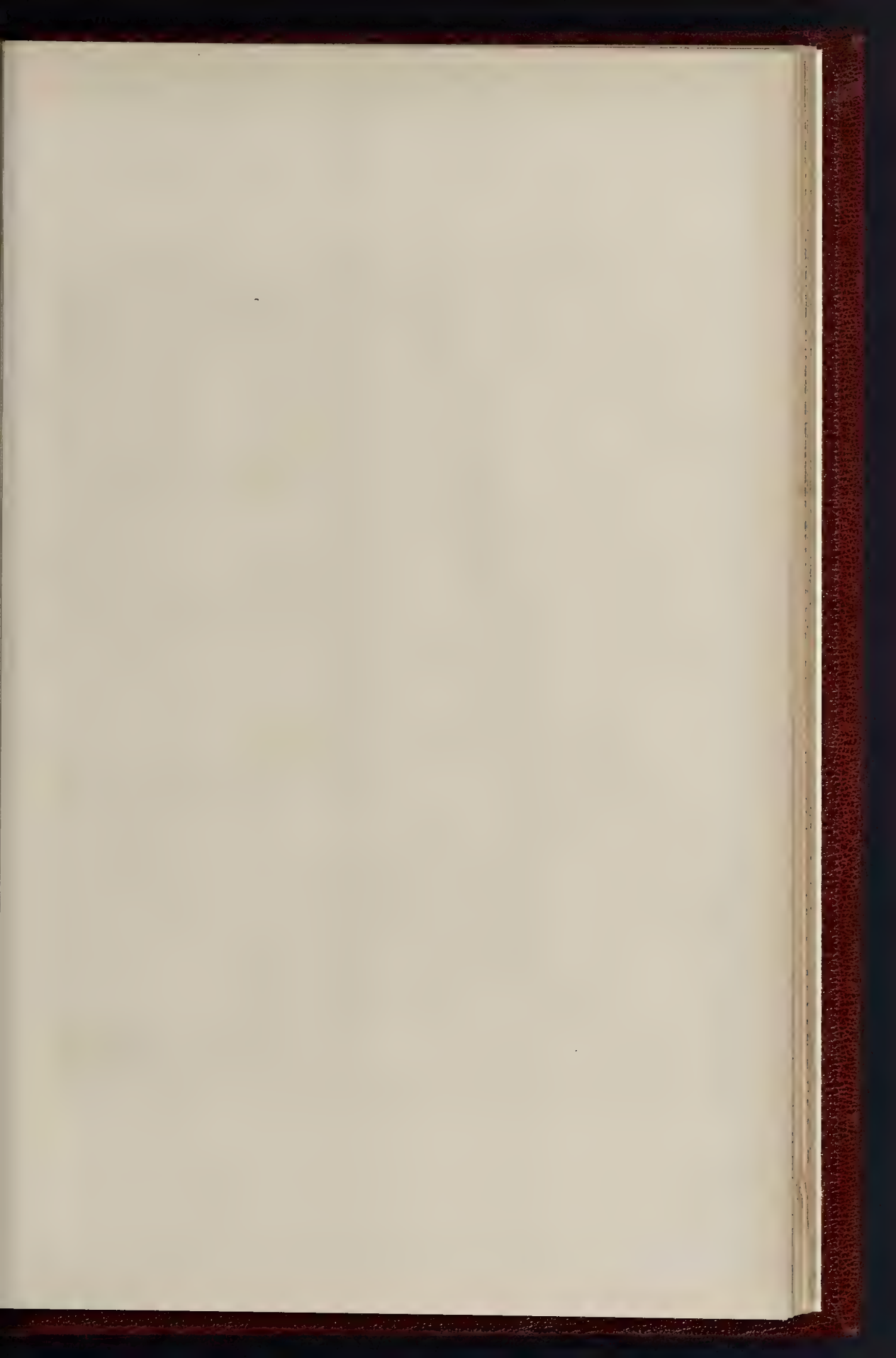


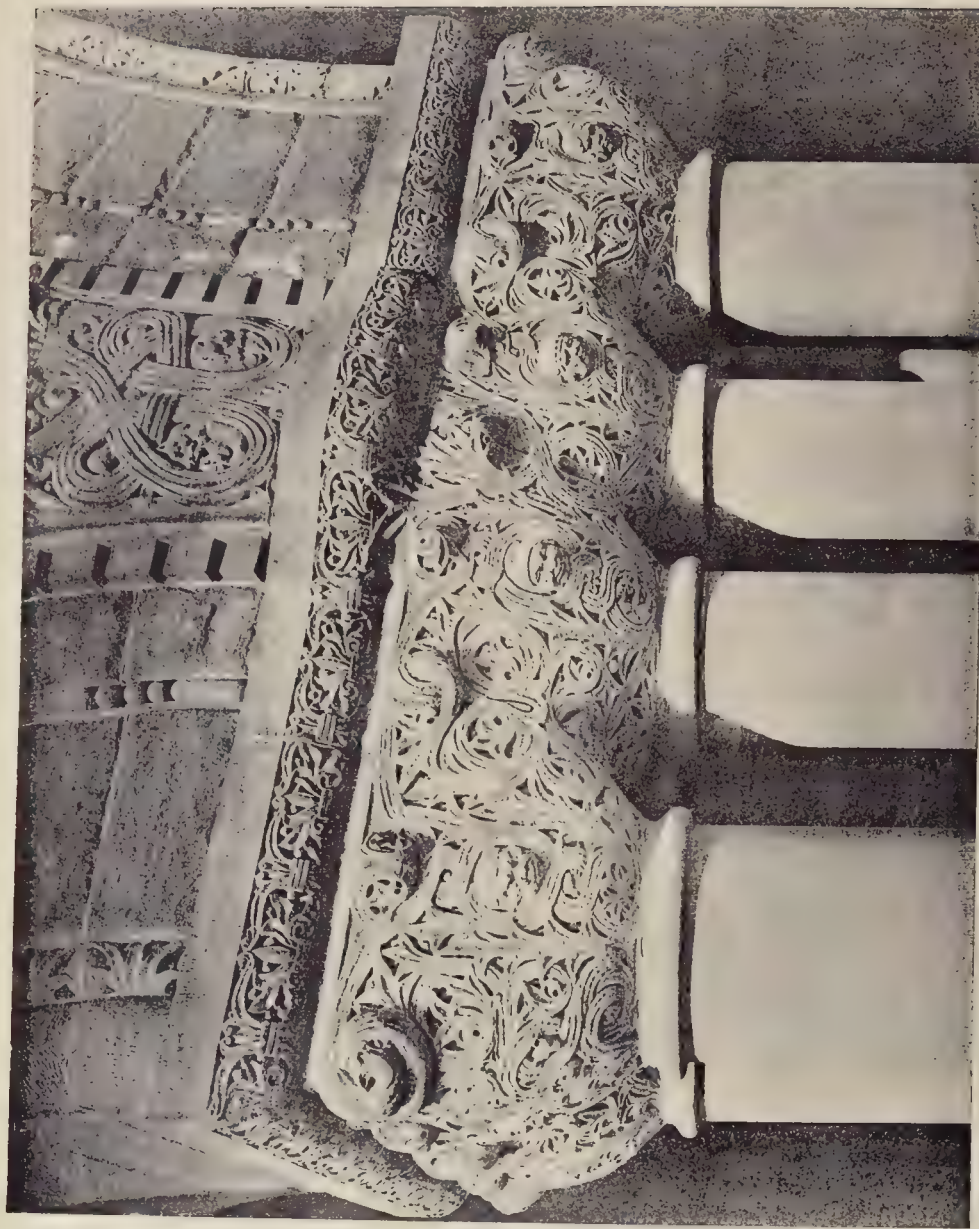
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AUSTIN HALL, HARVARD LAW SCHOOL, CAMBRIDGE, MASS.—MR. H. H. RICHARDSON, ARCHITECT.





THE DUILDER. DECEMBER 19, 1885.



AUSTIN HALL, HARVARD LAW SCHOOL, CAMBRIDGE, MASS.—MR. H. H. RICHARDSON, ARCHITECT  
(CAPITALS, ENTRANCE PORCH)





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AUSTIN HALL, HARVARD LAW SCHOOL, CAMBRIDGE, MASS.—MR. H. H. RICHARDSON, ARCHITECT.  
(ENTRANCE PORCH.)







AUSTIN HALL, HARVARD LAW SCHOOL, CAMBRIDGE, MASS.—MR. H. H. RICHARDSON, ARCHITECT.  
(FRONT VIEW.)



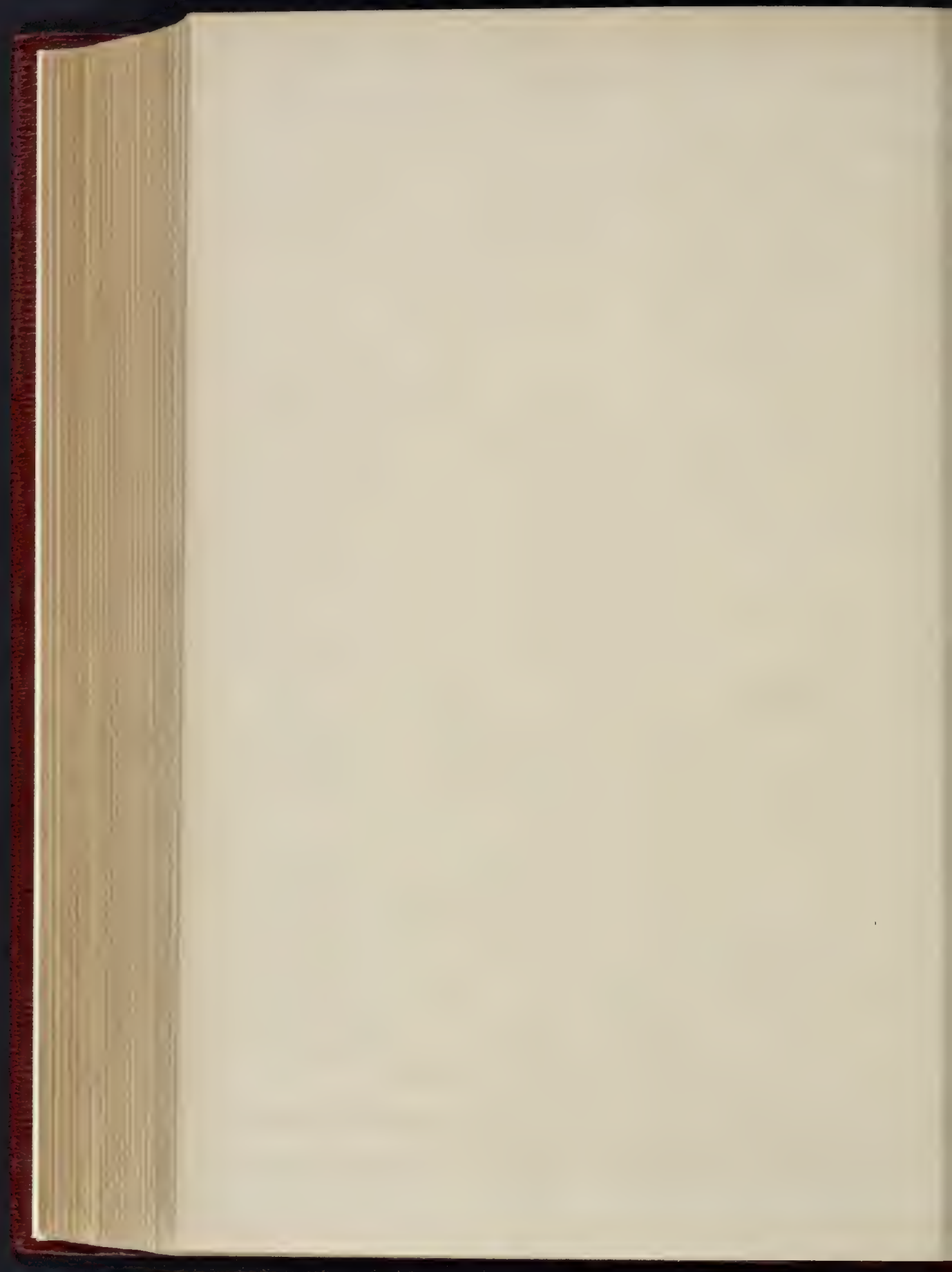




Wynnan & Sons Photo Litho

G'Queen St London WC

DESIGN FOR A SUBURBAN CHURCH. BY MR. E. J. TARVER, ARCHITECT.





## MISSION HALLS.

THIS sheet of Rochester Diocesan Mission Halls shows a few of those recently designed by Messrs. Romaine-Walker & Tanner, architects.

The Surrey Gardens Mission Hall is attached to St. Paul's, Lorrismore-square, and presents somewhat novel features in construction. The building committee desired an edifice partaking of a secular as well as an ecclesiastical character, in order to gain the attendance of those classes at the services in the hall who would not readily enter a church. The architects were also informed that there was a possibility in the future of the building being extended in length and converted into purely ecclesiastical uses. The internal dimensions are 70 ft. by 55 ft., and the varied requirements were met by the use of iron. Four iron stanchions are placed in the angles of a square about 24 ft. each way, dividing the hall into three bays, each about 24 ft. These stanchions support longitudinally bressummer girders, carrying the dwarf upper walls and gabled windows. To the heads of the stanchions above the girders are secured wrought-iron principals or trusses formed to the slopes of the roof, and constructed to prevent any outward thrust. The ridge is iron, and the purlins are iron. The principals of the lower roofs are also iron, and bolted to the stanchions and bressummers. This construction rendered all outside buttresses unnecessary, and every inch of area was available for the floor-space of the hall. The ironwork was so designed as to give the effect, when cased in wood, of curved principals supported by wooden piers with carved caps; and longitudinally there are segmental arches to every bay, forming an arcade, and the whole interior presents a novel and striking effect. The building has excellent acoustic properties.

The exterior is of red brick and Box ground Bath stone, and is roofed with tiles. A small vestry is adjacent to the platform end, with lavatories and heating-chamber below. The building is warmed with large-bore pipes, carried out by Messrs. Richardson & Slade. There is also a special system of ventilation. The constructive ironwork was carried out by Messrs. Dennett & Ingle. The floor is wood block paving. The general contractors were Messrs. H. Burman & Son, who also prepared the seating, which is reversible, and will accommodate 800 persons.

Westcombe Park Mission Hall is attached to Christ Church, East Greenwich, and is a building, 60 ft. by 30 ft., with a class-room, 19 ft. by 18 ft.; there is also a vestry, a range and boiler, and all necessary offices. The exterior is faced with stock bricks and hung tiles. The roofs are tiled. The interior is spanned by four trusses, and to avoid cross-ties the wall-pieces are taken down to the ground. An elevator, coil-shutter divides the class-room and hall. The floor is paved with wood blocks on concrete. The seating was made by Messrs. H. Burman & Son, and the hall holds 450 persons. The heating-apparatus was put in by Messrs. R. Renton Gibbs & Son, on their small-bore pipe system. The general contractor was Mr. R. Lewis Wood, and the clerk of works Mr. V. Hibbins.

St. Anne's Mission Hall, Bernondsey, is to be started early in the new year.

A Mission Hall connected with the Church of the Ascension, Lavender-hill, is in progress, and when complete will accommodate 1,000 adults. The first block, seating 500, will be opened at Christmas. In connexion with the Wilberforce Mission House, at Newington-butt, which was opened last year, the new Memorial Hall has been completed this autumn. These two buildings, as well as those illustrated, are by the same architects.

## STAND INDEPENDENT CHURCH, NEAR MANCHESTER.

THE design which we illustrate was selected in a competition limited to four firms of experience in Nonconformist Church building. The chief difficulty the designers had to contend with was the limited area of the site, which is in a graveyard that has been in use for 200 years, and is still used,—hence the total absence of buttresses.

A crypt extends under the whole area, the roof forming the floor of the church, being of cement concrete and iron joists, covered on the top with wood block paving for the seats, and

mosaic tiles for the gangways. The building is faced with porphyry from Brighouse, and the dressings are of best white stone, from Hollington.

Internally, the nave is divided from the aisles by an arcade having pillars of polished red Peterhead granite, with carved caps, and moulded arches of stone. The chancel arch is similarly treated, and the organ-chamber has also arches opening into the nave and chancel.

The roofs are hammer-beam and wagon-headed, groined in the lower part between the clearstory windows. The pulpit, prayer-desk, and choir-stalls are to be of oak, the rest of the woodwork of pitch pine. The roscos will be enriched by terra-cotta bas-reliefs of the "Last Supper," "Christ Healing the Blind," and "Christ Healing the Deaf," modelled by Morris. The windows are to be of muffled glass, slightly tinted, with borders and divisions of rich colours and roundels, and simple devices in the tracery.

The architect is Mr. J. P. Pritchett, of Darlington.

The memorial stone was laid on Saturday, July 25th, with the usual ceremonies.

## DESIGN FOR A SUBURBAN CHURCH.

THIS is a design for a church for a site on the Telford Park Estate, where there at present exists a temporary church, the full attendance at which encourages the hope that the permanent church may soon take its place.

The site adjoins cross roads, and will be passed, not only by residents on the estate, but by many others living in Clapham Park, on their way to Streatham Hill Station.

A clock, therefore, which may be seen from several directions to give the correct time to the neighbourhood, is the main feature of the tower. The tower is enlarged at the stage where this important use is fulfilled, and space is thus provided for bells as well; an upper belfry being available for a carillon to be worked by the clock.

As regards the body of the church, an arrangement is adopted which,—as proved by the estimates,—reduces the cost far below that involved by the usual constructive features.

The style of the building is that of the surrounding houses, for the use of whose inhabitants the church is required.

EDWARD J. TARVER.

## TUNBRIDGE WELLS WATER SUPPLY.

TUNBRIDGE WELLS, on December 10th, was *en fête* to signalise the completion of an important increase to its water supply by the opening of a new reservoir at Denbury, which, with a top area of seven acres, is capable of holding 45,000,000 gallons. The scheme, which has cost 33,000*l.* to carry out, was first mooted in 1875, but active constructional operations were not commenced until the end of 1881. After delays of various kinds, the opening ceremony was last week performed by the wife of the Chairman of the Local Board.

The work, which embodies some points of special interest, necessitated the excavation of 120,000 yards of earth, which has been utilised in the construction of two artificial embankments, each having a base thickness of 156 ft. The reservoir, which is 27 ft. deep, has 21,418 square yards of bottom surface, which was concreted to a depth of 12 in., while the slopes measure 13,222 square yards, also concreted with an average thickness of 9 in. The whole of this 34,640 square yards of concrete was afterwards covered with Bradshaw's Limer Asphalt of a thickness of 1 in. to 1½ in.

The engineer, Mr. W. Brentnall, M.I.C.E., at the dinner following the opening ceremony, gave a detailed account of the work, and emphasised the importance of two interesting points of departure taken by him from the methods usually employed in such undertakings. He said:—There are some features of engineering interest in connexion with these works. I will mention two only, which will perhaps allay the fears some may have as to the stability of the embankments. Storage reservoirs are usually so constructed that only one artificially-made embankment is required, which is built up in thick layers of earth, of 11 in. to 2 ft. in thickness, tipped loosely from barrows or wagons, and consolidated by its own weight (a very uneven and imperfect consolidation, taking an indefinite length of time); a clay-puddle wall

in the centre of the embankment being relied on for water-tightness. This sometimes fails with most calamitous results. In the present case the site of the reservoir was arbitrarily fixed by the relative positions of the engine-house and tunnel of the old works; and two artificial embankments were imperatively necessary. I made a wide departure from the ordinary method of construction, just explained, in constructing the embankments in layers of earth fresh from the excavation, laid only 6 in. thick, with a little water added, and then rolled and cross-rolled with a steam roller, until each layer was reduced to about 3½ in. thick. By this method the embankments were at once consolidated equal to the original earth; no subsidence whatever taking place, as is proved by the brickwork erected upon it remaining perfectly sound; indeed, so perfect was the consolidation that when the men were required to move some of it, it was like a piece of rock, and had to be picked out. The reservoir is, in fact, unique in this respect, and in that it has a culvert running through the centre of it. This culvert is necessary in order to carry the surface-water, which generally flows through the valley to the Medway. This again necessitated extra cost, and involved great forethought; for it had to be constructed so that it should carry an immense weight. It passes directly through the centre of the two artificial embankments, and thus underneath the whole length of the reservoir. I am glad to say that my example of embankment construction has been followed in the North of England by an engineer of eminence, who is constructing a reservoir with an embankment upwards of 100 ft. high, the rolling alone costing close on 6,000*l.*, which is money well spent, as the work is at once consolidated and the stability of the bank insured. Another wide departure from the ordinary method of construction was the adoption of an inner skin or layer of asphalt as the watertight material in lieu of clay-puddle, and, to my mind, there are several advantages in the adoption of asphalt. It is quite as cheap as clay-puddle; should a leak occur it can easily be found and stopped; it will prevent the growth of vegetable matter, and there will be no risk of the slopes being damaged by waves in rough weather. It has also a clean and neat appearance, and forms a fitting receptacle for filtered potable water. This plan of asphaltting has also been adopted by an engineer in the construction of a reservoir to hold 12,000,000 gallons. The asphaltting of the reservoir bed and slopes was done by Messrs. Bradshaw & Co., of London, in a manner that reflects the highest credit on them; they did it in three months and a half the work for which six months had been allowed. No deviation from the contract plans prepared by me in 1880 was at all necessary. Every bit of work done can be found shown on those plans; and the "extras," as "extras" are understood, do not exceed the sum of 100*l.*, which is not much on a 30,000*l.* job.

## SOCIETY OF ENGINEERS.

THE thirty-first annual general meeting of the Society of Engineers was held on December 14th, in the Reading-room of the Society, 6, Westminster-chambers, S.W. The chair was occupied by Mr. Charles Gandon, President. The following gentlemen were balloted for and duly elected as the Council and officers for the ensuing year, viz.:—As President, Mr. Perry F. Nurey; as Vice-Presidents, Prof. H. Robinson, Mr. A. T. Walmisley, and Mr. W. Sobolevsky; as Ordinary Members of Council, Messrs. R. Berridge, W. Barnes Kinsey, W. Macgogney, Arthur F. Phillips, M. Ogle Tarbotton, Jonathan R. Baillie, R. W. Peregrine Birch, and John Standfield, the three latter gentlemen being new Members of Council; as Honorary Secretary and Treasurer, Mr. Alfred Williams; and as Auditor, Mr. Alfred Lass. The proceedings terminated by a general vote of thanks to the Council and officers for 1885, which was duly acknowledged by the Chairman.

The annual dinner of the Society was held on Wednesday evening last at the Guildhall Tavern, the President, Mr. Charles Gandon, in the chair.

The loyal and patriotic toasts having been duly honoured, General Bruce responding on behalf of the Army and Navy, and Major John



Aird, of the Engineer and Railway Volunteer Staff Corps, for the Reserve Forces.

The Chairman proposed the toast of the evening, "Success to the Society of Engineers." He congratulated the members upon the increasing numbers and usefulness of the Society, upon the excellent papers which were read at its meetings during last session, and upon the interesting and instructive visits which the members had made during the year to various important engineering workshops and works in progress. It was gratifying to be able to say that many men who had joined the Society as students were now occupying responsible posts in all parts of the world. With the toast he coupled the name of Mr. Alfred Williams, the hon. secretary and treasurer, who had served the Society in those offices since its foundation, thirty-one years ago.

Mr. Williams replied, making special reference to the value of the visits to works, facilities for which were so kindly afforded by the engineers-in-charge.

Mr. Arthur Riggs proposed "The President," and referred to the able manner in which Mr. Gandon had fulfilled his duties during the past year.

Mr. Gandon replied, expressing his gratification that he was to be followed by so able and well-tried a man as the President-elect, Mr. Perry F. Nursey, whose health he proposed. The toast was very warmly received.

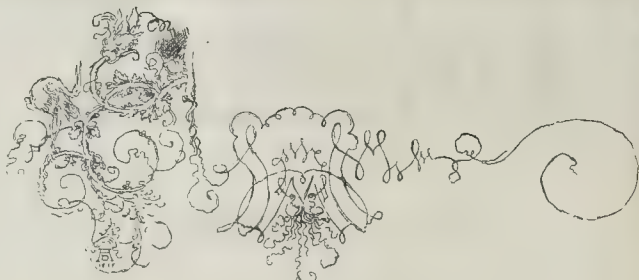
Mr. Nursey (Editor of *Iron*) replied in felicitous terms, thanking the members for having elected him to be their President, after twenty-eight years of official connexion with the Society. He had, in fact, served four apprenticeships in office,—firstly, as assistant hon. secretary, subsequently as secretary, and for the last seven years as a Member of Council. During the coming year he would do all in his power to advance the interests of the Society and of the profession.

The other toasts were "The Vice-Presidents and Members of Council," proposed by Mr. Aird and coupled with the name of Professor H. Robinson; "The Visitors," coupled with the names of Messrs. D. Baynes and W. Wainwright; and "The Secretary," Mr. C. J. Light, who was, unfortunately, unable to attend, owing to illness.

#### THE LATE MR. H. E. COE.

We announce with much regret that Mr. Henry Edward Coe, architect, died on Thursday, December 10th, after a painful illness. He was the son of Mr. Henry John Coe, solicitor, and was a pupil of the late Sir G. G. Scott at the same time as the late George Edmund Street. When quite a young man he obtained the honour of being placed first in the competition for the Foreign Offices, for which he obtained a premium of 800 guineas, but he was not allowed the privilege of carrying out this work, which fell to the lot of the late Sir G. G. Scott. More recently Mr. Coe gained the second premium (500 guineas) in the Glasgow Municipal Buildings competition. He was at various times in partnership with the late Mr. Frederick Peck and the late Mr. Stephen Robinson, and at the time of his death with Mr. Arthur Catt, who was a pupil of his, and who, with Mr. S. B. J. Smith (who has also been connected with the office for some years) intends to carry on the business. The late Mr. Coe has, in conjunction with the aforesaid gentlemen, or by himself, carried out many works of importance, including the Agricultural Hall, at Islington (in conjunction with Mr. Peck); Parochial Schools at Norwood, for the parish of Lambeth; Devon and Cornwall Hospital, Plymouth; Trent College, Derbyshire; the Guildhall, Cambridge; the Female Orphan Asylum at Beddington; and a number of other public institutions, together with churches, schools, mansions, &c. The new National Agricultural Hall, at Kensington (of which we recently gave illustrations) is now being erected from his designs. Mr. Coe was fifty-nine years of age at the time of his death. His remains were interred on Wednesday last at Highgate Cemetery.

**The Art Journal.**—The January number of this journal will contain an article upon the forthcoming representation of Goethe's "Faust," from the pen of Mr. Joseph Hutton. It will be illustrated with engravings taken from sketches made for the scenery by Messrs. Telbin & Craven.



Decorative Border by Albert Dürer.

#### DECORATIVE SKETCH BY ALBERT DÜRER.

In the article on "The Decorative Work of the Early German Engravers" last week (p. 618), reference was made to a collection of decorative sketches by Albert Dürer for book margins, and other such subjects, collected and edited by Obernetter. The accompanying illustration is a reproduction from a tracing of one of these, somewhat reduced in size, and may be of interest as an example of this class of Albert Dürer's work, which is not much known.

#### ST. JAMES'S CHURCH, TAUNTON.

EXTENSIVE additions at the east end of this fifteenth-century church have just been made. Notwithstanding its large and magnificent western tower, the body of the church is poor. In plan it comprises a nave and aisles, all under span roofs, with a south porch, the whole rather modernised. The easternmost arches of the nave are modern, and much wider than the others, as, some forty years since the greater portion of the Mediaeval chancel was thrown into the nave, and an arch of brick, covered with Portland cement, built over the entrance to the sanctuary. The pseudo-chancel was, in fact, only 12 ft. long, and a small vestry then built, is now pulled down. It was obviously impossible to bring back the old condition of things, as the recent improvements had to provide for no diminution in the number of sittings (for about 880), notwithstanding the pulling down of the large galleries in the north and south aisles. Consequently, an entirely new chancel has been built, 40 ft. long, of the same width as was the ancient one, having a handsome lofty moulded stone chancel-arch. A spacious organ-chamber and choir-vestry, 23 ft. long by 17 ft. 3 in. wide, and a clergy vestry, 17 ft. 9 in. by 11 ft. 3 in., have been attached to the north side of the chancel. On the south side an aisle has been built, divided from the chancel by two arches. The east windows of the former chancel and south nave aisle have been carefully re-built further east, as well as the old piscina, after conservative repair. In order not to unnecessarily disturb any ancient part of the structure, the modern glass from the east window of the north aisle has been removed, the old stanchions and saddle-bars being left. The space under the window has been pierced with an ornamental stone screen, following the vertical lines of the windows above. The space at the east end of the north aisle, lately occupied by the organ, is now devoted to seats. The interesting old font has been removed to a more suitable position under the tower, and set upon a proper stone platform. The old oak Jacobean pulpit has been cleared of its varnish and paint, and reset at a lower level, upon a base of Bishops Lydeard red sandstone, with white liss coping to the Keinton stone steps. An oak Litany-desk, from the architect's design, has been added. From the same level to that of the footpace on which the altar stands are seven steps, the greater number of them placed eastwards of the choir-seats. The prayer-desks and choir-seats are of English oak. A credence of Pennant stone has been fixed within the sanctuary. An elaborate panelled English oak altar has also been carried out. The pavements to the chancel and south chancel aisle are of Godwin's encaustic tiles, specially designed by the architect. The windows not supplied with

painted glass are now filled with cathedral rolled glass of various tints in geometrical patterns, and there are arrangements of glass of somewhat like character to several windows in the body of the building. Wagon-headed ribbed and panelled English oak ceilings have been put to the chancel and south chancel aisle with carved pateras. The former also has a rich cresting, and over the sanctuary is ornamentally cusped. Designs and working drawings have been prepared for handsome oak screens under the chancel arch and side arches, but at present sufficient funds are not forthcoming. It is also in contemplation to put new oak boarded and panelled ceilings to the body of the church in place of the present lath and plaster ceiling and cement ribs. A series of suitable character with the church is likewise thought of.

A design has been prepared for a handsome oak screen and lobby to the west entrance of the tower in place of the present poor deal lobbies. Handsome oak benches and book-boards standing on a platform have been placed at the west end of the nave on the north and south sides for the official use of the churchwardens.

The main material of the walls is the same as the old part of the church,—rough local stone with Ham Hill freestone dressings. The new roofs are covered with Delabole slates and red Bridgewater ridge tiles. The architect was Mr. B. Edmund Ferrey, F.S.A.; the clerk of works, Mr. Charles H. Webber, of Taunton; and the builder, Mr. John Pearse, of Minehead.

#### ARCHITECTURAL SOCIETIES.

**Royal Institute of the Architects of Ireland.**—The annual general meeting of the members of the Royal Institute of the Architects of Ireland was held on Saturday afternoon, in their offices, 37, Dawson-street. Mr. T. Drew occupied the chair. The other members present were:—Messrs. J. R. Carroll, J. L. Robinson, Parke Neville, R. Langrishe, C. A. Owen, C. Geoghegan, W. Stirling, W. K. Parry, J. J. O'Callaghan, W. Mitchell, J. Fullerton, G. Ashlin, S. Symes, hon. treasurer, and A. E. Murray, hon. secretary. The election of officers for 1886 was the first business proceeded with. The following gentlemen were elected:—President, W. H. Lynn, Belfast; hon. secretary, Albert E. Murray; hon. treasurer, Sandham Symes; Council, Parke Neville, J. J. O'Callaghan, J. R. Carroll, George C. Ashlin, Thomas Drew, Charles Geoghegan, James H. Owen, William Mitchell, Thomas N. Deane; auditors, H. R. Newton and T. M. Deane. The following gentlemen were elected Fellows:—W. H. Byrne, Samuel Close, W. H. Lynn, T. N. Deane, J. F. Fuller, J. L. Robinson, and D. F. Freeman. Mr. Murray read the report, which, after expressing regret at the death of Mr. John McCurdy, the late President, went on to refer to the growing tendency of the Government in this country to get works, such as the building of post-offices, national schools, coastguard-stations, piers, &c., carried out by their own officials. This was a practice which had not been followed in Ireland until of late years, and was not at all followed in England. The works at the Royal University had been carried out by the Board of Works instead of by the profession. The Council had this subject under consideration, and proposed at a near date to bring it vigorously forward. Mr. Symes read the financial report, from which it appeared the financial condition of the insti-





Fig. 1.—The Doulton-Peto Flooring.

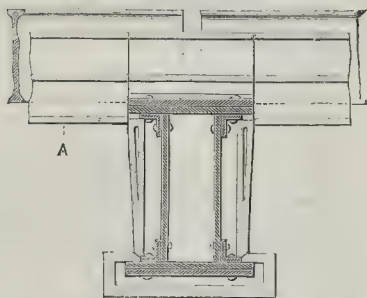


Fig. 2.—Method of Protecting a Girder from Fire.

tute was satisfactory. The reports were adopted, and votes of thanks passed to Mr. Murray and Mr. Symes for the able manner in which they had filled their respective offices during the past year. Mr. Fullerton, Armagh, read a paper on "The Better Protection of the Profession." He urged the necessity of architects being registered with the Institute, so as to prevent in some measure the growing tendency of builders and other unqualified persons imposing on the public, and bringing the real professional men into contempt. He cited numerous instances where unqualified men had been blindly employed by the public, who were afterwards obliged to call in qualified men to correct the mistakes which had been made. In the evening the annual dinner was held in the Grosvenor Hotel.

**Birmingham Architectural Association.**—The second ordinary meeting of the current session was held on Tuesday evening last, at Queen's College, Mr. John Cotton, Vice-President, in the chair. Mr. J. A. Cossins read a paper entitled "Notes on Warwickshire Churches," which was copiously illustrated by photographs, pen and pencil sketches, &c., mostly by the author's own hand. A vote of thanks was unanimously accorded to the lecturer. Mr. Cossins, in responding, deplored the modern system of restoration, and very kindly acceded to the request of the members to conduct a visit during the coming summer to some of the churches referred to. The following gentlemen were elected members of the Association:—Messrs. F. B. Peacock, F. Evans, F. B. Andrews, J. Irvine, E. Wilkes, E. H. Bowley.

**York Architectural Association.**—The members and friends of the York Architectural Association held their third annual *conversations* in the Water-colour Galleries of the Fine Art Exhibition on the 11th inst. During the evening the President of the Council (Mr. A. Pollard) who was supported by Mr. W. G. Penty (past-president) and other officers, delivered an address, and the prizes were distributed. The President, who was warmly applauded, said the result of the competitions for prizes was greatly to the credit of the winners, who had produced some good work, though there still existed a want of enthusiasm amongst members eligible to compete for prizes.

**Access to St. James's Park from Charing Cross.**—At the meeting of the Metropolitan Board of Works this Friday, the 18th inst., the Works and General Purposes Committee will present a report recommending "That a letter be addressed to her Majesty's Government, asking, with reference to the proposed new Admiralty and War Offices, that a public roadway may be formed in a direct line with the Strand to the Mall of St. James's Park, in accordance with the suggestion made by a deputation from this Board to the First Commissioner of her Majesty's Works, &c., in June, 1882."

#### FIREPROOF CONSTRUCTION.

In our account of the Sanitary Exhibition held at Leicester two or three months ago,\* we referred to a new form of construction for fireproof flooring, exhibited by Messrs. Doulton & Co., of Lambeth, which has been named the "Doulton-Peto Flooring." It consists, as we then said in effect (and as will be seen by the accompanying diagram, fig. 1), of a number of fireclay voussoirs, made hollow, and keyed together as shown, the end pieces or *voussoirs* being so shaped as to pass round and over the lower flanges of the iron joists, so as to protect the latter from the action of fire. The rebates or grooves left in the sides of the blocks are filled flush with cement immediately before fixing, and the surfaces of these lines of cement come in contact, so that on hardening a good cement key is afforded. The grooves left in the soffits of the blocks are to afford a key for the plastering. This method of flooring has been used throughout at the new London Pavilion Music Hall, Piccadilly, and with such facility, we are informed, that the builders, Messrs. Peto, were enabled to lay the wood flooring above the blocks and to cover the soffit with plastering simultaneously, thus saving time. This method of fireproof flooring is, moreover, as may be inferred, very cleanly in construction.

The following diagram (fig. 2) shows Messrs. Doulton's system of covering main girders by terra-cotta *sottis*-pieces and side slabs. This does not need detailed description, but, as will be seen by the diagram, air-spaces are provided so as to act as non-conductors of heat. These air-spaces, it is urged, have also the advantage of being available for purposes of ventilation, as holes may be made in any part of the slabs without injuring their stability, but with considerably diminished effectiveness, without doubt, in their primary object,—that of protecting the girders from the action of fire. Messrs. Doulton make no claim to have originated the principle of encasing the ironwork of a building with terra-cotta. Indeed, as our readers know, Mr. Waterhouse has protected the iron girders and columns of the new Natural History Museum by encasing them with that material.

#### BUSINESS PREMISES, LEWISHAM.

SIR,—A slight error occurred in your issue of the 14th ult. [p. 697] in the description of "Business Premises, Lewisham High-road." The article should have stated that they have been "opened by Messrs. Haycraft & Son, in connection with their old-established business, Broadway, Deptford." Mr. G. E. Haycraft was responsible for their erection, and we find the discrepancy has caused a certain amount of misapprehension in some quarters.

J. HAYCRAFT & SON.

Deptford Broadway.

\* See *Builder*, p. 416, ante.

#### THE PROPOSED NEW CHARTER,

R.I.B.A.

SIR,—Now that the Charter is recommended one may expect a perfect document, although lawyers tell us that Acts of Parliament when finished by the draughtsman are generally better compositions than when they emerge from the Committee of the House, demonstrating, in fact, the truth of the adage "too many cooks." I must say I disapprove the action of the Council in sending out a draft of the proposed Charter some months before the commencement of the present session that all should study it, and then a few days before the opening day to send round another. I gave much attention to the first and had not sufficient time to study the second. The course is very suggestive of what so frequently occurs with men eager to accept office, yet leave the work to be done by two or three who attend with regularity, and then, appearing like comets on the scene, brandish their fiery scimitars, upset and confuse what has been done, and perhaps better done, by their steadily working colleagues who have mastered the subject.

The Associates supported the proposed Charter loyally, as they will be largely and very properly benefited. They are a numerous class, mostly youthful, and those of us who are no longer young feel a pleasure in helping them. But they should not ask too much. I mean, they should not rebel at the proposed restrictions which deny them the power of voting for the election of Fellows and the passing of By-laws. Equality of voting power is too communistic. It may be objected that this voting for Fellows and By-laws is a money qualification, but something more is involved. It is a question of professional grade. It leaves something to work for, is a stimulus to ambition, and a hostage for propriety of deportment. For example, if members of the, so to speak, lower house deport themselves improperly, by excluding them from the class of Fellows a penalty is inflicted which may have a salutary influence.

The question of amalgamating all provincial societies with the Institute is a cherished wish with me, and I hope a majority of the profession will insist on the introduction in the new Charter of a clause embodying it. Some see difficulties. I see very few,—in fact, none that cannot be coped with. When Germany was divided into a number of small kingdoms, each having its own system of passports and commercial regulations, it took longer to conform to the various requisitions before passing from one state to another than it does in these days to try a man and execute him for a capital offence; and equally obstructive were the laws regulating trade. But the Zollverein banished all impediments; the exigencies of trade and the needs of the community were deemed of far greater import than obedience to antiquated customs: so the Prussian Commercial Union became a fact and a boon, and the several States followed one code of laws. With equal ease may the difficulties in amalgamating the central body of architects with the provincial bodies be met.

Each architectural society in the provinces has been established on its own lines; but why may not these lines be changed so as to harmonise with those of the Royal Institute of Architects? Life is made up of compromises, and in dealing with this federation scheme, each must make concessions if they can be shown to be reasonable. Possibly something may have to be said on the "quantities" question. That need not be imported into the new Charter, but may be dealt with in the By-laws. As we are now a kind of *united* states, let us endeavour to become the opposite. If some of the chief provincial societies will set the example, others may follow, and those who refuse to modify will pay the penalty of isolation. Time is the cure, and when it is felt that individual action is unfettered, and that we as a professional brotherhood are merely following generally accepted laws, which may add to our professional status, the instructed public will employ only the chartered men. Those who keep aloof will stand in the same relation to the holder of the Institute's certificate as the compounder of a patent medicine stands to the medical practitioner who holds the indisputable certificate to practise.

Dec. 9, 1885.

T. E. KNIGHTLEY.

\* \* \* Postponed from last week for want of space.



### "SUTTON'S HOSPITAL IN CHARTER-HOUSE."

SIR,—As an "old Carthusian" I have read your article on "Sutton's Hospital" [p. 811, ante] with the deepest interest, and I look forward to your promised further description of our old school.

I may supplement your interesting notes on the buildings by explaining that in my school-days (1851-7) our buildings surrounded "Upper Green," where our cricket matches were played; on the north side of this was a "hill," on which our school-room stood,\* and beyond this was "Under Green," the great irregular space sold by the Merchant Taylors after their purchase of it, and now built over. It is "Upper Green" which interests us specially. That great square space was the cloister court of the Carthusian Monastery, and on its west and east sides were existing in my time (and I hope still exist) some of the ancient doorways of the monks' cells, with the small arched apertures through which meals were passed to the occupants from the cloister alley just as I have since seen at the Monastery of the Grand Chartreuse, and as Viollet-le-Duc gives them in his "Dictionnaire d'Architecture." The best-preserved remains were in the later brick cloister (where we played football under difficulties!) near "Middle Friars," but I trust that others still exist in "Crown Walk," so called from the white crown painted up on the wall by Lord Ellenborough when (as my grandfather used to tell me) the boys of his day played at coach-and-horses, and there "changed horses."

I am inclined to think that the Carthusian monks' chapel stood on the "hill," and where as tradition says the bodies of those who died at the Great Plague were buried. This would agree with the usual Carthusian plan. Certain it is that our present chapel is of much later date and was most likely built by the Howards in connexion with their house. Yet this chapel is to us Carthusians of surpassing interest, for there is our founder's tomb, "good Richard Sutton," and there we meet for evening prayer on our founder's birthday (December 12) before we dine in our old hall. The chapel and Howard House stand on the south side of "Upper Green." The former is characteristic of that date (James I.), and has a double aisle lighted by windows placed high in the wall with a round-arched arcade; the tomb of the founder is in the north aisle. Though I used to sit in it I could bear without much emotion to hear that the ugly modern projection northwards from the Sutton aisle was to be removed. It is incongruous, and spoils the old proportions of the chapel.

The old hall is of the Howard date, but was much altered when it came into Sutton's hands. He added a quasi-clearstory, put on a new roof, and constructed a music gallery and screen, with panelling and chimney-piece, over which is a side gallery from end to end; very curious in effect.

Howard House, with its beautiful mullioned windows, and tapestry-covered walls, is well known; and we Carthusians remember its state-room, used for our singing lessons, under Hullab then, and for the "Oration" which we all had annually to go and hear, before its delivery in the Hall.

The older Carthusian relics are not so familiar to the general public, but, as an essential part of our history, of which we are so proud, I am sure that I only express the earnest wish of old Carthusians that they may never disappear for any consideration whatever.

We who were present on Thursday last in the old Hall, heard, with profound interest, after dinner, the extensive scheme of the Governors; it was explained in detail to us by the Master, and, though we appreciate the sense of duty in the Governors to extend Sutton's Charity as largely as possible, we regret the necessity of the sweeping away of any of our old buildings. One, however, feels that, in the hands of such truly "conservative" Governors as the Attorney-General and Mr. J. G. Talbot, all possible consideration will be given to old traditions. Yet one also feels sad to think that by this proposed scheme, the "adsum" to their Master will not in future be said by Sutton's pensioners within the sound of their old chapel bell.

R. HERBERT CARPENTER.

\* The quins and other stones of the old school, covered with names of old Carthusians, are removed and re-fired at the new buildings at Godalming.

### CIRCULAR HOSPITAL WARDS.

SIR,—I think it will be best, as Mr. Snell's feelings appear to be hurt, and he is evidently very angry, not to pursue this discussion further with him. HENRY C. BURDETT.  
December 17th, 1885.

### PROPOSED EXTENSION OF THE SITE FOR THE NEW GOVERNMENT OFFICES.

SIR,—Born and bred in London, and having some practical acquaintance with architecture, I have watched with great interest all metropolitan improvements for some years, and should like to add one word in support of the recommendations of Mr. E. C. Robins on the above subject, so clearly illustrated by the plan given in your paper of Nov. 21st last.

The combination of advantages that would be gained by its adoption, viz.:—  
1. The continuation of the Mall into Charing-cross.

2. The widening of the Whitehall thoroughfare at its narrowest part.

3. The extension of the Whitehall façade of the new buildings, which would so largely enhance the general effect of the structure; as well as

4. The great increase of light and wholesomeness that would be secured by the enlargement of the open courts and areas.

would, I believe, if sufficiently laid before, and realised by, the public, easily reconcile them to the increased cost; while the proposed dodging of the new building round the back of the two banks (which it would nevertheless dwarf into unpleasant insignificance), not, I am sure, be a source of intense regret to all future generations.

In numberless cases the avoidance of an immediate outlay has proved to be false economy, and produced the more dissatisfaction because it has ultimately led to greatly increased expenditure.

As a second change in the headship of the Office of Works has taken place, there seems some hope of an alteration in the accepted plan being made, and if the new First Commissioner would give an impartial consideration to Mr. Robins's proposals, and adopt them, probably many would not regret that through the fortune of political warfare this great decision, at any rate, has come into the hands of an Irish representative. HENRY STAINES.

### "OVERCROWDING IN LONDON."

SIR,—In the otherwise excellent report of the discussion on the paper read to the Association of Sanitary Inspectors on "Overcrowding in London," published in the *Builder* of the 12th inst. [p. 841], I am reported to have said:—"Architects seemed to think they had an exclusive privilege to construct 'dwellings,' &c., and on that sentence I am favoured with a footnote expressing surprise that a sanitary inspector should be so ill-informed as not to know that 95 per cent. of the dwellings of London are built by speculating builders, and not from the plans or under the supervision of architects."

Having had a large experience in the building trade, and also in practical sanitation, I shall be glad if you will be good enough to allow me to say that the absurdity of such words as "exclusive privilege" as to you; and, that they are not mine. What I pointed out was, that any one is privileged to construct dwellings wherein the rooms may be as small as he pleases; that there is no restraint of law as to dimensions, save that ceilings must at least be 7 ft. high; and I pointed out that this privilege is very much abused all over London,—may I add, abused not only in the construction of so-called "Models"; but also in the construction of an enormous proportion of the houses built and being built in and around London!—the space suitable for one room being generally divided into two or more rooms, in which elbow-room for families simply does not exist.

I venture to hope the time is not far distant when the full gravity of the evil consequences involved in penning up a great population in rooms utterly inadequate in size to the requirements of a home, shall be better understood, and its further extension prevented by an enactment prescribing a minimum superficies of floor and ceiling, and a minimum portion of length to width (where the sides are not equal) for all rooms intended for human habitation.

HUGH ALEXANDER,  
Chief Sanitary Inspector, Shoreditch.

### BIRKENHEAD ABATTOIRS COMPETITION.

SIR,—From the articles and letters which have appeared in the local papers it is clear that a grave injustice has been done to the architects who have sent in the plans. First, by inviting them to compete, when, at the same time, the decision to employ a certain architect had been determined. Secondly, by the force of calling in professional assistance, and ignoring it when it was found that the architect who had been determined upon was not represented among the three

sets of plans selected, and deliberately bringing in his plans and adopting them.

The local papers do not hesitate to refer to it as a piece of jobbery, to condemn it in the strongest terms, and to recommend competitors to combine in a memorial to the Council asking them to reconsider the whole question. In view of such a course being taken, a notice to competitors to send in their names to "A. B. C.," care of Broom & Walsley, 1, Hamilton-square, Birkenhead, was posted at the entrance to the room where the plans were exhibited. Some names have been received; but the notice may not have been seen by all competitors. Will you, therefore, permit attention to be drawn to it through the medium of the *Builder*? The memorial is being prepared and will be sent for signature to every competitor whose name is received.

ONE OF THE COMPETITORS.

### THE VENTILATION OF PRIVATE DWELLINGS.

SIR,—Referring to your report of the paper on the above subject [p. 839], read at the last meeting of the Architectural Association, I have evidently quite failed to express my meaning with regard to inlets and outlets in a system of ventilation. I do not by any means advocate the neglect of outlets; what I meant to say was that in a common-place house it was desirable to provide enough properly-arranged inlets, and then rather to leave the extraction to the natural agent,—the fire,—than to specially-contrived outlets, which are expensive, and uncertain in their action.

It was evident that on the evening of discussion one of the speakers (Mr. Slater) was under the same misapprehension as myself, and I had thoughts of correcting his impression, but refrained, under the idea that but little importance would be attached to my views as a private individual; but as you have commented on them as those of the chairman, I venture to trouble you with this correction.

J. ALFRED GOTCH.

### WHAT IS A "QUARRY"?

SIR,—I am much obliged for your remarks *re* above, but you misunderstand me: my question is not, what is the meaning of the word; but what is a quarry,—a quarry as known in the trade for the last half-century. You say:—"It thus appears that recent custom takes it to mean a diamond shape." By the enclosed glass merchants' list dated 1829, however, you will see that even at that date quarries were known as "quarries," and squares as "squares."

We all know that the word "square" is used daily for pannels which are not square in the true sense of the word.

I have used the word "pane" in preference for five-and-twenty years; if no other, it has the one advantage of being shorter. If you could find space in the *Builder* to reprint the list enclosed I have no doubt it would interest many of your readers.

If some of your correspondents will kindly answer my query they will much oblige

TEN TO THE FOOT.

\*\* The price list of 1829 referred to is hardly of sufficient interest to print, but it gives "quarries" as a separate item under the general head of "Prices of Crown Window Glass," and "squares" and "small squares" as two other headings.

### FELT ROOFING.

SIR,—I should be greatly obliged if, through the medium of your paper, I could get information as to the experience of other people with regard to felt roofing. Does the smell ever quite go off? It is now three years since I added a library to my house,—a large room, with no others above it, having a high oak roof, boarded in, with felt over, and then slated. The builder and architect both told me the smell of tar from the felt would go off in a few months, but I have not found it so. In the summer and dry weather it soon became very little perceptible, but on rainy and damp days, of which we get a great many this West, the strong gaseous smell of tar, which catches one's throat, is as powerful as ever, and renders the room quite uninhabitable at this season. Having a good fire makes things worse, as the heat seems to draw the smell down into the room. Is there any remedy? F.

The late Sir William Siemens.—We understand that a biography of this eminent man is being prepared, at the desire of the executors, by Dr. William Pole, F.R.S., honorary secretary of the Institution of Civil Engineers, and author of the "Life of Sir William Fairbairn, Bart." We are asked to say that Dr. Pole will be grateful for the loan of any of Sir William's letters, or for any information of importance. Address, Athenaeum Club, S.W.



## The Student's Column.

## DESCRIPTIVE GEOMETRY.—PART II.

XXIX.

## THE HYPERBOLIC PARABOLOID.

**H**IS surface (fig. 225\*) is engendered by a straight line, A, sliding on two other straight lines, B and B', not contained in one plane, the straight line A remaining always parallel to a given plane, P, which is called a Directing Plane. To produce a series of generators, A, we have only to cut the two directors, B and B', by planes parallel to the directing plane P; joining the points of intersection, m, n, m', n', m'' n'' . . . . ., we have the generators A, A', A'' . . . . . required.

This paraboloid is a skew surface, for any two generators, A and A', cannot be in one plane, otherwise the directors B and B' would be in one plane.

This paraboloid has also, like the hyperboloid, another system of generation, in which the directors B become generators, which slide along any two lines, A, which then become the directors. We prove this by showing that any plane, DUV, parallel to the directors, B and B', cuts the paraboloid along a straight line; this means that the intersections, d, d', d'', of the plane with the generators A, A', A'' are in a straight line.

Let us project our figure on a plane, Q, o x, parallel to the directors B and B'; and let the lines of projection be parallel to the line P o (mind this is not an orthogonal projection, as those we ordinarily make, but an oblique projection on a plane, which need not be at right angles with the plane). Now, B and B' will be projected in b and b', and the lines m d n, m' d' n', m'' d'' n'' will be projected on m d n, m' d' n', m'' d'' n'', parallel to o x. We shall have, therefore, on account of the projection lines being parallels:—

$$\frac{m d}{d n} = \frac{m' d'}{d' n'} = \frac{m'' d''}{d'' n''} = \frac{m^1 d^1}{d^1 n^1} = \frac{m^1 d^1}{d^1 n^1}$$

but as the lines, A, A', A'', are in three planes parallel to the plane Q, we have by the fifth proposition:—

$$\frac{m d}{d n} = \frac{m' d'}{d' n'} = \frac{m^1 d^1}{d^1 n^1}$$

and, therefore, the second members of the former equations are equal, and we have:—

$$\frac{m d}{d n} = \frac{m' d'}{d' n'} = \frac{m^1 d^1}{d^1 n^1}$$

As the lines m n, m' n', m'' n'', are parallel, these proportions show that the points d, d', d'' are on a straight line; the points d, d', d'' are, therefore, in the projecting plane of the line d, d', d'', and as the points d, d', d'' are also in the plane DUV, they are on the intersection of both planes, and are therefore in a straight line.

We can conclude, therefore, that if a line B, parallel to the plane Q, is made to slide on the two lines A and A', it will describe the same paraboloid described before by the line A.

Now, if without requiring that the line B be parallel to a given plane, we slide the line B on three lines, A, A', A'', parallel to a plane P; the line B will again engender the paraboloid. From this point of view, the paraboloid may be considered as a special case of the hyperboloid of one sheet.

From the above we can conclude:—

Firstly. That through any point v of the paraboloid two generators pass, the one of system A, the other of system B.

Secondly. That two generators of the same system are never in one plane.

Thirdly. That each generator of one system meets all the generators of the other system, but that there are no two generators parallel; for, if A' and B', for instance, were parallel, they would have to be both parallel to o x intersection of the two directing planes. This is impossible; for by the very conditions of the surface, a plane which passes through B', and is parallel to o x, will be parallel to the directing plane Q, and can never intersect any other director B; therefore, can never give another point of a generator.

Fourthly.—A straight line can pierce a paraboloid in not more than two points.

As the generators of the paraboloid are found

by the intersections of the directors by planes parallel to the plane P, we know by the fifth proposition that the parallel planes cut the lines B and B' in proportional parts; this gives us the following proportions:—

$$\frac{m m'}{n n'} = \frac{m' m''}{n' n''} = \frac{m'' m'''}{n'' n'''} = \dots$$

The surface of the paraboloid might therefore be described by a line, A, sliding on the directors B and B' in such a way as to cut these directors in proportional parts.—This gives us an easy way of constructing a hyperbolic paraboloid with four wood rails and a reel of thread. Make with the rails a skew quadrilateral of rigid angles, then divide each side in equal parts, and join the divisions on opposite sides of the quadrilateral with thread. From the last definition we see that each thread will be a generator of a paraboloid, of which all the threads taken together will clearly represent the surface.

The tangent plane (fig. 225) to the paraboloid in a point o is the plane of the two generators which pass through that point. We therefore produce a second generator, A', parallel to the directing plane P, and then cut both the generators A and A' by a plane parallel to the other directing plane Q, and passing through o; this gives us the second generator, g n k, required.

The section of the paraboloid by a plane  $\pi$  (fig. 225) is found by marking on the generators the points where they are cut by the plane and connecting these points by a continuous line. The tangent to the curve of intersection will be, as in every other case, the intersection of the cutting plane  $\pi$  by the plane tangent to the surface of the paraboloid which we find as above. But we can foretell beforehand what the nature of the section will be.

If the plane  $\pi$  contains a generator of the paraboloid, the other branch of the section will be also a straight line; but if the plane  $\pi$  be parallel to the directing plane P, there would be but one straight line of section, viz., a generator itself.

Let the plane  $\pi$  be any plane not parallel to the directing planes, and its traces on those planes be  $\delta$  and  $\delta'$ . We know that the paraboloid will have generators parallel to  $\delta$  and  $\delta'$ ; for, if we take a plane, Bce, parallel to  $\delta$ , it will cut the director B' somewhere, say in n'; if through n' you carry a horizontal plane, it will cut the paraboloid along the generator A', which is parallel to c e and, therefore, to  $\delta$ , that is parallel to the plane  $\pi$ . In the same way a generator of the B system may be found parallel to  $\delta'$  and the plane  $\pi$ . The plane  $\pi$  will never touch the two generators which are parallel to it, the section must therefore be an open curve which will tend to touch the said generators at an infinite distance. This means the section is a hyperbola.

The limits (prop. asymptotes) of the hyperbola are the intersection of the plane  $\pi$  by the planes tangent to the hyperboloid at an infinite distance on the generators parallel to the plane  $\pi$ . These tangent planes are the planes which contain the generators, and are parallel to the directing planes; the limits are therefore very easily found.

If the plane  $\pi$  is parallel to the intersection o x of the directing planes, then the section is a parabola.

In fig. 226 we have represented the plan of a hyperbolic paraboloid and two elevations, by which the reader will be able to realise the appearance of this surface. He will find it identical with that described before in fig. 98 (June 6th, 1885), for its outline on both elevations, or, what is the same, its sections by the vertical planes on c e and d' f' are parabolas and all other sections of the surface parallel to those planes are also parabolas, as they are all vertical planes parallel, as we will see, to the intersection of the directing planes P and Q; the surface may therefore be described as formed by the motion of a parabola along another parabola at right angles with it.

In our figure the two directing planes are supposed vertical, and their horizontal traces P<sup>h</sup> and Q<sup>h</sup> are given at the right-hand side of the plan; their intersection is, therefore, a vertical line. The horizontal projections of the generators of the paraboloid will, of course, be parallel to P<sup>h</sup> and Q<sup>h</sup>. We have taken the lines d c and e f as directors, and drawn only one system of generators (few of the other system are indicated on the plan by broken lines), so as to allow us to show on the elevations by plain lines the parts of the generators which

are seen, and by dotted lines the parts which are hidden by the surface itself.

We have cut the paraboloid by three horizontal planes; one above the point o, which gives us as section the two hyperbolas that touch the points m and n; another horizontal plane taken below the point o gives a section formed of the two hyperbolas which touch the points u and v; the horizontal plane taken at the level of the point o cuts the paraboloid along two straight lines, and is tangent to the surface in the point o. The point o is called the crown of the paraboloid, and the vertical line o x through o is called the axis of the paraboloid.

## THE TANGENT PLANES TO SKEW SURFACES IN GENERAL.

Of all skew surfaces, the hyperboloid of one sheet and the hyperbolic paraboloid are the simplest, and their tangent planes are very easy to find. They offer a means of solving similar problems on any other kind of skew surface, thanks to the two following propositions:—

First Proposition (fig. 227).—When two skew surfaces S and S' have one generator, G, L M N, in common and are tangent in three points, L M N, of that generator, then the two surfaces are connected all along that generator. Two surfaces are said to be connected when they are continuous without any apparent joint; this implies that in every point of their connection the tangent planes will be common to both surfaces.

As the two surfaces are tangent in the points L, M, N, any three planes taken through these points will cut both surfaces along curves a b, b c, and a' b', b' c', respectively tangent to one another; of these curves, the three first may be taken as the directors of the surface S, and the three last as the directors of the surface S'. Now, if the generator, G, slides along an infinitely small distance, and occupies the position g, it will still be on both surfaces; for the directing curves of both surfaces have the same linear elements, L, M, N, because they have the same tangents. We can conclude that the superficial element comprised between the generators G and g is common to both surfaces (mind, the superficial element is a skew surface, not a plane), and the two surfaces are therefore connected all along the generator G.

Second Proposition (fig. 227).—If the two surfaces, S and S', have directing planes, they will be connected all along the generator G if they are tangent in any two points, L and M, of that generator, and have both the same directing plane. It is evident that in this case the line g will be sufficiently determined by having to be parallel to the directing plane, and to touch the elements, L, M; and we can conclude that the above conditions are sufficient for connecting the surfaces along the generator G.

The two preceding propositions on the contact of skew surfaces are not only useful in many questions of masonry and carpentry where skew surfaces have to be neatly connected, but they give us the means of producing the surfaces of the joints of certain vaults, for these surfaces must always be normal to the inner surface of the vault, that means perpendicular to the planes tangent to the vault in every point of the joint.

Find the plane tangent in a given point of a skew surface (fig. 228).—Let the curves a b, b c be the three directing lines of a skew surface, S, and we wish to find the plane tangent to this surface in the point n, situated on the generator G L M N. Produce the tangents L n, M n, N n to the directing curves. If the generator, G, is made to slide on those tangents it will describe a hyperboloid (the surface L T V N in fig. 228), which will be tangent to the surface S in the three points L, M, N, and, according to our first proposition, this hyperboloid will be tangent to the surface S all along the generator G. This is a connecting hyperboloid. The problem is therefore brought back to finding the plane tangent in the point n to the connecting hyperboloid, a problem which we have learned to solve.

To find a connecting hyperboloid we are not limited to the tangents on the directing curves given, but the tangent to any other curves delineated on the surface will do as well; in fact, we have the choice in each point, L, M, N, of any straight line belonging to the plane tangent in that point. This shows that there are an infinite number of connecting hyperboloids, which touch a surface along a given generator; but of all these hyperboloids there is one more closely connected with the surface

\* Figs. 222, 223, and 224 refer to the preceding article.

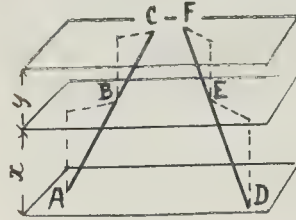


Fig. 222.

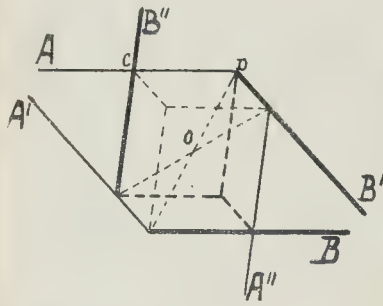


Fig. 223.

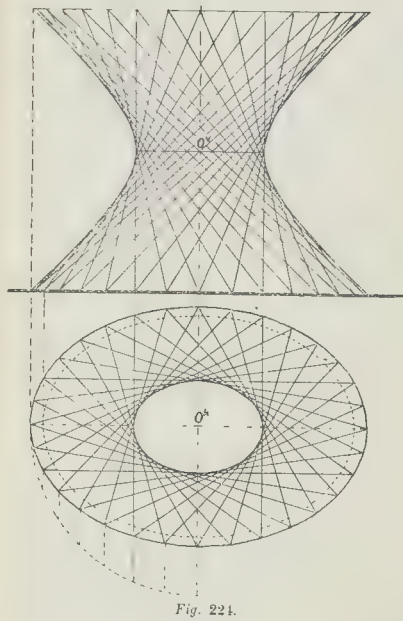


Fig. 221.

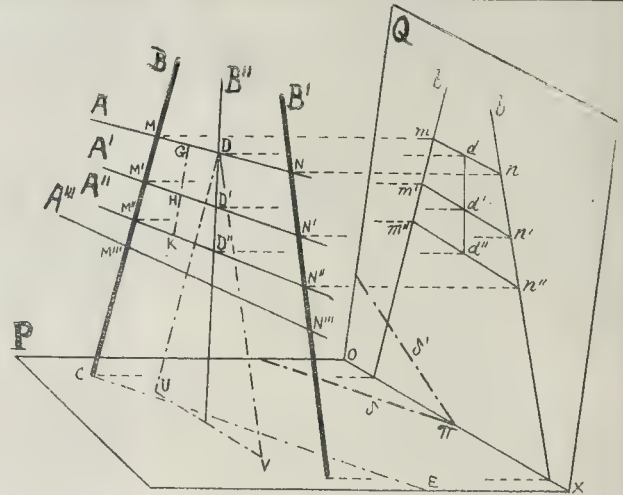


Fig. 225.

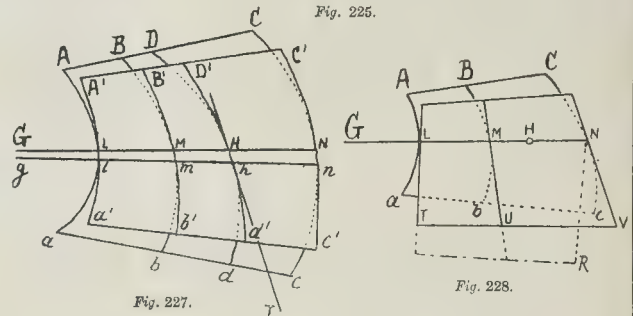


Fig. 227.

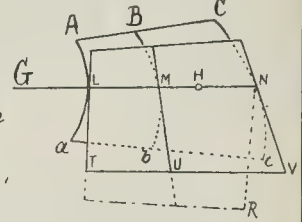


Fig. 228.

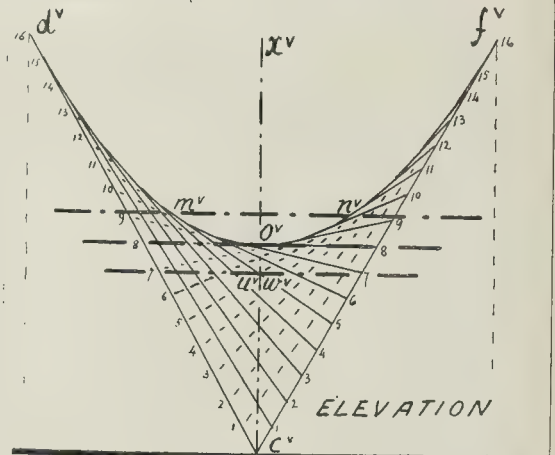


Fig. 226.

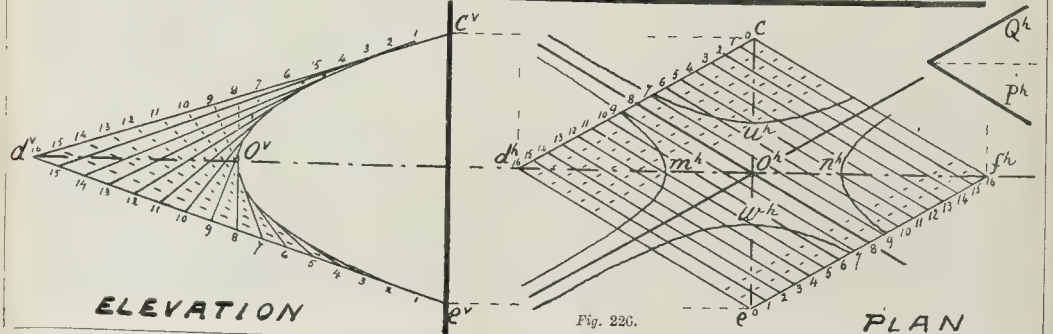


Fig. 226.



than all the others. This is what we call the *osculating hyperboloid*, of which we shall speak when we treat of the curvature of surfaces.

The connecting paraboloïd offers the simplest method of finding a plane tangent to a skew surface. S. We can always (fig. 228) in the plane tangent to the surface S, in a point N, produce a line, N R, parallel to the same plane as the tangents L T and M V. To do this we have only to cut the tangent plane G N V by a plane parallel to L T and M V. If, then, we adopt the lines L T, M V, N R as directors, the connecting surface will be a paraboloïd, the tangent planes to which are particularly easy to find. We shall show further on a practical example: this method applied to finding the joints of a skew archway.

If the surface S be itself a cylindroid, with a directing plane, the connecting paraboloïd will be constructed on the tangents L T and M V to the two directing curves. A practical example of this operation will be given further on, when finding the tangent plane to a conoid.

### STAINED GLASS.

**Tatton Park.**—The private chapel at Tatton Park, the seat of Lord Egerton, has just been completed, the windows round the chapel being filled with stained glass containing figure work, very delicately treated on white glass, silvery in tone, and golden stain. The details are strictly in keeping with the Renaissance style. The east window of three compartments is adapted from a fresco by Pietro Perugino at Pavia. These windows were designed and executed by Messrs. Henton, Butler, & Bayne, under the supervision of the architect, Mr. A. W. Blomfield.

**Kildwick (Yorks).**—Stained glass has been inserted into one of the three-light windows in the south aisle of Kildwick Church, in memory of the late Richard Hartley, of Sutton. The subject is the Adoration of the Shepherds, and the work has been designed and executed by Messrs. Powell Brothers, of Leeds.

**York.**—A stained-glass window has recently been erected in the north aisle of St. Sampson's Church, York, as a memorial to Mr. Jacob Hird, who for forty years took part in the choir of this church, and from his youth to his death was connected with the Wilberforce School for the Blind, first as a pupil, and afterwards as teacher of basket-making. The subject chosen is our Lord calling Bartimeus, and is represented in two panels surmounted with canopies of rich Perpendicular work, with the texts, "He stood still and commanded him to be brought," and "Be of good comfort, rise, He calleth thee." The artist was Mr. J. W. Knowles, of York, who has executed five other windows in this church.

**Liverpool.**—The baptistry of St. Nicholas, Blundellsands, Liverpool, has just received an addition of three Munich windows, representing the Presentation in the Temple, the Good Shepherd, and the Baptism of Christ. They are exceedingly rich in tone, and very artistic in design. These windows are by Messrs. Mayer & Co., who have already erected a three-light window in the same church.

**Rotherham (Yorkshire).**—A two-light stained glass window has lately been erected in the church of Adwick-on-Deane, near Rotherham, to the memory of "Betsy, the beloved wife of Mr. Christopher Norwood," of that place. The subject is "The good Shepherd." Messrs. Pitman & Son, of London, are the artists.

**Post-Office Handbooks.**—We have received the following circular from the Secretary of the General Post-Office:—"On the 1st of January next, a new official publication, entitled 'The Post-office Handbook,' containing the principal regulations and other necessary information respecting Post-office business, will be issued for sale to the public at the price of 1d. The book may be obtained at all Post-offices, and also of the town and rural postmen throughout the United Kingdom. The 'Post-office Guide,' and other official publications, which have hitherto been supplied to the public through private publishers, will, after the end of the present year, be obtainable from Postmasters only. All persons, therefore, desirous of obtaining copies of the next issue, should make early application to the local Postmaster or sub-Postmaster for the same."

### RECENT PATENTS.

#### ABSTRACTS OF SPECIFICATIONS.

10,211, Coupling Carls. A. Steadman.

Two carts are coupled together to form a single wagon, the connection being made by iron bars fixed to the body and bolted together, and by plates bolted to the sides of the body by long bolts. When the carts are disconnected and used separately, these bolts serve to assist in securing the removable shafts to the bodies.

12,097, Paving Block. J. Maclaren.

The top of the wooden block, such as is generally used for paving, is dovetailed to a metallic part, which may be grooved, channelled, or left plain as desired. The metallic portion forms the road-surface, and is channelled so as to prevent slipping and to drain off water, &c., from the roadway. Studa are inserted at intervals in the blocks used, so as to secure a uniform width of joint.

12,803, Material for Building, &c. E. Robbins.

Unground sulphate of lime is dehydrated by heat or pressure, in a suitable way, pressed into a mould, into which any suitable material may be first placed, to form the face of, or to be embodied in, the product, and the mass is indurated by the addition of water or an aqueous solution of any chemical, or by heat, or by pressure. The gypsum employed may be combined with any other ingredients, solid, liquid, or gaseous, such ingredients being of either a binding, a neutral, or a colouring nature. Various methods of carrying the invention into effect are described.

14,598, Frost Cocks for Hydrants. W. L. Baker.

To prevent water standing in the discharge-pipes of hydrants after the sluice is shut, and thereby causing bursting by frost, a cock or valve is fitted at the bottom of the bend to allow the water to run off. A plug-valve may be employed with a hole in the top, in which the suncock's hook may be inserted. Or the plug may be hollow and fitted with a balanced or loaded valve which opens automatically when the water pressure is shut off by the sluice.

14,717, Ornamental Surfaces of Metal, &c. A. Swan.

Producing ornamental surfaces of metal, combined with glass or other material capable of being pressed, cast, or moulded. The metal is formed with projections, grooves, or irregularities at the parts with which the glass or the like is to come in contact, and the latter is then cast or moulded thereon.

15,014, Artificial Stone. J. Thompson and J. H. Bryant.

Portland cement, crushed granite, and iron slag, are mixed together in certain proportions, and water containing sodium silicate is added, with or without a suitable pigment. The mass is then laid *in situ*, or made into slabs and allowed to set.

#### NEW APPLICATIONS FOR PATENTS.

Dec. 4.—14,574, R. Best, Construction of Central Light Gasaliers.—14,581, A. Carey and A. Jack, Manufacture of Portland Cement.—14,901, H. Rushbury, Improvements in Door Locks.—14,907, C. Hodges, Improved Lamp Post.

Dec. 5.—14,921, J. Sephton and J. Evans, Chimney Pots for Preventing Down-draughts.—14,951, J. Davis, Supporting Vertically Sliding Window Sashes and Shutters in their Frames.

Dec. 7.—14,977, C. Henderson, Fan for Producing a Current of Air.—14,978, J. Cartland, Ventilating Rooms and other Compartments.—14,981, W. Reed, Pneumatic Chimney-cowl and Ventilator.—15,001, J. Cant, Improvements in Ventilations.—15,003, E. Benn, Improvements in Chimney Pots.—15,007, W. Borey, Improvements in Fire-grates.—15,016, W. Berridge, Improvements in Stoves or Fire-places.

Dec. 8.—15,031, W. Collis, Jointing Cast-iron or other Rain or other Water Gutters.—15,035, W. Scott Morton, Improvements in Fireplaces.—15,038, W. Collis, Ventilating Vertical Sanitary or other Water Pipes or Tubes.—15,044, D. Gill, Improvements in Room Doors and Doorways for Isolating the Air in Rooms from Passages and Staircases.—15,054, A. Ayers and W. Wilson, Sash Frames, Holders, and Casings for Windows, &c.—15,088, M. Buckner, Improvements in Windows.

Dec. 9.—15,097, G. McCarthy, Sash Fastener.—15,108, J. Gibson, Cooking Ranges and Stoves.—15,112, J. Armistead, Ventilating Rooms, &c.—15,133, L. Scott, Improvements in Glass Levels.—15,134, A. McLean and R. Smith, Improvements in the Preparation of Coloured Varnishes.—15,135, A. McLean and R. Smith, Improvements in the Manufacture of Pigments.—15,136, E. Banner, Fastening or Securing Cool-hole Plates, &c.

Dec. 10.—15,157, W. Stirling, jun., and T. Swann, Preventing the Flow of Solid Matter from Water-closets into Public Sewers or Water-course.—15,185, T. Carder, Improvements in Kilns.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

11,805, H. Phillips, Flushing Cisterns.—12,223, R. Wyatt, Syphon Flushing Apparatus for Cisterns.—12,392, C. Fellows, Improved Sash Fastener.—

13,198, F. Caws, Ventilating.—13,758, E. Horsley Door and Window Fastener.—13,760, E. Horsley, Window Fasteners.—14,467, J. Jeffries, Improved System of Glazing.—14,538, D. Brown, Protecting the Astragals of Glass Roofs and arranging Channels for Condensed Water as part of same.—14,553, W. Brierley, Improvements in the Manufacture of Bricks and Tiles.—12,957, J. Shanks, Improvements in Wood and other Screens.—13,078, C. Hunt Combined Reflecting and Ventilating Apparatus in connexion with Gas Lights.—13,100, E. Hughes, Apparatus for Feeding Timber to Circular or other Saws.—13,271, S. Sutcliffe, Tile Grate Fronts and Tile Grates and Chimney-pieces combined.—14,347, G. Gordon, Apparatus for Propping or Staying Purpose in Building, Excavating, Quarrying, &c.—14,559, R. Lee and J. Hodgson, Construction of Fireproof Pillars and Columns.

#### COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

695, W. Hackley, Improved Portable Soldering Apparatus.—824, E. Mills, Process for the Agglomeration or Consolidation of Materials, and for Hardening Stone Coments, &c.—1,538, W. Brow, Apparatus for Regulating and Adjusting the Opening of Casements, &c.—2,451, M. Brissac, Industrial Product for Panels and Hangings in Relief.—12,923, A. Boulton, Door Checks.—12,927, A. Boulton, Door Checks.—1,355, A. Reddie, Improvements in Fire Grates.—1,388, A. Reddie, Machine for Sharpening and Setting Saws.—1,777, G. Chubb and G. Exton, Door Locks, Latches, and Furniture.—2,092, A. Campbell and J. Ash, Improvements in the Catches of Door Locks or Fastenings.—3,396, H. Salis, Improvements in Hinges.—11,805, H. Phillips, Improvements in Flushing Cisterns.—11,890, H. Hadden, Improvements in the Treatment of Veneers.—12,903, W. Lake, Improvements in Doors, and Hanging and Closing the same.—13,730, C. Knight, Improved Means for Joining Pipes.

### RECENT SALES OF PROPERTY.

#### ESTATE EXCHANGE REPORT.

Dec. 3.  
By Messrs. ELDON.  
Russell-square—No. 27, term 16 years, ground-rent 42s. £1,200  
2, Torrington Mews, 20 years, ground-rent 6l. 6s. 169

Dec. 4.  
By Messrs. ELDON.  
Barnsbury—82, Thornhill-road, 23 years, ground-rent 6l. 270  
Canonbury—88, Grosvenor-road, 64 years, ground-rent 17l. 10s. 1,130

Dec. 5.  
By Messrs. ELDON.  
5, Alyn-road, 60 years, ground-rent 10l. 730

Dec. 6.  
By W. B. HALLITT.  
Walham Green—14 and 16, Armadale-road, 87 years, ground-rent 10l. 445

Dec. 7.  
By Messrs. LEAGUE.  
Fulham—50, 62, and 64, Radpole-road; and 45, Cheshill-road, 94 years, ground-rent 32l. 1,800

Dec. 8.  
By W. F. NOKES.  
Islington—36 and 27, North-road, 75 years, ground-rent 16l. 10s. 850

Dec. 9.  
By VENTON, BULL, & COOPER.  
West Kensington—62, Talgarth-road, 91 years, ground-rent 10l. 10s. 650

Dec. 10.  
By Messrs. ELDON.  
39 and 41, Gwendwr-road, 91 years, ground-rent 15l. 1,700  
61, Gwendwr-road, 91 years, ground-rent 15l. 850

Dec. 11.  
By Messrs. ELDON.  
Forest Hill—Ground-rents of 14l. a year, reversion in 71 years 350

Dec. 12.  
By Messrs. ELDON.  
St. Vincent—"The Belvedere and Brighton Sugar Estates," 613 acres 2,000  
"The Calder Sugar Estate," 560 acres 3,300  
"The Argyle Sugar Estate," 405 acres 3,600

Dec. 13.  
By W. F. Houghton.  
Upper Clapton, Hill-street—Two freehold houses... 2,000

Dec. 14.  
By A. & A. FIELD.  
Berkley Heath—Freehold house and stabling... 450  
Bermundsey—122, Alcock-road, 47 years, ground-rent 4l. 10s. 380

Dec. 15.  
By Messrs. ELDON.  
Brixton—398 and 399, Colliers-bour-lane, area 4,600 ft. freehold 970  
Staines—Freehold land, about 20 acres... 1,200

Dec. 16.  
By Messrs. ELDON.  
Essex, Blackmore—Coppold cottage, and 14s. 2s. 32p. 115  
Stonden Many—Freehold land 6s. 3d. 136  
Blackmore—Four freehold allotments, 0s. 1r. 18p. 34

Dec. 17.  
By Messrs. ELDON.  
Barnes—6 to 8, Rose Cottage, freehold 485  
10, John's-row, freehold 126

Dec. 18.  
By C. C. & T. MOORE.  
Limehouse—61 to 69 odd, Lime-street, 63 years, ground-rent 37l. 400  
St. George's-in-the-East—11 to 25 odd, Anthony-street, 26 years, ground-rent 16l. 18s. 4d. 1,375

Dec. 19.  
By Messrs. ELDON.  
31 and 33, Anthony-street, 25 years, ground-rent 6l. 335  
27, 21, 25 to 28, Upper Fenton-street, 24 years, ground-rent 12l. 715  
252, 254, and 256, Cable-street, 68 years, ground-rent 5l. 775

Dec. 20.  
By Messrs. ELDON.  
Brixton—11, Frederick-crescent, 75 years, ground-rent 6l. 10s. 290  
156, Brixton-road; and 39, 32, and 34, Cowley-road, 15 years, ground-rent 25l. 650



|                                                                              |      |
|------------------------------------------------------------------------------|------|
| Oxford-street—218, Great Portland-street, 34 years,<br>ground-rent 15s. .... | £920 |
| Chelsea—23, Stayton-street, 23 years, ground-rent<br>4l. 6s. ....            | 165  |
| Forest Hill—46, Ewart-road, freehold. ....                                   | 250  |
| Canterbury, Artizans'-row—A plot of land, area<br>7,600 ft. ....             | £20  |
| DEC. 11.                                                                     |      |
| By HORNCASTLE & PEMBER.                                                      |      |
| Limehouse—15, Maroon-street freehold. ....                                   | 165  |
| 115 and 117, Maroon-street, freehold. ....                                   | 353  |
| Thames—21 and 23, Grady-street. ....                                         | 32   |
| By WILLIAMS & CHARLTON.                                                      |      |
| Clarks-well—17, Myddellon-square, 26 years,<br>ground-rent 10s. ....         | £25  |

## MEETINGS.

SATURDAY, DECEMBER 19.

Crystal Palace School of Engineering.—Award of Certificates to Students. Sir F. A. Abel, F.R.S., in the chair. 1 p.m.

MONDAY, DECEMBER 21.

Lambeth Potteries.—H.R.H. the Prince of Wales will present the Albert Medal of the Society of Arts to Mr. Henry Doulton. 12 noon.  
Inventors' Institute.—8 p.m.

TUESDAY, DECEMBER 22.

Institution of Civil Engineers.—Mr. John Milne "On Construction in Earthquake Countries." 8 p.m.

WEDNESDAY, DECEMBER 23.

Edinburgh Architectural Association.—Annual dinner.

## Miscellanea.

**Liverpool Engineering Society.**—The usual fortnightly meeting of this society was held at the Royal Institution, Colquhoun-street, on the 9th inst., when the President, Mr. W. E. Mills, delivered his retiring address, which took the form of a short review of the art of engineering, looked at in the threefold aspect—first, what it had been in the past; second, what it is now in the present; third, what it is likely to be in the future. The concluding portion of the address was devoted to considerations on the education best fitted for those who intend to become engineers. The want of technical schools throughout the country, of which Sir William Fairbairn had pointed out the necessity more than thirty years ago, was strongly commented upon, while the appointment of a Professor of Engineering at University College was regarded with much satisfaction as a step in the right direction, and all (especially students) were urged to avail themselves fully of the advantages offered by means of the classes and lectures now set on foot.

**Berks Archaeological and Architectural Society.**—In the recent competition organised by this society for measured drawings of any ancient building, or part of a building, in the county of Berks, the first prize of three guineas was awarded to Mr. W. Roland Howell for a set of drawings illustrating St. Nicholas Church, Newbury. For the second prize of two guineas the judges considered that the drawings of the rood-screen of Warfield Church, submitted by Arthur E. Permain, and the drawings of Chidrey Church, near Wantage, by Frederick Musto, were of equal merit, but gave the prize to the former on account of his being the younger student, and at the same time awarded Frederick Musto a special prize of one guinea as a recognition of the merit shown by his work.

**London Sanitary Protection Association.**—At a meeting of the Council of this Association, held on the 11th inst. at the Offices, 1, Adam-street, Adelphi, Mr. E. B. Fillice Clark, M. Inst. C.E., was appointed Consulting Engineer to the Association, in succession to the late Professor Fleeming Jenkin. We are informed that the Association, which has been in existence now five years, consists of over 1,000 members.

**H.R.H. the Prince of Wales** has intimated his intention of visiting the Lambeth Pottery on Monday next, December 21st, for the purpose of presenting to Mr. Henry Doulton the Albert Medal of the Society of Arts, awarded in recognition of the impulse given by Messrs. Doulton to the production of art-pottery in England.

**Sanitary Assurance Association.**—At the monthly meeting of the Council last Monday, arrangements were completed for the series of free lectures to be given by the Association at the Parkes Museum during January and February next. The first lecture is to be by Professor Roger Smith, on "A Damp House," on Wednesday evening, January 20th; and on the following Wednesday Mr. F. B. Jessett, F.R.C.S. Eng., will lecture on "Preventible Diseases."

**The Parkes Museum.**—The tenth annual meeting of the members of the Parkes Museum was held in the Museum on Wednesday last, December 16th, Captain Douglas Galton in the chair. The annual report of the Council was of an encouraging character, the number of members having increased during the year from 260 to 365. The report concluded by stating that a scheme for amalgamating the Sanitary Institute with the Museum was under consideration, upon which the Council hoped to shortly report to the members. The financial statement of assets and liabilities (estimate) to the end of 1885 showed a balance of 1917.16s. 3d. in hand after the purchase of the lease of the present premises. In addition to the report of the Council, a report was submitted by the Joint Committee elected at the extraordinary meeting of members in February last. This Committee organised the great meeting at the Mansion House which had resulted in contributions of upwards of 1,000l., and had enabled the Council to purchase the lease of the Margaret-street premises, thus reducing the annual expenditure for rent from 320l. to 200l. On the motion of the Chairman, the two reports were unanimously adopted. Dr. Alfred Carpenter proposed a vote of thanks to the joint Committee. This was seconded by Dr. G. V. Poore, and carried. On the motion of Captain Galton, seconded by Professor Hayter Lewis, the retiring vice-presidents were re-elected, and on the motion of the Chairman, seconded by Mr. Mark H. Judge, the following members of the Council were re-elected:—Dr. Foote, Prof. Reynolds, Mr. Robins, and Mr. Thomas Twining. A vote of thanks to the Chairman concluded the proceedings.

**Gleanings in a Gloucestershire Parish.** This was the title of an interesting paper recently read before the Archaeological Section of the Birmingham and Midland Institute by Mr. Cecil T. Jervis, Mr. R. F. Martineau in the chair. The parish of Painswick, near Stroud, formed the subject of the paper. Mention was made of the various, though few, pre-Norman remains found in the parish. The extract from Domesday gave the earliest documentary evidence now extant of Painswick. A sketch-list of the various families who held the manor from the time of Domesday to the present time, with short accounts of the more striking events in the history of the parish, followed. Such were the court of inquiry by John Talbot, Earl of Shrewsbury, c. 1400, the erecting and maintaining of gallows by Sir Anthony Kingston, famed for his "sportive cruelty," and the royal visits of Charles I. and George III. The church was described and attention was directed to its celebrated peal of bells. The Court-house and its associations with Charles I. were not overlooked. A rubbing was shown of an altar-stone built into the wall of the pigsties at the former residence of the lords of the manor. The inscription is perfect and similar to the one found at Deerhurst, a facsimile of which was printed in last week's *Builder*, p. 819. Specimens of the Painswick tokens were exhibited and described. The paper was illustrated by some eighty photographs and sketches, the latter being kindly lent by Mr. U. J. Davis, of Painswick, who has in the press some "Notes on Painswick."

**Sewage Purification.**—Some weeks ago the Urban Sanitary Authority decided to test the operation of Mr. F. R. Conder's process for sewage purification, and arrangements were made accordingly by the Borough Surveyor. A small tank was fixed at the junction of two sewers at the corner of Bury-street, with the view of purifying the flow of contents, the sewer being, we believe, somewhat unpleasantly known in the vicinity of St. Nicholas Church. The tank was filled with the chemicals used in the process, and was set to work about three o'clock on Wednesday afternoon. A sample was taken at six the same evening, and to the surprise of all concerned the contents of the sewer were found to be running bright and clear, sweeping along with a granular deposit at the bottom, also inoffensive, and being swept into a 'catch-pit' at the mouth of the sewer. The objectionable smells were also destroyed. The proceedings were continued until the heavy rains, causing a rise of the river, hid the mouth of the sewer from view. We need only add that the chemical analysis of specimens of sewage treated by the process showed entire destruction of the noxious matter. A report will in due course be made to the Authority on the subject by the Surveyor.—*Survey Advertiser.*

**Royal School of Mines.**—Prof. Warington Smyth, F.R.S., in resuming his lectures upon Mining in the Theatre of the Geological Museum, Jermyn-street, spoke of the depths to which boring operations had been carried, observing that to penetrate much beyond 3,000 ft. is not considered advisable even under circumstances which may appear to be favourable. Veins are not frequently found productive until considerable depths have been reached, as, for instance, in Cornwall, where no copper of any note has been obtained at a less depth than 30 fathoms. A lode may be large at the surface, and yet not be productive till after many fathoms had been worked out, the probable explanation being the surface exposure to various oxidising agencies. Unless lodes are compact, and the surrounding rock free from fissures so as to prevent the admission of water, which always carries with it carbonic acid, or a clayey soil covers the back of the lode, its productive properties, which may have been originally good, are no longer possible. Not only does the nature of the veins depend upon the physical condition of the rock through which it passes; but the rock itself is often affected by the presence of the vein, due to the chemical action accompanying the process of filling. Bischof had put forth the most probable theory regarding the means by which the lodes were filled, viz., that the various substances are introduced by the underground circulation of water containing the metallic compound in solution, and we know that mineral waters do contain many of the substances which are found in veins.

**A New Library at Manchester.**—A new library building of four stories has recently been opened in Kennedy-street, Manchester, for the Manchester Incorporated Law Library Society. The basement is used for the storage of old books; the ground-floor contains the books in circulation; the first floor is used as a members' reading-room, and the second floor for meetings of law students. The front is faced with Pilgrimage stone and is designed in the Early Decorated style, and is designed in the narrowness of the streets both at the front and back, an unusual amount of window-surface is obtained. This is, however, arranged for without sacrificing an appearance of stability in the building by recessing the windows somewhat deeply, and forming boldly projecting piers between them. The contract was taken by Councillor Holt, of Cheetham, for the sum of 2,465l., and the works have been completed within that sum. The brickwork was done by Mr. Healey, of Salford; the stonework by Mr. Kirkham; the furniture and decorations are by Messrs. Goodall & Co., of Manchester; the stained glass by Mr. S. Evans, of Birmingham; and the mosaic work by Messrs. E. Smith & Co., of Coalville. The architect is Mr. Thomas Hartas, of Manchester.

**Testimonial to an Architect and District Surveyor.**—On Friday, December 11th, the first annual dinner of the Strand Ratepayers' Association was held at the Holborn Restaurant, Mr. E. J. Watherston in the chair. About 150 of the leading ratepayers of the Strand Union sat down to dinner. During the evening a testimonial, consisting of a silver tea and coffee service and silver tray and centre-piece, was presented to Mr. Robert Walker, F.R.I.B.A., District Surveyor of St. Martin-in-the-Fields, in recognition of the valuable services rendered by him in organising and carrying to a successful issue the opposition to the recently attempted wholesale increase in the Strand assessments.

**Royal Meteorological Society.**—The usual monthly meeting of this Society was held on Wednesday evening, the 16th inst., at the Institution of Civil Engineers, Mr. R. H. Scott, F.R.S., President, in the chair. The following papers were read:—(1) "On the Influence of Forests upon Climate," by Dr. A. Weickof, Hon. Mem. R. Met. Soc.; (2) "Report on the Phenological Observations for 1885," by the Rev. T. A. Preston, M.A., F.R. Met. Soc.; (3) "Études sur les Crépuscules Rosées," by Prof. A. Ricco, of Palermo; (4) "The Storm of October 15th, 1885, at Partenkirchen, Bavaria," by Col. M. F. Ward, F.R. Met. Soc.

**New Clock for India.**—The Maharajah of Mysore, following the example of the Hesseabad Commissioners of Lucknow, is having a turret clock erected at his palace by Mr. J. W. Benson, of London. The new clock has two illuminated dials, strikes the hours, and is fitted with Graham's dead-beat escapement, and all recent improvements.



**The Dephosphorisation of Iron.**—At a meeting of the Society of Engineers, held on the 7th inst. at the Town Hall, Caxton-street, Westminster, Mr. Charles Gandon, President, in the chair, a paper was read on "The Dephosphorisation of Iron in the Puddling Furnace," by Mr. Philip S. Justice. The author, after referring to the generally-depressed condition of the iron manufacture, showed how it bore most hardly on the works which were dependent on the use of phosphoric pig-iron, and on those which, in more favourable times, could work up cinder-pig. The presence of even a low percentage of phosphorus in the iron was most injurious to its quality and value, and, with the extremely low prices at present ruling, it was impossible to make these inferior qualities at a profit, and the use of phosphoric ores must be greatly limited, unless some means were found of obtaining from the pig-iron made from them a superior plate or bar-iron with cheapened cost of production. Many authorities had said that this was impossible with the ordinary puddling furnace, and that, in the face of the acknowledged success of the Bessemer, Siemens, Thomas-Gilchrist, and other systems of making mild steel, "the days of puddling are gone." But the author contended that this was not the case, and that the process discovered by Mr. Beasley, of Handsworth, and fully tested by two years' working on a considerable scale, met the difficulty by a special treatment of the "fettling" of the puddling furnace, whereby the phosphorus was eliminated during the ordinary process of puddling. The details of this treatment were fully explained, and its results stated to be the production of an iron equal in tensile quality and fibre to the best "marked bars." Experience also proved that the weight of iron produced, instead of being, as usual, less than that of the pig-iron charged into the furnace, was actually more, the process extracting the gain of iron from the "fettling" itself, which is usually lost in the slag as a silicate of iron.

**The Hoo Brook Viaduct.**—The Hoo Brook Viaduct, near Kidderminster, which has for some time past been in course of construction, has at length been completed, and has received a final visit of inspection from Col. Rich, the Government Inspector, preparatory to being thrown open for traffic. The structure consists of twenty semicircular arches, of 45 ft. span, and 3 ft. in thickness. The total height to the top of the parapet walls is nearly 74 ft., whilst the entire length of the viaduct is 1,100 ft. The arches are supported in the centre by very substantial projecting piers or buttresses, which rise above the parapet walls, and are surmounted by stones, with the names of the engineer, Mr. D. W. Rotherham, C.E., and the contractor, Mr. E. Gabbutt, inscribed upon them. The viaduct runs in a slight curve, each end of it being supported by massive abutments and strong counterforts. Over seven million bricks, of the best brinded kind, manufactured by J. W. Howlett, of Oldbury, have been employed in the construction; and the lime used is of blue lias, from Warwick. The contractors in the asphaltic department were the Brunswick Rock Asphaltic Company, of Gracechurch-street, London. The work has been executed under the management of Mr. J. E. Gabbutt, with Mr. Brain as inspector.

#### PRICES CURRENT OF MATERIALS.

| TIMBER.                               | £. | s. | d. | £. | s. | d. |
|---------------------------------------|----|----|----|----|----|----|
| Greenheart, B.G. .... ton             | 6  | 10 | 0  | 7  | 10 | 0  |
| Teak, B.I. .... do                    | 12 | 10 | 0  | 15 | 10 | 0  |
| Begonia, U.S. .... f. cube            | 0  | 2  | 6  | 0  | 2  | 6  |
| Ash, Canada, load                     | 3  | 0  | 0  | 5  | 0  | 0  |
| Birch " " " "                         | 3  | 0  | 0  | 4  | 10 | 0  |
| Elm " " " "                           | 3  | 10 | 0  | 5  | 0  | 0  |
| Fir, Danstic, &c. ....                | 1  | 10 | 0  | 4  | 10 | 0  |
| Oak " " " "                           | 3  | 0  | 0  | 5  | 0  | 0  |
| Canada " " " "                        | 6  | 0  | 0  | 7  | 0  | 0  |
| Pine, Canada red " " "                | 3  | 0  | 0  | 4  | 0  | 0  |
| " " " " " "                           | 3  | 15 | 0  | 5  | 0  | 0  |
| Lath, Danish " " " "                  | 4  | 10 | 0  | 6  | 0  | 0  |
| St. Petersburg " " " "                | 5  | 0  | 0  | 7  | 0  | 0  |
| Waincoat, Riga " " " "                | 2  | 15 | 0  | 4  | 10 | 0  |
| Oleas " " " " " "                     | 3  | 12 | 0  | 3  | 15 | 0  |
| Deals, Finland, 2nd and 1st, std. 100 | 7  | 10 | 0  | 8  | 10 | 0  |
| Rigs " " " " " "                      | 6  | 0  | 0  | 7  | 10 | 0  |
| " 4th and 3rd " " " "                 | 6  | 0  | 0  | 8  | 0  | 0  |
| " " " " " " " "                       | 9  | 0  | 0  | 15 | 0  | 0  |
| St. Petersburg, 1st yel. " " "        | 7  | 0  | 0  | 8  | 15 | 0  |
| " 2nd " " " " " "                     | 7  | 0  | 0  | 8  | 15 | 0  |
| " " " " " " " "                       | 8  | 0  | 0  | 10 | 10 | 0  |
| Sweden " " " " " "                    | 6  | 0  | 0  | 15 | 10 | 0  |
| White Sea " " " " " "                 | 8  | 0  | 0  | 18 | 0  | 0  |
| Canada, Pine 1st " " " "              | 17 | 0  | 0  | 31 | 18 | 0  |
| " 2nd " " " " " "                     | 12 | 0  | 0  | 17 | 10 | 0  |
| " 3rd, &c. " " " " " "                | 7  | 0  | 0  | 12 | 0  | 0  |
| " Spruce 1st " " " " " "              | 9  | 0  | 0  | 12 | 0  | 0  |
| " 3rd and 2nd " " " " " "             | 6  | 0  | 0  | 8  | 0  | 0  |
| New Brunswick, &c. " " " "            | 3  | 0  | 0  | 7  | 0  | 0  |
| Battens, all kinds " " " "            | 4  | 0  | 0  | 12 | 0  | 0  |

#### TIMBER (continued).

| Flooring Boards, sq. 1 in.—Prepared, first | £. | s. | d. | £. | s. | d. |
|--------------------------------------------|----|----|----|----|----|----|
| Second " " " "                             | 0  | 9  | 0  | 0  | 13 | 0  |
| Other qualities " " " "                    | 0  | 7  | 6  | 0  | 8  | 6  |
| Cedar, Cuba " " " "                        | 0  | 6  | 0  | 0  | 7  | 0  |
| Honduras, &c. " " " "                      | 0  | 0  | 3  | 0  | 0  | 4  |
| Australian " " " "                         | 0  | 0  | 3  | 0  | 0  | 4  |
| Managay, Cuba " " " "                      | 0  | 0  | 3  | 0  | 0  | 4  |
| St. Domingo cargo av. " " "                | 0  | 0  | 5  | 0  | 0  | 7  |
| Mexican " " " " " "                        | 0  | 0  | 5  | 0  | 0  | 7  |
| Tobacco cargo av. " " " "                  | 0  | 0  | 4  | 0  | 0  | 6  |
| Honduras cargo av. " " " "                 | 0  | 0  | 4  | 0  | 0  | 6  |
| Maple, Bird's eye " " " "                  | 0  | 0  | 3  | 0  | 0  | 6  |
| Rose, Rio " " " " " "                      | 7  | 0  | 0  | 16 | 0  | 0  |
| Bahia " " " " " "                          | 8  | 0  | 0  | 14 | 0  | 0  |
| Rox, Turkey " " " " " "                    | 5  | 0  | 0  | 18 | 0  | 0  |
| Satin, St. Domingo " " " "                 | 0  | 0  | 0  | 0  | 0  | 0  |
| Porto Rico " " " " " "                     | 0  | 0  | 0  | 0  | 0  | 0  |
| Walnut, Italian " " " "                    | 0  | 0  | 4  | 0  | 0  | 6  |

#### METALS.

| Iron—Pig in Scotland      | ton | 2  | 2 | 6  | 0  | 0 | 0 |
|---------------------------|-----|----|---|----|----|---|---|
| Bar, Welsh, in London     | 4   | 15 | 0 | 5  | 0  | 0 | 0 |
| " " " " " " " "           | 4   | 7  | 6 | 4  | 10 | 0 | 0 |
| Starfords, London         | 5   | 15 | 0 | 7  | 0  | 0 | 0 |
| Sheets, single, in London | 7   | 10 | 0 | 9  | 0  | 0 | 0 |
| Hoops " " " " " "         | 8   | 5  | 0 | 7  | 10 | 0 | 0 |
| Weld rods " " " " " "     | 5   | 15 | 0 | 7  | 0  | 0 | 0 |
| Correr " " " " " "        | 44  | 0  | 0 | 45 | 0  | 0 | 0 |
| British, cke, and ingot   | 45  | 0  | 0 | 46 | 0  | 0 | 0 |
| Best selected " " " " " " | 54  | 0  | 0 | 0  | 0  | 0 | 0 |
| Sheets, strong, in London | 48  | 0  | 0 | 49 | 0  | 0 | 0 |
| " " India " " " " " "     | 0   | 0  | 0 | 0  | 0  | 0 | 0 |
| Australian, fine cash     | 0   | 0  | 0 | 0  | 0  | 0 | 0 |
| Chili, bars " " " " " "   | 41  | 2  | 6 | 41 | 15 | 0 | 0 |

#### METALS (continued).

|                      |    |    |    |    |    |    |
|----------------------|----|----|----|----|----|----|
| YELLOW METAL.....lb. | 0  | 0  | 41 | 0  | 0  | 41 |
| LEAD—Pig, Spanish    | 12 | 2  | 6  | 12 | 5  | 0  |
| English, com. brands | 12 | 2  | 6  | 12 | 5  | 0  |
| SILVER—              |    |    |    |    |    |    |
| Silesian, special    | 15 | 2  | 6  | 15 | 7  | 6  |
| Ordinary brands      | 14 | 17 | 6  | 15 | 0  | 0  |
| TIN—                 |    |    |    |    |    |    |
| Banco                | 96 | 0  | 0  | 0  | 0  | 0  |
| Billion              | 94 | 0  | 0  | 0  | 0  | 0  |
| Straits              | 93 | 10 | 0  | 94 | 0  | 0  |
| Australian           | 93 | 10 | 0  | 94 | 0  | 0  |
| English ingots       | 97 | 0  | 0  | 0  | 0  | 0  |
| ZINC—                |    |    |    |    |    |    |
| English sheet        | 17 | 0  | 0  | 17 | 10 | 0  |

|                        |    |    |   |    |    |   |
|------------------------|----|----|---|----|----|---|
| OILS.                  |    |    |   |    |    |   |
| Linseed.....ton        | 20 | 6  | 0 | 20 | 15 | 0 |
| Cocoonut, Cochina      | 30 | 0  | 0 | 0  | 0  | 0 |
| Ceylon                 | 26 | 15 | 0 | 0  | 0  | 0 |
| Coupa                  | 0  | 0  | 0 | 0  | 0  | 0 |
| Palm, Lagos            | 29 | 10 | 0 | 0  | 0  | 0 |
| Palm-nut Kernel        | 26 | 0  | 0 | 25 | 10 | 0 |
| Rapeseed, English pale | 23 | 10 | 0 | 0  | 0  | 0 |
| “ “ brown              | 22 | 0  | 0 | 0  | 0  | 0 |
| Cottonseed, refined    | 18 | 5  | 0 | 23 | 10 | 0 |
| Tallow and Oleine      | 25 | 0  | 0 | 40 | 0  | 0 |
| Lubricating, U. S.     | 7  | 0  | 0 | 10 | 0  | 0 |
| “ “ Refined            | 4  | 0  | 0 | 10 | 0  | 0 |

|                   |   |    |   |   |    |   |
|-------------------|---|----|---|---|----|---|
| TURPENTINE        |   |    |   |   |    |   |
| American, in cks. | 1 | 6  | 9 | 1 | 7  | 0 |
| TAR—Stockholm     | 0 | 18 | 6 | 0 | 19 | 0 |
| Arabsangel        | 0 | 11 | 6 | 0 | 12 | 0 |

### COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

#### COMPETITIONS.

| Nature of Work.       | By whom required.       | Premium.   | Designs to be delivered. | Page. |
|-----------------------|-------------------------|------------|--------------------------|-------|
| New Wing to Buildings | East London Hospital.   | Not stated | March 1st                | ii.   |
| Detached Hospital     | Montrose Royal Lun. As. | do.        | Not stated               | ii.   |

#### CONTRACTS.

| Nature of Work, or Materials.              | By whom required.         | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|--------------------------------------------|---------------------------|-----------------------------------|--------------------------|-------|
| Albany Institute and Hall, Slough          | The Committee             | H. A. Cheers                      | Dec. 19th                | ii.   |
| Erection, &c., New Station, Offices, &c.   | L. B. and S. C. Ry. Co.   | Official                          | Dec. 21st                | ii.   |
| Sanitary Works and Alterations             | Guardians of St. George's | Wilson, Son, & Aliwinckle         | Dec. 22nd                | ii.   |
| Repairs to Houses, Camberwell              | in-the-East               | H. Bennett                        | Dec. 23rd                | ii.   |
| Storehouse and Offices, &c.                | The Corporation of        | Official                          | Dec. 31st                | ii.   |
| New Post-Office at Wisbech                 | Trinity House             | do.                               | Jan. 1st                 | ii.   |
| Police Station, Canning Town               | Com. of H.M. Works        | do.                               | Jan. 1st                 | ii.   |
| Sewerage Works                             | Receiv. Mat. Police Dis.  | do.                               | Jan. 2nd                 | ii.   |
| Roads and Sewers                           | Besumars Corporation      | Shone & Ault                      | Jan. 4th                 | xiii. |
| Collection, &c., of Dust                   | Com. of H.M. Works        | Official                          | do.                      | ii.   |
| Removal of Sweepings, London               | Wandsworth Bd. of Wks     | do.                               | Jan. 5th                 | ii.   |
| Sewering, Road-making, York Paving, &c.    | Chiswick Local Board      | A. Barmden                        | Jan. 6th                 | ii.   |
| Materials and Works                        | do.                       | do.                               | do.                      | xiii. |
| Gasholders and Apparatus                   | Liverpool Corporation     | Official                          | Jan. 9th                 | ii.   |
| Sewage Works                               | Oliverman Co. Asylum      | Giles & Gough                     | Jan. 13th                | ii.   |
| Boundary Walls, Abutments, &c., for Bridge | Dorking Local Board.      | Smith & Austin                    | Jan. 14th                | xiii. |
| Ironwork for Bridge                        | Colne and Marsden L.E.    | H. Bancroft                       | Feb. 2nd                 | ii.   |
| Cast-iron Mains, &c., for Water-Supply     | do.                       | do.                               | do.                      | ii.   |
| Additions to School of Art, Bromley        | City of Bombay            | Official                          | March 15th               | ii.   |
|                                            | The Committee             | Potts, Sulman, & Hennings         | Not stated               | ii.   |

#### PUBLIC APPOINTMENTS.

| Nature of Appointment.              | By whom Advertised.   | Salary.            | Applications to be in. | Page. |
|-------------------------------------|-----------------------|--------------------|------------------------|-------|
| Assistant Surveyors                 | Civil Service Com.    | Not stated         | Jan. 5th               | xvi.  |
| Building Inspector                  | Willesden Local Board | 22s. 10s. per week | Jan. 5th               | xvi.  |
| Surveyor and Inspector of Nuisances | Wavertree Local Board | 220s.              | Jan. 8th               | xvi.  |

#### TENDERS.

|                                                                                                                                                             |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| AYLESBURY.—For additions and alterations to a cottage at Bishopston, for the Right Hon. Lord Carrington.                                                    |            |
| Mr. J. Carter Jones, surveyor, Cambridge                                                                                                                    |            |
| Ball                                                                                                                                                        | £174 0 0   |
| Harris                                                                                                                                                      | 175 15 0   |
| Rose Bros.                                                                                                                                                  | 180 0 0    |
| Heley                                                                                                                                                       | 154 0 0    |
| Grist                                                                                                                                                       | 138 15 0   |
| BARNET.—For proposed detached house in Manor-road, for Mrs. Schwier. Mr. Joseph White, surveyor.                                                            |            |
| Miller                                                                                                                                                      | £1,374 0 0 |
| J. Baugher                                                                                                                                                  | 934 0 0    |
| Williams                                                                                                                                                    | 998 0 0    |
| James                                                                                                                                                       | 834 0 0    |
| Curnow                                                                                                                                                      | 793 0 0    |
| [All of High Barnet.]                                                                                                                                       |            |
| BRIDGEND (Gloucestershire).—For extension of gas-works at the County Lunatic Asylum. Messrs. John Giles & Gough, architects. Quantities by Mr. C. H. Goode. |            |
| W. Church                                                                                                                                                   | £2,998 0 0 |
| G. Drew                                                                                                                                                     | 2,991 0 0  |
| G. James & Sons                                                                                                                                             | 2,750 0 0  |
| Thomas, Watkins, & Jenkins                                                                                                                                  | 2,665 0 0  |
| J. Jones & Sons                                                                                                                                             | 2,650 0 0  |
| D. C. Jones & Co.                                                                                                                                           | 2,690 0 0  |
| R. Richards                                                                                                                                                 | 2,487 0 0  |
| H. Hilton & Sons                                                                                                                                            | 2,399 0 0  |
| Stephen & Bastow                                                                                                                                            | 2,190 0 0  |
| John Schofield                                                                                                                                              | 2,218 0 0  |
| A. J. Beavan                                                                                                                                                | 2,200 0 0  |
| Chas. Bridge                                                                                                                                                | 2,137 0 0  |
| David Davies                                                                                                                                                | 2,125 0 0  |

BOURNEMOUTH.—For repairing A ward Roads A.W. (Canford Cliff-road) and A.Z., for the owners of the Canford Cliffs Estate, West Bournemouth. Messrs. Kemp-Park & Pinder, architects to the estate:—

|                             |           |
|-----------------------------|-----------|
| H. Ford                     | £273 15 0 |
| G. Troke                    | 191 2 6   |
| C. Strickland               | 131 10 6  |
| W. A. Gey                   | 125 0 0   |
| Saunders & White (accepted) | 36 15 0   |

CARDIFF.—For building a new grand stand in Cardiff Arms Park, for the Cardiff Football Club. Mr. Ch. Thomas, architect and surveyor:—

J. Gibson (accepted) £390 0 0

LONDON.—For alterations to Nos. 427, 440, 457, and 458, Hackney-road, for Mr. H. W. Lee. Mr. G. Chuter, architect:—

|                       |            |
|-----------------------|------------|
| Vetherill, Lee, & Co. | £1,814 0 0 |
| Laughton              | 1,643 0 0  |
| Jackson & Todd        | 1,112 10 0 |
| Thomson & Son         | 1,372 0 0  |

LONDON.—For the erection of new warehouse, and construction of a bleaching-room, hot-room, and furnace, at No. 45, Houndsditch. Messrs. William Reddall & Son, architects and surveyors, South-street, Finsbury:—

|                 |            |
|-----------------|------------|
| Barnett         | £1,849 6 0 |
| Heaps           | 1,621 0 0  |
| Colls & Sons    | 1,616 0 0  |
| Fritchard       | 1,489 0 0  |
| Woodward        | 1,461 0 0  |
| Nightingale     | 1,283 0 0  |
| Kilby & Gayford | 1,180 0 0  |

**NEWPORT (Mon.).**—For alterations and additions to office, Dock-street, for the Newport Harbour Commissioners. Mr. E. A. Lansdowne, architect:—  
 O. Colly, Newport..... £250 0 0  
 Edwards & Roach, Newport..... 85 0 0  
 Wm. Price, Newport..... 817 0 0  
 John Linton, Newport..... 700 0 0  
 Wm. Jones & Son, Newport..... 667 0 0  
 Wm. Blackburne, Newport (accepted)..... 645 0 0  
 C. Miles..... 645 0 0  
 A. Davis..... 625 0 0

**NORTHAMPTONSHIRE.**—For farm buildings at Harrowden, Rutland, and Easton, Northamptonshire. Mr. J. B. Corby, architect and surveyor, Stamford:—  
 Harrowden, Easton, Total.  
 Dean..... £. s. d. £. s. d. £. s. d.  
 Scholes..... 600 0 0 720 0 0 1,320 0 0  
 Ludlow & Emerson..... 838 18 6 670 15 0 1,508 13 6  
 Roberts Bros..... 632 0 0 668 0 0 1,298 0 0  
 Woolston..... 618 0 0 669 0 0 1,275 0 0  
 Sharp & Cook..... 605 8 0 615 14 1 1,221 2 1  
 Perkins Bros..... 623 0 0 582 0 0 1,205 0 0

**PARC GWYLLT (Glamorganshire).**—For the erection of farm buildings and other works at the New Glamorgan County Lunatic Asylum, Messrs. John Giles & Gough, architects, Quantities by Mr. C. H. Goods:—  
 Pearce..... £6,304 0 0  
 G. Drew..... 5,292 0 0  
 W. Church..... 5,271 0 0  
 J. Schofield..... 5,218 0 0  
 Thomas, Watkins, & Jenkins..... 5,171 0 0  
 Chas. Claridge..... 5,030 0 0  
 D. C. Jones & Co..... 4,869 0 0  
 H. Hilton & Sons..... 4,799 0 0  
 David Davies..... 4,590 0 0  
 J. Richards..... 4,340 0 0  
 A. J. Bevan..... 4,170 0 0  
 J. Jones & Sons..... 4,070 0 0  
 Stephens & Bastow..... 4,050 0 0

**SANDHURST (Berks.).**—For alterations and additions to Longdown Lodge, Sandhurst, Berks, for Mr. C. A. Wild. Mr. W. Ravenscroft, architect, Reading:—  
 John Bottrell, Reading..... £3,450 0 0  
 [Accepted. No competition.]

**STOKE NEWINGTON.**—For the erection of a fire-brigade station at the corner of Leam-street and Brookside, Stoke Newington, for the Metropolitan Board of Works. Mr. Geo. Vulliamy, architect; Messrs. Nixon & Raven, surveyors:—  
 Hack..... £2,933 0 0  
 Deacon & Co..... 6,850 0 0  
 Dickinson..... 6,841 0 0  
 Wood..... 6,773 0 0  
 Staines & Son..... 6,420 0 0  
 Garrud..... 6,877 0 0  
 Stephenson..... 6,500 0 0  
 Toms..... 6,477 0 0  
 Green..... 6,467 0 0  
 Manley..... 6,417 0 0  
 Broad..... 6,400 0 0  
 Brass & Son..... 6,383 0 0  
 Oldrey..... 6,188 0 0  
 Godfrey..... 6,180 0 0  
 Greenwood..... 6,075 0 0  
 Johnson..... 5,947 0 0  
 Howell..... 5,985 0 0  
 Pearce & Lansdowne..... 5,938 0 0  
 Stimpson & Co. (accepted)..... 5,980 0 0

**TUNBRIDGE WELLS.**—For terrace of five houses on the Prospect Lodge Estate, London-road, Tunbridge Wells. Mr. W. B. Hughes, architect, Tunbridge Wells:—  
 Grover..... £10,063 5 0  
 G. Winniffrith..... 9,686 0 0  
 G. Edwards..... 9,676 18 0  
 Gallard & Son..... 9,280 0 0  
 J. Jarvis..... 8,782 0 0  
 Beale & Son..... 8,432 0 0  
 A. Testman..... 8,265 0 0  
 Strange & Son..... 7,957 0 0

**TUNBRIDGE WELLS.**—For making new private road through the Prospect Lodge Estate, Tunbridge Wells. Mr. W. B. Hughes, Tunbridge Wells, architect:—  
 J. Jarvis..... £535 0 0  
 Strange & Son..... 511 0 0

**WAPPING.**—For the erection of warehouses in High-street, for Messrs. Banes, Noel, & Co. Mr. Horace A. Alexander, architect. Quantities supplied by Mr. Edwin A. B. Crockett:—

|                         | Main block. | Office block. | Total.  |
|-------------------------|-------------|---------------|---------|
| J. Anley.....           | £21,317     | £2,160        | £23,477 |
| Holland & Hannan.....   | 27,600      | 3,012         | 30,612  |
| G. H. & Hyatt.....      | 24,374      | 2,364         | 26,738  |
| T. Rider & Son.....     | 20,233      | 2,996         | 23,229  |
| Outwaite & Son.....     | 20,083      | 2,953         | 23,036  |
| M. Patrick & Son.....   | 19,800      | 2,900         | 22,700  |
| J. Morter.....          | 18,621      | 2,865         | 21,486  |
| Ashby & Horner.....     | 19,480      | 2,889         | 22,369  |
| Balsam Bros.....        | 19,477      | 2,805         | 22,282  |
| E. Lawrence & Sons..... | 19,250      | 2,698         | 21,948  |
| W. Brass & Son.....     | 19,097      | 2,685         | 21,782  |
| J. & J. Greenwood.....  | 18,740      | 2,580         | 21,320  |
| Kirk & Randall.....     | 17,969      | 2,678         | 20,647  |
| B. E. Nightingale.....  | 17,660      | 2,419         | 19,079  |

**SPECIAL NOTICE.**—As we shall go to press with next week's number a day earlier than usual, all lists of tenders intended for insertion in that number must reach us by 4 p.m. on **WEDNESDAY, December 23.**

#### TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

W. S.—H. A. C.—T. B.—P. & Son.—T. C. E.—H. A.—E. S. R.—N. W. (your letter too diffuse; a brief statement of the expedient would have answered the purpose.)  
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All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

**NOTE.**—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the author. We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, or have been sent to other papers, will not be published. All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other matters exclusively connected with the business of the paper should be addressed to THE PUBLISHER, and not to the Editor.

#### PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

**CHRISTMAS WEEK.**—"THE BUILDER" for the week ending DECEMBER 26th, will be issued on THURSDAY, the 26th. Advertisements for insertion in that issue must therefore reach the Office before THREE p.m. on WEDNESDAY, the 25th. Alterations in Standing Advertisements, or ORDERS TO DISCONTINUE the same, must be at the Office by TEN o'clock on TUESDAY morning.

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Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.  
 The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

The "NEW YEAR'S NUMBER" will be published on FRIDAY, the 1st of JANUARY next. Price 4d. Advertisements for this special issue should be sent to the Office as early as possible.

PERSONS Advertising in "The Builder," may have Replies addressed to the office, 46, Catherine-street, Covent Garden, W.C. free of charge. Letters will be forwarded if addressed in envelopes are sent, together with sufficient stamps to cover the postage.

#### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied gratis from the Office to residents in any part of the United Kingdom at the rate of 18s. per annum. For all parts of Europe and America, 26s. per annum. To India, China, Ceylon, &c. 36s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

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International Health Exhibition, 1884, One Gold Medal, Three Silver Medals, and One Bronze.

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**BANNER BROS. & CO. Sanitary and Ventilating Engineers,**  
 11, BILLITER SQUARE, LONDON, E.C.



# The Builder.

Vol. XLIX. No 5233.

SATURDAY, DECEMBER 26, 1885.

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### The Subsidence in the Metropolitan Railway Tunnel.



**AJOR-GENERAL HUTCHINSON'S** report on the subsidence recently noticed on the Metropolitan Railway is reassuring to the public, both as to the thoroughness of the investi-

gation which it promises, and as to the careful watch that is kept on the spot. In the railway tunnels of this country the importance of keeping down the cost per yard has led to a mode of construction which involves no little risk in the event of any disturbance of the surrounding ground. Few railway works, indeed, are so built as to be in a state of permanent statical equilibrium, apart from the support that they derive from the soil filled in at their backs. When a span is bridged by girders, and the pressure comes vertically on the piers, this remark does not apply. But in every case, probably, where lateral thrust comes into play, the abutments depend for their stability, not on their own weight alone,—as in the case of the flying arches and towering pinnacles of Gothic architects,—but on the support given by the backing, which is actually punned in behind them. And in the tunnel sections, which have generally taken for their type those designed by Mr. Robert Stephenson for the Watford and the Primrose Hill tunnels, this principle of depending on the resistance of the soil to the lateral pressure of the arch has been relied on to the utmost extent.

Mr. Simms, or rather the editor, Mr. D. K. Clark, of the work of the former on "Practical Tunnelling," a standard authority on the subject, speaks of the pressure of clay and shale on the brickwork of tunnels, where the soil has been disturbed by excavation, as something almost immeasurable. The phenomena of disturbance, he remarks, supply powerful examples of the flow of solids. The original designs for the tunnels on the London and North-Western Railway, just referred to, were ellipsoidal sections, struck from three centres (for the half section), and with the bottom formed by an invert of somewhat longer radius than the flattest part of the side of the main arch, or about 22 ft. The thickness of the arch varies in ordinary cases from 1 ft. 10½ in. to 3 ft., the invert generally being less in depth by half a brick than the ring. When the driftway through the Watford Tunnel was completed, the chalk appeared to be generally so firm, hard, and dry, that on the suggestion of the late Sir Charles Fox, then sub-assistant

engineer at Watford, Mr. Stephenson substituted footings to the side walls for the invert, with complete success. The same plan was then tried on the tunnel through the London clay of Primrose Hill. It was soon found, however, that this would not do. Although so hard as to require the use of the pick for excavation, this material proved to be in a semi-fluid state. The mortar was squeezed from the beds and joints of the brickwork; the inner arrises of the bricks flushed and chipped; the floor of the tunnel rose, and the walls began to approach to one another at the bottom. In fact, the whole structure was so evidently on the move as to leave no doubt that a non-inverted tunnel would soon be filled up with clay. Hard bricks had to be employed, set in Roman cement, for a thickness of 27 in., and an invert was also built. A similar experience was obtained in the Netherton Tunnel, built in the "blue bind," or marl. In this case, the invert was rebuilt with a smaller radius.

Mr. D. K. Clark remarks, in his additions to the work of Mr. Simms, that for the reason that the surrounding ground has been disturbed and moved in the course of construction of tunnels, through clay, shale, or loose strata, the operation of the enlargement of tunnels is peculiarly hazardous. In comparatively shallow ground,—that is to say, less than 40 ft. below the surface,—the pressure may be localised and concentrated upon the crown of the arch with peculiar severity. In the Stapleton tunnel the arch was at first built with only four rings of brickwork in mortar. When the autumn rains set in, the ground began to press heavily, so that the line of the tunnel could be traced as a hollow on the surface of the ground, which was not more than 40 ft. above the tunnel. A portion of the arch finally fell in, and was rebuilt with five and six rings of brick.

Some idea of the cost involved by such a work as the enlarging of a tunnel may be formed from the experience of the Lindal tunnel on the Furness Railway. This tunnel, three-eighths of a mile in length, was constructed in 1849. It was 14 ft. 6 in. high, and 12 ft. wide in the clear, and cost 67. per yard linear for excavation, and 157. 10s. per yard linear for masonry. In 1854 this tunnel was enlarged, in order to accommodate a double line of way. The additional cost thus incurred was 211. 4s. per linear yard for excavation, and 387. per linear yard for masonry. The original price of 67. per linear yard of excavation was equal to 6s. 2d. per cubic yard, a fair contract price.

This railway experience of thirty years ago coincides very closely with the observations of General Hutchinson as to what has

taken place on the Metropolitan Railway in the neighbourhood of Ossulston-street, about a quarter of a mile from the King's-cross Station. For a length of about 120 yards the north wall of the tunnel has been pushed inwards, and has settled, to the extent of from 13 in. to 18 in. vertically. For about 40 yards in length in the middle of this portion, at about one-third of the distance between the soffit and the springing of the arch, a crushing and scaling of the brickwork has occurred for an average width of about 18 in., varying in depth from ½ in. to 3 in. The thickness of the brickwork is not specified by General Hutchinson. Vertical cracks are also observed. It is not difficult to see what has been going on. Some movement, the cause and extent of which it is essential to ascertain, must have taken place in the ground surrounding the tunnel. The brick lining of the latter, not being, it appears, inverted, has had no chance of doing better than to accommodate itself to the changing conditions of pressure. In the change of shape thus effected, that part of the inner ring on which a new pressure was put naturally flushed and flew. A concrete invert is now being put in, which will probably resist any tendency of the footings of the walls to approach one another. There will still remain the question whether the side walls have been so far crushed by the shifting strain as to require replacement, bit by bit, by hard bricks set in cement. No doubt all due precautions will be taken; nor does there appear to be any reason to expect a sudden collapse if a constant watch is kept. But the points of interest to the professional reader are to see how the old difficulties presented by the London clay appear to be reproduced in the present instance; how the economy of omitting the invert has proved, as it did at Primrose Hill, and in the Euston cutting, to be a false economy; and how the use of bricks set in mortar for a structure which forms only a thin shell, balanced and supported by the earth which it keeps from the influence of the air and the damp, is a method of work which leaves but a small margin for the factor of safety.

There are few works of corresponding magnitude which reflect so much credit on their designers and executors as does the Metropolitan Railway. The cost has, no doubt, been enormous. At the end of 1878 it was 639,315. per mile, a rate which has been somewhat reduced by the sale of surplus lands. Purchase of land, of course, swells this enormous price, but in the face of such expenditure, the anxiety of the engineer that not a single cubic foot of brickwork that could be dispensed with should be put into the work, may be understood. The work has stood so well,



—the fall of a portion of the arch near Blackfriars Bridge, in course of construction, will be remembered by our readers,—as to justify the judgment of the engineers hitherto. We will not say that the stability has been more than any one had a right to anticipate. Still, the balance is delicate. The margin of safety is not very wide. And that unsleeping vigilance is demanded, and, no doubt, is exerted, is a very manifest corollary to the report of Major-General Hutchinson.

The Report of Sir Joseph Bazalgette and Mr. J. Wolfe Barry on the subject states that the north wall of the Metropolitan Railway at the point indicated has moved 15 in. laterally and 21 in. downwards, "thus forcing the clay upwards in the centre of the railway." This is, in fact, a repetition of the experience of 1834 as to the Primrose Hill tunnel. The remedy proposed is the formation of a concrete invert, 4 ft. thick, and with a versed sine of 3 ft. As to this, it may be observed that the brick invert of the normal section of the tunnel is 18 in. deep, with the same versed sine of 3 ft. The Report continues that the authors think this a proper remedy, as far as the foundations are concerned, but they "were not aware of the extent of the damage which the arch of the railway might have suffered." This, as we before pointed out, it is imperative at once to ascertain; and it appears to us that it is rather a duty incumbent on the engineers of the line than one to be left by them, as they suggest, to the examiners of the Board of Trade. Meantime, it is recommended that the traffic of the roadway of the Euston-road should be diverted; a precaution which shows the serious nature of the apprehensions entertained by Messrs. Bazalgette and Barry. They proceed,—“After that was done, and the repairs of the tunnel effected, it would take some time for the ground to consolidate.” We should like to know on what grounds this remark is made. As far as the general principle of the movement of the London clay is concerned, it is applicable. But the geological section of the Metropolitan Railway shows a bed of 7 ft. thick of the more treacherous yellow clay in the vicinity, which, as it thins out to the east of King's Cross Station, is overlaid by a mixture of clay and gravel. It is clear that any report which deals with the matter as its importance demands must embody a full description of the geological, or, it may be, the accidental and artificial, character of the earth surrounding the damaged portion of the tunnel. Nor can we admit that under a proper handling of the case “further settlements might be expected to take place.” We should like to have seen the face of Mr. Robert Stephenson if a report to that effect had been presented to him for approval.

#### SEWAGE PURIFICATION AT GUILDFORD.

BY FRANCIS R. CONDER, M. INST. C.E.

**A**S the process of sewage purification to which I have devoted long and careful attention has now reached the stage of practical success in the production of a pure effluent from a notoriously foul sewer at Guildford, I think that the time has come for me to lay before the readers of the *Builder* some of the most important results of this new and powerful method of disinfection.

Of the crying necessity for some better method of sewage disposal than any now in practice it is unnecessary for me to speak at any length. Lord Bramwell's letter of July, 1884, to the Home Secretary, is still applicable to the state of the Thames wherever the thermometer is rising above 60° Fahr. “We went on it at Woolwich Dockyard,” said his Lordship. “It was for its whole breadth black sewage, with a stench intolerable.” The condition of the river Lea, only less foul than the Thames, was described in the *Builder* of the 12th of September, 1885. The several Reports of the Rivers Pollution Commission tell of the poisoning of our rivers by sewage. And in numerous centres of population the authorities are at their wits' ends between the require-

ments of the Local Government Board, on the one hand, and the engineering, chemical, and financial difficulties that beset them on the other.

It is obvious, from this state of things, that a sound practical mode of obtaining, at a moderate cost, a way of escape from this terrible source of sanitary danger, as well as of personal nuisance, is hitherto unknown. Not only so, but we can speak as to quantitative result. In the useful work by Messrs. Robinson and Melliss on the purification of water-carried sewage, the various methods in use are described, and analyses are given, chiefly taken from the Reports of the Rivers Pollution Commissioners, of the sewage, the effluent, and the precipitates obtained, by various processes, in twenty-five different cases.

The average amount of solid impurity in these specimens of sewage is 82 grains per gallon, or 5½ grains per gallon less than the average obtained by Messrs. Lawes and Gilbert from 93 analyses of sewage. Of this (omitting fractions), 33 grains were in suspension, and 49 grains in solution. The effluent contained an average of 54 grains, leaving 28 grains of precipitate. Thus the effect of the processes in use, taken as an average, is to remove from the sewage treated 85 per cent. of the matter in suspension, without in any way affecting the matter in solution. Experiment shows that the same result may be obtained by merely allowing sewage to stand for a sufficient time to throw down its own suspended matter.

The annual cost at which this wholly ineffective result is obtained varies, according to circumstances, from 7½d. to 5s. 1½d. per head of population. The fact, however, which has the most controlling influence as to cost is this. In all chemical processes now in use, in order to obtain the imperfect precipitate above stated, from one to 14 tons of foreign matter is added to every million gallons of sewage. The deposit obtained thus contains from double to five or six times as much solid matter as has been precipitated from the sewage. And not only so, but in all cases where lime and clay are used as precipitants the deposit associates with itself water to the amount of some 85 per cent. of the total compound, which is known as sludge.

Thus at Birmingham, in the year 1884, with an estimated dry weather flow of sewage (treated by the lime process) to the outfall tanks of 15 millions of gallons per day, the sludge deposited in the tanks amounted to 174,946 cubic yards, or 31,238 cubic yards per million gallons. The sewage of Birmingham is unusually foul, containing 7 tons 7 cwt. of solid impurity per million gallons. Of this, 3 tons 15 cwt. is in suspension, and is precipitated by the lime or filtered out by subsequent passage over land. The result of an extension of the sewage used for filtration has not been given by the recent historian of the Birmingham Corporation, Mr. Bunce. “The effluent,” Mr. Melliss says (writing in 1879), “is simply clarified sewage.” The sludge amounts to more than eight times the bulk of the solid matter precipitated from the sewage by the lime.

At Coventry, where the sulphate of alumina process is applied to a sewage containing 3 tons 15 cwt. of solid impurity per million gallons, less than a ton of the same is removed from the effluent. But the resulting sludge is 12½ tons per million gallons, containing 85 per cent. of moisture. This is more than thirteen times the bulk of matter removed from the sewage.

In London it is proposed to boat away the sludge that will be formed from the application of the precipitating process now in contemplation. The strength of the sewage of London has been estimated at some twenty per cent. under that of Birmingham. The volume is upwards of 140 million gallons per day. The resulting sludge, if produced in the same proportion as at Birmingham, would be 1,275,000 cubic yards per annum, and if in the same proportion as at Coventry, half as much more.

In all precipitating processes hitherto brought into use, therefore, the putrescible matter held in solution in the sewage is untouched; the precipitate contains a proportionate amount of

putrescible matter, and the bulk of the latter is so increased by the process adopted as to be from eight to thirteen times that of the solids removed from the effluent. Purification is not obtained; and the Local Government Board, as at present advised, hold that a filtration through land is a necessary adjunct to any process of precipitation. In the case of Edmonton, however, the waters of the River Lea are visibly fouled by an effluent which has been thus doubly treated.

The application of iron to the purification of water is not new. In the *Builder* of May 16th, 1885, and of September 5th, 1885; in the Report of the Conference on Water Supply held at the International Health Exhibition, in July, 1884; and in Volumes 72 and 81 of the Minutes of Proceedings of the Institution of Civil Engineers, will be found some account of the history of the application of iron for this purpose. The use of the persalts of iron was recommended by Messrs. Hofman and Frankland, and by the Royal Commissioners in the Second Report (of 1861). Perchloride of iron is now used in France as a disinfectant, and the great cost of the material is the chief obstacle to its employment. Sulphate of iron has been applied, together with other ingredients, in several processes, with a uniformly disastrous effect when lime is present. Its disinfecting action is well known to chemists; as is also the practical difficulty which has prevented its general use. “Chemists,” said Mr. Bischof at the Institution of Civil Engineers on January 16th, 1883 (Proceedings, vol. lxxii, p. 67), “could not deal with ferrous compounds; they were by far too rapidly organised.” “He could not say what it was that acted in spongy iron. It was difficult to tell how a seed put into the ground germinated. It must, however, be accepted as a fact.”

Sulphate of iron has never hitherto been systematically applied to the disinfection of water-carried sewage, under conditions that render possible the great energy of the compound. This is not mere matter of negative evidence. Dr. Thresh, whose application of a chalybeate spring to the sewage of Buxton was described in the *Builder* of May 16th, 1885, wrote to the *Manchester Guardian* on October 3rd, 1885, to the effect that he had “made a great many experiments with various kinds of sewage before and after treatment with ferrous sulphate and other chemicals. . . . In no single instance was the result satisfactory. . . . Chemists who have given attention to this matter will be utterly at a loss to account for the remarkable results said to have been obtained by Mr. Conder by the use of ferrous sulphate.” There is thus irrefutable scientific evidence as to the novelty of the process successfully employed at Guildford.

It is unnecessary here to go step by step through the long process, first of examination of the literature of the subject, and of the records of the Patent Office; second, of private experiment on various kinds of sewage and other polluted waters; and thirdly, of quantitative analysis by a trained and well-known chemist, which preceded the practical application of the process to a notoriously foul sewer at Guildford in November, 1885. Samples of the water of the river Wey, and of the sewage poured into it, were taken from time to time, and submitted to analysis. The first sample of effluent sewage taken contained the frightful amount of 1,014 parts of solid matter in solution, and 112,843 parts in suspension, per million, or 11·3 per cent. of the fluid. The spot selected for the practical treatment was only about 200 yards from the outfall into the Wey of the St. Nicholas Sewer, which carries off the sewage of some 200 persons. A small tank was provided and fixed by the Borough Surveyor, Mr. Henry Peak, and connected with two pipes; the one admitting, through a bib cock, water from the Town Waterworks, the other running from the tank into the sewer. At 2·40 p.m. on the 18th of November this tank was charged with 5 lb. 2 oz. of disinfectant, 5 lb. of which was sulphate of iron. The water was turned on at the rate of one quart per minute, equal to fifteen gallons per hour, at which rate of flow the 5 lb. of sulphate was dissolved in twenty-



four hours, being, in round numbers, at the rate of 25 grains per minute, or 1,500 grains per hour. The flow of the sewer is extremely irregular, varying from almost nothing to sixty gallons per minute, the latter volume being in great part due to the waste-water of a large brewery.

It was anticipated that several days at least would elapse before so small a quantity of iron, which was that proper, according to my calculations, to disinfect the sewage of 185 persons, would produce any sensible effect on so foul a sewer. It was thus only as a matter of precaution that I ordered samples of the effluent to be taken that night and on the following morning. And I confess to being as agreeably surprised as was the Borough Surveyor, Mr. Peak, to find that the very first sample, which had been taken at 5.45 p.m. on the 18th, was not only sweet, but clear and bright, and that the effluent from the mouth of the sewer was the same,—the smell having entirely ceased.

At the next meeting of the Urban Sanitary Authority the Surveyor reported (as is stated in the *Surrey Advertiser* of 12th December) as follows:—"In accordance with your instructions I have conferred with Mr. Conder M. Inst. C.E., as to his proposal for the purification of the sewers, and have, with him, carried out some inexpensive experiments, with a view to put the system to a practical and useful test. I do not now propose to enter into the details of what has been done, as the matter originally came before the General Purposes Committee, but, as the results appear to be so satisfactory, I think the subject is worthy a further and early consideration; and if the Committee will be good enough to meet again when convenient a report shall be laid before them."

As to the chemical action set up by the process, it may be enough here to state that the chemist I have consulted in the matter is Mr. G. M. Taylor, C.E., F.C.S., of the firm of John Taylor & Sons, of 27, Great George-street. No members of the profession have more experience and authority, with regard to the purification of water, and the securing the water supply of London from sewage pollution, than the engineers of the New River and the Lambeth Waterworks. The action of the iron as applied in my process is described by the analyst to be that of splitting up the putrescible matter in the sewage into its elements, and rendering it innocuous. Mr. Taylor says, "The putrescent character of both precipitate and effluent is entirely removed, and all germs are destroyed by the iron, as far as microscopic analysis has yet been carried." I have mentioned the average quantitative results of twenty-five cases of treatment of sewage. In the case of a very strong domestic sewage, analysed by Mr. Taylor before and after treatment by my process, 63 grains of solid impurities were at first held in solution, and 9.40 grains in suspension per gallon. The whole of the suspended matter, and 28 per cent. of the matter in solution, were removed from the effluent by the treatment. The weight of the putrescible matter resolved, and escaping as non-combustible gas, is a little more than that of the chemicals added. Thus there is no sludge. The deposit obtained is in the form of a fine sinter, which is readily swept away by a gentle current, and contains only the solid matter precipitated from the sewage. The quantity of deposit is, therefore, only from one-eighth to one-thirteenth that obtained from sewage of equal strength, by any sludge-forming treatment. The cost of the chemical treatment of the St. Nicholas sewer is about 2½d. per day. The allowance of sulphate of iron that has been found ample as a general rule, is at the rate of 10 lb. avoirdupois per individual per annum.

## PAST AND PRESENT: A REVERIE IN WELLS CATHEDRAL.

"Pan is dead. Great Pan is dead."

Pan, Pan, is dead."

**P**RO enter one of our English cathedralists is to feel that the spirit that gave them their form is fled. "Pan is dead." The bulk of Englishmen conceive that they are to be saved by other means than incense, celebration of mass, and brilliant processions. Their souls find eternal repose without the aid of prayers daily offered long after their bodies have mingled with the dust of the enclosing coffins. In a word, Englishmen are Protestants; our cathedrals are Roman Catholic.

Stand before the west front of Wells Cathedral, and carry the eye from tier to tier of that wonderful storehouse of sculpture: each one of that great host of figures had its meaning once, and carried its lesson; now, not only is the lesson never learned, and the meaning never mastered, but the very identity of many of the figures is as irretrievably lost as the arms of the Venus de Milo: their only, their abiding value is as works of sculpture: as mere arrangements of drapery and examples of posing, admirably in keeping with the architectural framework in which they appear. They belong to an era in which sculpture was the lowly handmaiden of architecture. The stiff limbs had not yet relaxed, the frozen muscles had not yet thawed beneath the genial breath of the Renaissance. In formal rows they adorn the vast front, stark and stony. They raise the hand, they lean on a lifted knee, they cling to scanty thrones, they gaze with grave eyes across the little city, and whisper in a silent unanimous chorus, "We are Architecture." Not for some centuries were the prophets and sages of Scripture to descend from their pedestals, and pose on their own account as independent works of art, in company with the long array of heathen gods and goddesses. Here at Wells, a dignified band of saints and sages, they are content, with rigid lines, to serve as architecture only. Their names, their deeds, the very reasons of their selection have perished. One tier of sculpture, it is true, is recognised as illustrating events from the Bible, the great connecting link between the religious life of that day and our own. Another portrays scenes of the general Resurrection. A third group is said to represent the "nine orders of the celestial hierarchy." Surely here is a symptom of death. What is the celestial hierarchy to the modern Englishman? and how many of us know what number of orders it embraced? At the time it was carved on the west front at Wells, the celestial hierarchy was a power over the souls of men, but now—Pan is dead.

Let us go round and enter through the north porch. In the capitals of the shafts to the outer doorway is some strange carving, which seems to set forth the legend of St. Edmund, King and Martyr. Legend, we say, and why not history? It was history when it was carved; and history as firmly believed as the creation of woman from man's rib, or the miraculous gift of tongues. The legend is briefly this. Edmund, king of East Anglia, being made prisoner by invading Danes, was tied to a tree and shot to death with arrows. His slayers then cut his head from the body and threw it into a thick wood. Presently came his friends and followers, to find the headless body of their king bristling with arrows, "like a porcupine." For a long time they searched for the beloved head, but in vain; at last, attracted by cries of "Here! here! here!" they found it protected by a wolf, who delivered it up, and then mournfully retreated into the thicket. In the carving of the shafts to the north porch at Wells may be seen the king pierced with arrows, six from each side; the inhuman Danes with their bows; and a man taking the head from the paws of the pious wolf. The legend further relates how the head, being restored to its normal position with regard to the trunk, grew there again, so that the severance could only be detected by a thin scarlet line. On this piece of history, confirmed by the possession of the martyr's body (presumably with its scarlet line), was built the

enormous abbey at St. Edmundsbury,—a substantial witness to the truth of the legend. Yet who now thinks of St. Edmund as anything but a picturesque character in early history, convenient for the pointing of a moral or adorning of a tale? Indeed Pan is dead.

The nave at Wells is a curious piece of work. The clustered columns of the arcade are as beautiful as anything can be; but the clear-story falls so far short in general design as to make one wonder whether it were not chance which produced the beautiful effects of those early days. In this clear-story the architectural lines are heavy and crude,—it is the carving which deserves all the praise. This, indeed, is wonderful. In certain places it lacks definite bounding lines, and the restraint of architectural members; but the vigour of the execution and the fertility of imagination displayed in it are marvellous. Heads are here which run through the whole gamut of human expression. Flowers, transformed into decorative patterns, lose their own characteristics only to gain in crispness of execution. They curl round the end of a label; they issue from monsters' heads to support the vaulting shafts; they veil birds and beasts never met with in modern books of zoology. They sprout and wave, and cling, like the freshest ivy, the brightest grass, the most vigorous columbine; and yet they are flowers, the like of which no botanist, living or dead, ever yet classified. And so, too, the beasts. Here are two, either kissing or biting, with heads as of cats, bodies as of birds, and tails of foliage. Yonder is a monkey with a fool's cap on, sitting, with the body of a bird, on one branch of his own flowering tail, and engaged in biting another. What are we to make of these? Do they represent anything or nothing? Are they the embodiment of fearful conceptions of nature on the part of the carvers, or are they merely a way of rejoicing in vigorous lines and clean curves? Whether they have any particular meaning or not, they speak of a singleness of purpose, a simplicity of mind,—an ignorance, if you will,—that has passed away. Pan is dead.

Near the east end of the nave, and occupying the whole space between two columns on either side, are the two chantries of Bishop Bubwith and Dean Sugar. They are finished with all the delicacy and minute division of parts which mark the Perpendicular style,—the style of careful and painstaking design. The artists have bestowed on them all the refinement of design, the ingenious fancy, and the manual skill, which characterise the work of the fifteenth century. The purpose for which they were built, and which induced so much pains to be taken with them, was simple and godly. It was that in them masses might perpetually be chanted for the repose of the souls of the founders; that day after day, throughout all ages, prayers might ascend in mitigation of the shortcomings of the pious dead. A simple and godly object, but now no longer possible of fulfilment. The times have changed. The dead now die indeed, beyond the help of prayers and masses; their fate has passed away from all human control or intercession; and the chantries which once resounded with the sonorous, perfunctory notes of the priest, now serve as convenient places in which the visitor may enter his name among those of the scores of sightseers who come to the cathedral. It is a perfectly natural result of the march of time. It calls neither for regret nor rejoicing. But when we pass through the narrow doorway to sign our names in the book which stands where once a sacred altar stood; when we gaze up to the traceried vaulting among which the prayers have ceased to echo these centuries,—Pan, Pan is dead.

But now, having entered our names duly, we are free of the whole place, and may wander at will through the privileged aisles of the choir. Here, too, the same lesson is learned. Instead of free access at all hours and to every part we meet with locked doors to everything but the nave. Quite right, if we think awhile on the modern tourist. Instead of a long-skirted priest pacing slowly to the confessional, you are met by a draped vergier, who demands sixpence

**Association of Municipal and Sanitary Engineers and Surveyors.**—The Council of this Association give notice of their intention to hold voluntary examinations with the view of granting certificates of competency to candidates for the appointments of Borough Surveyors and Surveyors to Local Boards and other Sanitary Authorities. Particulars of these examinations will shortly be published.



towards the repair of the building before you may see the choir. It is quite just that they who come to see should help towards the preservation of what they look at. Once past the jealous gates that guard the choir, all is solitary and deserted. Where are now the altars before which men and women bowed with full hearts? Where are the kneeling forms leaning in wrapt devotion or mechanically counting their beads, or, perhaps, simply enjoying in the dim and solemn coolness a short respite from their daily toil? Not here. Perhaps in some French town you may still see them. You may watch the peasant women come in with their baskets to kneel before their patron saints with a mechanical simplicity that tells of devout faith and faithful devotion. As the daylight fades you may see the attendant lighting candle after candle, each one a tiny speck in the incense-scented darkness. You may hear the solemn stillness broken by the clank of a retreating peasant, happy in the simplicity of her creed, and you will realise to some extent the use and meaning of our empty aisles and deserted chapels. But here, if you see any one, it is an open-mouthed tourist. If you hear anything it is the monotonous story of the verger, told with the same inflexions of voice at precisely the same spots, recounting the same scraps of history, and repeating the old classification of beauties from generation to generation.

To the mind of the verger, the most beautiful view in Wells Cathedral is the vista formed by the columns of the retro-choir and Lady-chapel, as seen from the choir; and it is truly lovely. Decorated work is here seen at its best. The whole group seems to be alive with beauty; every change of light makes itself felt as it does over the Weald of Sussex on a bright, fresh day when the clouds sail across the sky. But the vista is modern. If the high altar were there it would be extinguished. If such an altar were introduced as would beset the ritual for which the choir was built, lo! the "vista" would exist no longer. It would be blocked out, annihilated. "But why," says the tourist, "have a better altar than what is there now? An altar! what do you mean by an altar? Why don't you say 'communion-table'?" Pray, (don't sacrifice this fine vista, the most striking view we have ever seen, for the sake of something that only affects your ritual. Pay some respect to the love of beauty felt by tourists from all parts of England and America." What is to be done? Are the feelings of the few, who habitually use the cathedral, or the wishes of the many who come to admire, to prevail? Here is a dead-lock. Alas! Pan is dead.

It is the same story wherever we go. The cloisters are empty, save for the few who pace them out of curiosity. The retro-choir, the Lady-chapel,—what do the terms mean? The uses for which they were built have entirely disappeared. But let us go along the north transept and through a low door in the east aisle thereof. Here is something of interest. A great flight of steps leading up and up, through a beautiful arch and away to a closed door, which stops further view. Before passing through the arch some of the steps ingeniously sweep round and lead through another arch, divided by a slender shaft, into the chapter-house. The steps are worn terribly in places. How eloquent those wavy edges are! What generations of workers do they tell of! Here, at any rate, is life still. The life, no doubt, is vastly changed. From the topmost door which bounds the view, now descend young theological students instead of shaven priests. Through the double door of the chapter-house pass clerical gentlemen in truly modern garb, instead of the brilliant robes of four centuries ago; but the object of their presence is the same,—the proper government of their cathedral. The resolutions now passed within those walls are not so far-reaching as of old; the presiding dignity can no longer dispense life and death, either spiritual or temporal. Indeed, the atmosphere is as much changed up here as it is down below in the sacred building itself. The Dean and Chapter, indeed, are absolute within their own jurisdiction, but their jurisdiction has

shrunk since the old days. No longer need they concern themselves with heretics and backsliders, further than perhaps to admonish, perhaps to reclaim. Their thunderbolts are quenched, their swords are turned to ploughshares, their spears to pruning-hooks. No more shall they consign, with bell, book, and candle, any of their fellow-creatures to a life of outcast misery; and never again shall they light their path to heaven with the burning bodies of such as could not accept their theological views:—"Pan is dead."

## NOTES.

**F**IVE fine Yorkshire properties, in the North Riding, are about to be sold during the ensuing season by order of the Marquess of Ailesbury's trustees. Set in portions of its best scenery, these include one of the fourteen abbeys and two of the numerous baronial fortresses for which the county is pre-eminently renowned. One property, the largest, is the Jervaulx Abbey estate,—lying in the valley of Wensleydale, and watered by the Ure. Comprising some forty farms and their home-steads, with smaller holdings, inns, mills, and the like, as also limestone and freestone quarries, it embraces an area of say 10,000 acres, yielding a net income calculated at 11,000*l.* a year. Many of our readers are, doubtless, familiar with the remaining ruins of the abbey church and its adjacent monastic buildings. The four other properties are known as the Wath, the East Tanfield, the Tanfield Lodge, and the Whorlton Castle and Swainby Estates. In the last-named are situated the ruins of Whorlton Castle. On this estate (nearly 6,000 acres), which extends over the Scougdale valley to the Cleveland district, stand the works of the Carlton Iron Company, and here are believed to exist rich salt and other mineral deposits. The rents and royalties are estimated to be worth 3,500*l.* per annum. The Wath Estate, of 643 acres, is coterminous with the township of Wath, whose village tenements and four farms produce a rental of nearly 1,400*l.* The Tanfield Lodge and East Tanfield Estates are mainly agricultural, consisting in the aggregate of 3,800 acres, assessed at 3,600*l.* a year. By Tanfield Lodge are the lovely Hackfall ravine, on the Ure, and the Magdalen woods; whilst the foundation of Tanfield Castle, now dismantled, is attributed to John, Lord Marmion. The advowsons and rights of presentation to the livings of Swainby, Wath, East Witton, and Tanfield will be sold along with the several purchases, certain life interests of the present Marquess therein being duly reserved. Similar reservations are stipulated for in respect of the mansion, abbey, and curtilage at Jervaulx, and of Whorlton Castle, though the purchasers of these will not be precluded from becoming tenants in possession on completion of the purchases under agreements with the vendors.

**T**HE experiments which that father of living engineers, Captain John Ericsson, has long been carrying on at New York with regard to the propulsion and guidance of torpedoes, are now about to be repeated at Woolwich. It is a matter of extreme significance, as regards the future of marine warfare, that the Nestor of the profession has laid aside the results of his long experiments on compressed air, and on electricity, as motors for the torpedo, in favour of the submarine explosion of gunpowder. The experiments as to this explosive action, as applied to a gun tube, which have long since been made, have been regarded as finally condemnatory of the value of the method. Nothing, however, that Captain Ericsson does can be regarded except with great respect. But, taking the case as put by him, a range of 300 yards under water is the utmost contemplated. If this is compared with the range of a projectile fired with 20 lb. of powder in the air, it will be seen at once how hostile hydrostatic resistance is to submarine firing. The experiments will be awaited with interest. But, considering the result proposed, it may be questioned whether

the best outcome of such a system can at all compare with that of a shell fired through the air and arranged so as to explode at the moment of striking a vessel close to the water-line. The importance to an insular and maritime people like ourselves of an exhaustive knowledge of the capabilities of the torpedo cannot well be exaggerated. And as far as the national defence is concerned it will be good news for us all if we can be convinced that the truly irresistible action of the torpedo is defensive, and that as an implement of attack it is too uncertain in its results to compete with the more deadly aim and accurate time of marine artillery.

**T**HE Secretary of the City Church and Churchyard Protection Society writes to the *Times* to protest against what is stated to be the intention of the Bishop of London, to deconsecrate ("desecrate" is the word Mr. Wright uses, which, of course, sounds much worse) four of the London churches, viz., St. Catherine Coleman, St. Olave (Old Jewry), St. Thomas in the Liberty of the Rells, and Holy Trinity, Minories. The question whether these churches are really performing any useful function in providing for the wants of congregations is of course that on which the right or wrong of the proceeding really turns; and this is a question not in our province to deal with. We may, however, observe that there appears to be some tendency at present towards the revival of the use of churches for week-day worship, private as well as public, and that it should not be too hastily concluded that because a City church has for some time past been put to little use for the purpose for which it was built, it must necessarily be the same in the immediate future. If, however, it is clearly proved by experience that any particular church has really lost its reason for existence, except on grounds of purely architectural interest, we must be quite sure that the architectural and historic interest of the building is really so great as to compensate for the loss of the great public value of its site in these times of over-crowding and over-pressure. Our own feelings would lead us naturally to advocate the retention of every old City church where possible, and we hope the bishop will "do nothing rashly"; but if a building is really of no use, only considerable architectural beauty can justify its remaining where every yard of ground is of such value; and the architectural interest of some of the City churches has been rather exaggerated by enthusiastic *laudatores temporis acti*.

**A**N important and somewhat suggestive report on sewer ventilation has been issued by the Drainage Committee of the Richmond Vestry, aided by its officials. The old story of offensive smells from the gratings had been dinned into the ears of the Vestry; and it is worthy of note it is not recommended, as has been often the case, that the gratings should be closed up altogether. The system of ventilation within the parish comprises shafts and open gratings as near the centre of the road as possible. With the view, however, to the greater diffusion and dispersion of the sewer gas, it is suggested that the number of shafts shall be increased. It is important to note that public bodies are more and more recognising the principle that sewer gases become a dangerous nuisance if confined to cesspools or sewers; and that contact with the atmosphere renders them innocuous. The Vestry has closed manholes in obedience to the urgent request of rate-payers, but it has endeavoured at the same time to open vent-shafts, which work in connexion with the manholes in causing a draught of air through the sewer. The process of flushing adopted by the Vestry is that of a continuous stream flowing for a certain time through hose from the water-main, or by tidal water. In some cases the sewer at the point of the adjoining manhole on the fall is closed, and the intervening section filled and emptied rapidly.



A LARGE military hospital is being built in Rome, in the district known as Celius, and it has resulted in some very interesting archaeological discoveries. Celius was one of the three great aristocratic quarters of ancient Rome, which has been excavated at different times in the sixteenth, seventeenth, and eighteenth centuries. Indeed, it has been a regular quarry for antiquarian remains, which has yielded a good proportion of the statues now in the various museums at Florence and Rome. The present discovery has been that of a very large mosaic, which formed the principal decoration of the vestibule in the house of Annius. It is in exceeding good preservation, having in the middle black figures upon a white ground, representing Tritons coming out of the sea. This has been carefully removed, and will form the parquet in the hall of the new hospital. Close by, another mosaic has been found, representing two young athletes wrestling, with their instructor looking on, and the partial inscription, . . . VICTUS ES. Another interesting find has been that of a summer-house ornamented with frescoes, and supposed to have formed a portion of the Villa Casali, where, a short time ago, a broken column was unearthed, of red marble of a kind and colour totally unknown to the marble-cutters of modern Rome. The archaeological committee which takes cognisance of these things has inspected it and given it the quasi-geological name of breccia di Casali.

THE "Caisse de Défense Mutuelle des Architectes" has made up its list of officials for the year 1886 as follows:—President, M. Bailly, President of the Société Centrale, &c.; Vice-Presidents, MM. Achille Hermant, F. Rolland, and Dormoy, of Bar-sur-Aube; Treasurer, M. Feydeau; Vice-treasurer, M. Bartaumieux; Secretary, M. Charles Lucas; Assistant-secretary, M. Tournade; Honorary Member of the Committee, M. Questel, Past-President. The Caisse, which was only founded last June, already counts its hundred members in Paris, seventy members in the departments, and ten associated societies.

FAVOURED by remarkably fine weather, marked progress has been made in the erection of the buildings for the forthcoming International Exhibition at Edinburgh. At a meeting of Operative Masons, held in their hall last week, it was suggested by Dean of Guild Gowan that the masons of the city should hew two shapely and well-proportioned pillars, to be erected opposite the entrance to the Exhibition buildings, at the west end of the meadows, somewhat after the style of those existing at the northern and eastern entrances to the meadows. He would give his share of the stone, and he had no doubt other owners of quarries would do the same, so that the stone would be an exhibit by the quarry-masters, while the labour would be the contribution of the working masons of Edinburgh. The Chairman of the meeting suggested that an arch should be erected rather than pillars merely, and a committee of twelve was formed to consider what form the trophy should take, and to make arrangements for giving effect to the resolution.

THE ninth annual dinner of past architectural students of the Ecole des Beaux Arts last week drew together about a hundred guests between the ages of thirty and eighty. M. Charles Garnier was in the chair, supported by MM. Questel, Bailly, Diet, and other members of the Institut de France. The toasts were proposed by M. Hénard, Architect to the City of Paris, and by MM. Garnier and Questel. The *spirituel* and perfect drawing of the menu card was by M. Adrien Chancel.

THE Commercial Bank of Scotland was the first of the chartered banks in Edinburgh to erect a sumptuous building in the new town as their place of business, an example which has been followed by the other banks, with the exception of the National Bank, and that bank, it is said, has, from time to time expended as much in tinkering-up and altering their

premises as would have covered the cost of a new structure equally imposing and convenient with the others. The telling-room and entrance-hall of the Commercial Bank are both stately and effective, but the pillars with which they were adorned were formed of wood painted to imitate marble, and the floors were laid with colourless pavement. The pillars in the telling-room have been superseded by columns of black Devonshire marble veined with red and grey, and the Corinthian capitals are of bronze. Those in the hall are of emperor's red on bases of Belgian granite. The stone pavement has been lifted, and a marble mosaic floor substituted, the central feature of which, in the telling-room, shows the cognisance of the bank,—a female figure seated, representing Commerce. Other alterations have been made with the view of securing better light, &c., and the walls have been appropriately decorated in colours and gold. The alterations were carried out under the superintendence of Mr. Sydney Mitchell, architect.

THE past year's volume of the *Portfolio* shows that this high-class art periodical fully sustains its reputation. There is not one, we think it may be said, among the numerous illustrations in it which is not good of its kind; there are some among the more important and larger ones which are splendid. Among these may be mentioned "Magnolia Grandiflora," an etching by Mr. G. M. Rhead; "Val d'Aosta," engraved by Mr. Alfred Dawson from Turner's water-colour drawing; and "The Mother," an etching by Mr. W. Strang. Architectural subjects take a considerable place in the volume, and are very well illustrated in plates and sketches. Mr. Loftie contributes an interesting series of articles on "Windsor," and Mr. Watkiss Lloyd another series on "The Drama of the Greeks in relation to the Arts," with illustrations from Greek vases.

ON Saturday, the 19th, the first grand "commercial and industrial" fête took place at the Tribunal of Commerce. Mirrors, hangings, carpets, hot-house plants, and thousands of lights (candles, oil lamps, gas, and electricity), combined to make a veritable Eden of this commercial Palais de Justice, the most admirable parts of which were the grand staircase and the covered court with its two stages of porticos, above which was hung a white and yellow *velum*, whose tints repeated the effect of the gas and electric lights. MM. Alphan, president of the committee; Michau, president of the Tribunal de Commerce; and Bailly, architect of the building, received the guests, among whom the marked absence of the official world was deplored.

IT is in many respects to be regretted that, owing to the increase of the population in the capital of Italy, several of the fine old houses built by the patrician families of Rome during the fifteenth and sixteenth centuries are being bought up for the purpose of being demolished, and their sites covered with shops and residences adapted to modern requirements. The princely families to which the old villas belong are mostly in rather needy circumstances, and the sums offered by building speculators for the sites of their ancestral houses are too tempting to be resisted. Plots of ground in eligible positions within the city fetch enormous prices. Thus a well-known clothier and tailor of Rome, named Bocconi, has just paid the sum of 875,000 francs, or 35,000*l.*, for one-half the vacant area opposite the Chigi Palace. The purchaser likewise offers to architects a large premium for the best design for the new establishment he intends to erect and open in that part of the Corso.

A CURIOUS communication in regard to ventilation appears in *Nature*, in the shape of a letter from Mr. Fletcher, of Warrington, stating that he had tried the expedient of having an outlet over the chandelier in each room carried across to the chimney-breast, and run up side by side with the chimney-flue, with the view, of course, of quickening aspiration by the additional warmth

of the chimney-flue, but that the effect was the reverse of what had been intended, and whenever the fire was lighted the ventilating-flue set up a back-draught. "In the absence of any fire there is a strong upward current in both, but the instant the fire is lighted the upward current in the ceiling ventilator stops, and in a few minutes is reversed, the cold air and collected smoke from the chimney outlet coming in with such force that we have been compelled to make up every ceiling ventilator in the house except one, which, although useless when a fire is lighted, is not a nuisance." We have no doubt Mr. Fletcher is right about the facts, but the explanation of them is probably simpler than he thinks. Has he any inlet in his rooms for fresh air proportionate to the combined area of the chimney and the ventilating shaft? If not, of course, when the heat of the fire sets up a current to the fireplace, it draws in air to supply its place through the most commodious inlet, the flue in the ceiling, and a circulation system is set up between the two. Let Mr. Fletcher provide a more direct and a sufficient inlet of air to the fire, and he will no longer have down-draught from his chandelier chimneys.

#### ENGLISH PORCELAIN.

THE small book published under this title\* is one of the South Kensington Art Handbooks, and deserves to be called one of the best of that voluminous series. It is a small book of about 100 pages, not counting the illustration pages, but not a page in it is wasted, and the main facts in regard to the history of the various English manufactories (the majority of which are now extinct), the character of their work, and the marks by which it may be known, are given in a clear and consecutive manner, each class of work being illustrated by very well executed engravings of typical examples.

The consensus of fashion in regard to the interest in and taste for china in this country is curiously illustrated in the nearly simultaneous dates of the founding of the principal centres of manufacture. The earliest known or the earliest dated Chelsea work is 1745. How long the manufacture there had been carried on previous to that date there appears to be no evidence, but Professor Church thinks it clear that these were by no means first attempts, as they exhibit proficiency in the craft. Still, we cannot suppose that the Chelsea manufacture was many years previous to the earliest known dated piece. The works at Bow probably date, our author considers, from the patent taken out by Edward Heylyn and Thomas Frye in 1744. The Derby factory probably dates from just before 1750. The partnership deeds for carrying on the Worcester-Tonquin manufactory are dated 1744. Cookworthy, the founder of the Plymouth manufactory, had had his attention directed to the subject of kaolin and its capabilities in 1745, though he did not achieve the mastery of the manufacture till some years later. The Bristol manufactory can be traced back to 1753, though then in a crude state. Thus it seems that nearly within the same decade the demand arose sufficient to prompt the formation of all the principal schools or centres of manufacture of porcelain or "china," to give it the name attached to it then and which has clung to it more or less ever since. The connexion of the English manufacture with Chinese example, so obvious in the decoration of much of the earlier work, is curiously exemplified in the name of "New Canton," which was given to the now long-since extinct but once extensive works at Bow.

Professor Church's book is, as we have said, an excellent and portable manual of the facts of the history of British porcelain, and for these we refer the reader who is still in a state of Chinese Paganism, as ignorance on this subject may perhaps be called, to the pages of the handbook. We venture a remark or two on the art-criticism side of the subject, in regard to which we also shall possibly be regarded by the elect as in a state of Paganism. For in regard to much of the work so well illustrated in Professor Church's pages we hold that it is fashion alone that gives it much value from the point of view of abstract artistic judg-

\* English Porcelain. By Professor A. H. Church. Published for the Committee of Council on Education, by Chapman & Hall, 1885.





Fig. 1.



Fig. 2.

Examples of English Porcelain.

ment. China was a matter of fashion when it came in, and it has now mounted to the uppermost rim of the wheel of fashion again, and prices are given for genuine articles of Worcester and Chelsea make which would not have been dreamed of even when the fashion of the last century was at its height. Of course the apparent difference in nominal coinage is greater than the actual difference in the "retail value" of the same article now and a century ago; but still the sale of the same famous piece of "Chelsea" for three guineas in 1773, and for 29l. 10s. in 1883, represents a considerable development of "unearned increment."

This wholesale throwing about of guineas is too often carried on quite irrespective of any value which an unbiased judgment would attach to the pieces for which such large prices are paid, if considered on purely artistic grounds. Artists themselves appear unable to discriminate, and when once they begin collecting china they are as blind in their admiration and pecuniary enthusiasm for mere rarities as the most unenlightened dilettanti. A considerable proportion of the china which is run after and bid for is in reality at variance with every sort of purity of taste. A Greek artist would have sickened at it. Gross imitations of natural foliage in ragged protuberance of relief, made "more rawer" by gawgaw colouring; rococo forms, vulgar in themselves, made more vulgar by "parcel gilding" (as it would be called in the South Kensington tongue); fat-faced stumpy figures of shepherds and shepherdesses, poor enough as models, and bedizened with coloured finery; these are not surely the kind of works to take the eye and spirit of the artist. Prof. Church displays lucid moments of criticism in speaking of some of these things; but how far he is carried away from the centre, and how poor is the real level of the porcelain figure work, is obvious in connexion with the illustration of the Derby "Diana," a white biscuit statuette in the "Museum of Practical Geology" collection (what has a biscuit Diana to do with practical geology, by the way?). He calls this "an exquisite example" of Derby work; all that can really be said of it is, that it is better than a great many of the porcelain figures; in any other light than a china-fancier's it would be called a vulgarly-modelled commonplace thing.

We should like to see china collectors gauge the value of their acquisitions a little more by considerations of art, and less by mere fashion and considerations of scarcity, and the wish to secure something that Jones has not got in his collection, and of which a duplicate is not known to exist. We have little expectation of seeing it, however; collectors of all kinds are mostly mad. By way of pointing our remarks, however, and presenting our readers with favourable examples of the illustrations, we subjoin (by the kind permission of the publishers) two examples of really artistic English porcelain, in a pure and refined taste. Fig. 1 is a covered cup and saucer of Derby work; fig. 2, a sugar-basin and cover of the manufacture of Loughley (Shropshire), rather later in the century. In these examples there is elegant form, appropriate to the material; delicate and well-applied decoration; and no bunches of gawgaw imitation flowers, or shell-work, or such nonsense.

#### NEW REGULATIONS FOR PUBLIC TENDERS IN GERMANY.

THE re-adjustment of the various regulations affecting tenders is a subject which has of late years attracted considerable interest in German technical circles. Following up previous action, the Government last year invited a number of leading industrial authorities to join in a revision of the existing system, and this step has now led to the issue of a new series of regulations by the Prussian Ministry of Public Works, of which the following are the principal features:—

##### I.—MODE OF GIVING OUT TENDERS.

Work and materials are, as a rule, to be tendered for publicly, but the following exceptions are permitted:—(1) Work and materials which can only be suitably executed or supplied by a limited circle of contractors. (2) Work and materials for which suitable proposals have not been received in a public tender already held. Contracts can be made without any tender:—(1) Where the estimated cost does not exceed 50l. (2) When there is urgency for execution. (3) Where the work necessitates particular artistic skill. (4) In supplementary orders for materials to complete the total requirements of a work, provided no higher price is paid than that of the principal delivery.

##### II.—MODE OF PROCEDURE.

1. *Object of the Tender.*—This must be definitely indicated in all essential respects. Regarding accessory circumstances affecting the calculation of prices, details are to be given of sufficient completeness to allow of a proper appreciation of their importance. The periods of time for deliveries to supply continuous requirements are to be arranged according to the special circumstances of each case. Tenders of an extensive character are to be so divided as to allow the participation of smaller contractors and artificers. Therefore, in larger works of elevated building, the division would correspond with the various branches of trade and labour. Specially extensive divisions may be further made into lots. Unusual requirements not customary in trade are only to be applied, so far as is absolutely necessary, to the quality and measurement of goods or work. When such knowledge is of importance in appreciating the quality of articles delivered, the competitors may be required to state the names of the manufacturers by whom the goods are to be supplied. Sufficient time is to be allowed for the execution of work or for making deliveries, and when the term is, from reasons of urgent necessity, exceptionally short, special rapidity should only be prescribed for the portion first required.

2. *Announcement of the Tender.*—In announcements through the press, attention is to be paid to the regulations as to using official journals. These advertisements must contain, in compressed form, such information as is of importance in deciding interested persons to compete (division into lots, time of opening tenders and of adjudication, cost of plans, details, &c.).

3. *Time of opening Tenders.*—When special circumstances do not require an earlier date,

this should be within fourteen days for smaller works, and four weeks for those of a more extensive character.

4. *Time of Adjudication.*—This should be at as early a date as possible (more particularly in the case of materials liable to variations in price), and should not exceed fourteen days as a rule, or four weeks when the approval of superior authorities has to be obtained.

5. *Conditions of Competition.*—Those named in the special memorandum which follows are to be applied to public competitions. They are likewise applicable to limited competitions, with the exception of the clause as to payment for drawings, &c.

6. *Opening Tenders.*—Competitors or their representatives are alone entitled to attend. The tenders are to be read without indication of their sources. A protocol is drawn up of the proceedings in which the offers are inscribed after the names of the competitors, and this document is executed by the parties present. The publication of the offers and of the protocol is not to be permitted.\* If there are no special inquiries necessary as to the most acceptable offer, and if the presiding official is empowered to decide as to the adjudication, this can take place at once.

7. *Adjudication.*—No preference is to be given to the lowest tender as such, and the adjudication is only to be made to a tender in every respect acceptable and guaranteeing the efficient and punctual execution of the intended work. The following classes of tenders would be excluded:—(a) Those which do not correspond with the conditions laid down; (b) those which, according to types submitted, are unsuitable; (c) those which are evidently out of proportion to the normal value of the work, so that efficient execution could not be expected at the price. An exception would be allowable in the last-named case, if the competitor were reliable and capable, and could justify the quotation given. As a rule, the adjudication in public tenders would be given to that offer of the three lowest which would be considered the most acceptable upon taking into consideration all the circumstances affecting the case. In limited tenders, where the merits of the competitors are in other respects equal, the lowest offer would be selected. Where the working out of details as to constructions and appliances is left to the competitors, the offer is to be selected which is considered the most suitable for the case in point, and the cheapest in consideration of all the circumstances involved. If none of the lowest tenders thus referred to is considered acceptable, all the offers are to be refused. In the case of building work, where several equivalent quotations are received, those competitors who live at or near the locality of the work are to receive a preference.

##### III.—FORM AND DRAWING UP OF CONTRACTS.

1. *Form of Contracts.*—A written agreement is, as a rule, to be drawn up, expressing the contract made by the adjudication. The follow-

\* A correspondent of the *Eisen-Zeitung*, while admitting the injury which is done by the general diffusion of the results of tenders, calls attention to the disadvantage which would be suffered under these circumstances by persons tendering who had no representatives on the spot, and whose own attendance was not practicable; this being a matter in which the coal trade is specially interested.



ing exceptions are allowable, without the legal validity of the contract being impaired:—(a) Contracts of less value than 50*l.*; (b) work done day by day; (c) contracts, respecting the essential conditions of which an understanding has been arrived at by correspondence. In the latter case the use of order forms and the mutual acknowledgment of written notes should insure the proof, if necessary, of the essential points of the contract made.

2. *Drawing up of Contract.*—This must be concise, but also definite and clear. General contract conditions should be laid down for the separate groups of works which occur more frequently, and the changes necessitated by the application of these conditions to any particular description of materials or work should be expressed. Besides reciting the principal facts connected with the tender and adjudication, the contract should specify (a) the object to be carried out, and (if so desired) the source from which the material is to be obtained. (b) The dates for partial and complete execution. (c) The amount and mode of payment. (d) The amount of any conventional penalty, and the circumstances under which this would be enforced. (e) The amount of any security to be lodged, and the obligations of which it is to guarantee the fulfilment as well as the circumstances under which it is to be returned. (f) Details as to the taking-over of work or deliveries, as well as the extent and duration of the guarantee to be given by the contractor. (g) Provisions as to the eventual appointment of arbitrators and an umpire.

There should be mutual acknowledgments of estimates and drawings, as well as of detailed technical directions, which would be appended to the contract. The generally adopted conditions for contracts (quoted in detail as an appendix to the new regulations) should be affixed to the contract, in which their validity would be recognised, subject to the alterations and omissions which would be made in the copy attached.

#### IV.—CONTENTS AND EXECUTION OF CONTRACTS.

The obligations imposed upon contractors should not exceed the measure of those which private persons are accustomed to undertake under similar circumstances. The contractor has rights which should be expressed as clearly as his obligations. These affect:—

1. *Payment.*—This should be hastened as much as possible, and, when the work is to extend over a long period, instalments should be arranged for, a similar provision being suggested when a delay of entire payment is necessitated by the detailed examination of the work done. A subsequent withholding of an agreed instalment for the purpose of increasing the amount of security would only take place if claims had already been made upon the contractor which the security in hand did not cover.

2. *Security.*—Admission to a competition by tender cannot be made dependent upon security being previously given, but in cases where this step is considered necessary the prompt furnishing of security can be demanded before the adjudication is made. The amount of the security and the duration of its validity or retention should not be more than necessary to secure the givers of the work from eventual loss and should not, as a rule, exceed 5 per cent. of the contract amount, being given either by a cash deposit (money, papers of value, State Railway bonds, &c.) or by the guarantee of responsible persons. In case of a depreciation of the bonds, &c., held as security, further cover may be asked from the contractor. When the guaranteed obligations have been fulfilled, the return or release of the security is to take place without delay.

3. *Increase or Decrease of Quantities.*—There should be no reservation for a one-sided increase or diminution of the agreed work or deliveries coupled with the maintenance of the contract prices.

4. *Conventional Penalties.*—These should only be stipulated for when important interests depend upon the punctual execution of the work, and should not be asked for when the contract is for anything which could in case of need be readily procured elsewhere in the requisite quality and quantity.

5. *Control of Execution.*—The givers of the contract have the right of supervision, as to the execution of what has been agreed upon, in works, workshops, work-places, &c. The control of the

building operations would likewise extend to seeing that the contractor fulfilled his stipulated obligations towards the artificers and workmen. If from the neglect of such obligations the progress of the work should become doubtful, it would be allowable to make payments for account of the contractor direct to the interested persons. When the productions of special manufacturers are specified, arrears in deliveries should be notified to them.

6. *Differences.*—Arrangements would be made for arbitration and eventual further reference. Arbitration as to the mode of executing building work would only deal with such claims for compensation which might be founded upon such mode of execution.

7. *Expenses of Contracts and Stamps, &c.*—The expenses of making contracts would be equally divided between the two parties. The legal enactments as to the stamps being paid by the persons giving the work would be followed. Postage, telegrams, &c., in the interest of the conclusion and execution of contracts would be paid by each of the parties incurring such charges.

An appendix (referred to in Division II., section 5) contains a number of detailed regulations as to the sending in of tenders, the steps involved in communicating the results of adjudications to those interested, the deposit of security, &c. A second appendix contains the general conditions of contracts for the execution of building work, which have already been alluded to (III., 2). The main features of these conditions have in some cases been incorporated with the regulations of which details have been quoted; this being the case as to the inspection and taking over of work, payments, claims, security, arbitration, cost of drawing contracts, &c. The following points of a special character are likewise dealt with:—

The contractor or his representative must attend at the building site to consult with the officials in charge of the work when the latter consider it necessary. These officials have the control of the contractor's workmen in matters affecting the execution of the building work and the maintenance of order. The contractor has to construct the necessary closets, &c., and to be responsible for their being regularly cleaned and disinfected as well as their subsequent removal. The watching of his scaffolding, tools, and materials on the building site is incumbent upon the contractor. While the scaffolding erected by the building contractor is standing, workmen belonging to other branches can use it gratuitously, but he is not obliged to make alterations for the convenience of the latter. The contractor is responsible for the due observance of official regulations in all matters within the scope of his contract obligations. Without prejudice to his responsibility for the strength and general efficiency of his scaffolding, he is obliged to complete or strengthen it without delay at his own expense upon being ordered to do so by the officials in charge. He is likewise responsible for the acts of his deputies, assistants, and workpeople in the execution of the contract.

The contractor is not empowered to transfer his contract responsibilities to another person without the consent of the authorities conducting the work. If he fails before the fulfilment of the contract, the building authorities are entitled to annul the contract from the day of the failure; payment being in this case treated according to existing regulations. In event of the contractor's death before the complete fulfilment of the contract, the building authorities have the option of continuing the contract with his heirs or of considering it annulled.

#### Proposed Palace of Justice at Munich.

The Bavarian Government has determined to erect a new Palace of Justice in Munich, the capital of Bavaria, the accommodation hitherto existing for the principal tribunals of the kingdom having proved entirely inadequate. The question of the site of this new and extensive edifice, which will be a great ornament to the art-loving city on the Isar, is at the present time agitating the architectural and Governmental circles of that capital. Opinion appears to be inclining in favour of the choice of the extensive and open area near the so-called "Cadettencorps" which, although rather distant from the centre of the city, is probably the finest site that could be selected.

#### ENGLISH HOMES IN THE SEVENTEENTH CENTURY.

ARCHITECTURAL ASSOCIATION.

THE first meeting of this Association for the present session was held on the 18th inst., at Conduit-street, Mr. C. R. Pink (President) in the chair.

The following new members were elected, viz., Messrs. W. H. Burt, C. R. G. Hall, C. Owendon, F. M. Coley, H. J. Wembridge, S. J. Sampson, M. S. Stokes, R. S. Maynard, H. J. Ellis, W. J. Wildon, A. S. Rowe, J. J. Cotten, F. C. Schweder, Henry Berney, and T. E. N. Woodgate.

Mr. J. A. Gutch (Vice-President) then read the following paper on "English Homes in the Seventeenth Century":—

Gothic architecture was moribund. The pulses of its long and brilliant life were waxing faint and feeble. Its supple Early English youth had passed into the beauty of Decorated manhood, and this, in its turn, had matured to the calm grandeur of Perpendicular old age. And now, all its cunning forgotten, or only remembered at melancholy intervals, its mightiest efforts little better than forlorn caricatures of its ancient prowess,—it stood ready to take leave of the world, its best friends hoping that so noble a career might have a speedy and painless end. Their wishes were granted; for presently came the joyous Renaissance, with its merciful hand, and quietly stifled the worn-out veteran. A few of the old man's effects were retained in affectionate remembrance, and then the youthful stranger stepped forth before mankind the acknowledged heir of dead Gothic.

The period of which this young style was the product was one of the most interesting and important in the history of the modern world. To its influences we owe all that we now enjoy of comfort and freedom. Perhaps the four principal events which have moulded modern ideas are the invention of printing, the discovery of a new world in America, the Reformation, and the rise of English literature: all of these sprang from the re-awakening called the Renaissance.

The influence of printing on the spread of new ideas in the sixteenth century was incalculable; it was one of the great agents that shaped events and the men who took part in them. The discovery of America gave birth to a spirit of enterprise and a love of adventure which tinged the whole spirit of the times, and gave us Francis Drake, Martin Frobieher, and Sir Walter Raleigh. The Reformation gave us the English version of the Bible; it gave us the Puritans, whose spirit is still abroad; and, which is more to our present purpose, it gave to the nobles and squires of England the enormous funds of the suppressed monasteries, with which, in the fulness of time, they built themselves the houses we are about to explore. Modern English literature may be said to commence with Shakespeare and his contemporaries, and it is in the pages of Shakespeare and his fellow-workers that the most vivid pictures may be obtained of the home life of the period; for wherever the scene is laid,—whether in Italy or Greece, in Verona, in Arden, or in Fairyland,—it is England which is really portrayed. Men and women walk across the stage in foreign garb, it is true, and call each other by hard foreign names, but beneath the surface they are all English; their speech bewrayeth them. Therefore, if I quote them rather freely, I trust you will not think them tedious, but rather regard them in the light of contemporary witnesses of great importance.

History will tell us of the heroes of those times. The printer has recorded the labours of his ancestors, and their comrades of the Renaissance. In the great book of History we may read of the founders of the American nation; of the first colonisers; of the first colony, called Virginia, after the virgin Queen. There we may learn the names of the mariners who humbled the pride of Spain; of the statesmen whose wise counsels, falling into the ear of an astute princess, lifted England into the rank of a first-rate power. There, too, we may watch the flames kindling round devoted men, whom we call martyrs if we agree with their views, and fanatics if we do not. There we may read the story of hunted priests and persecuted Papists, and how they tried at one great blow to revenge themselves, and turn the wheel of Fortune, on a certain 5th day of November. In History's pages we may mark the brilliant fancies, the exuberant wit of Elizabeth's days, slowly



changing to the sober earnestness, the Puritan harshness, of the times of James I. and his ill-fated, arrogant son. We may there watch the people of England silently taking sides for the great struggle that cost Charles his head, and gave England her freedom. We may see the nobles, the squires, the citizens,—the Fairfaxes, the Hampdens, the Miltons,—girding them for the strife, and striking a good blow with sword or pen for the cause they had at heart. Of all these great doings we may read in history, but let us to-night forsake the great, broad, beaten track, and stroll down the quiet by-ways. Let us visit the homes of the men of whom we have read,—of Burleigh and Raleigh; of the Gunpowder Plotter who would fain have been a hero had he dared; and of the country squire who at the call of duty suddenly found himself a hero against his will. Let us see the houses they lived in, and the gardens amid which their dwellings were set. If we can picture them in their habits as they lived, we cannot fail to obtain a better grasp of the stirring times in which they moved.

When Sir John Falstaff went recruiting into Gloucestershire he paid a visit to an old comrade of his, a country squire, one Justice Shallow, who lived in such a house as we will now examine. Its outer door is approached by an avenue of newly-planted trees, and itself opens into a court enclosed by a far-stretching stone balustrade. Above the door is the coat-of-arms of Shallow,—the twelve luses,—the fresh-water fish of which the justice was so proud, although, good man, he cheerfully admitted that the salt-water fish was an old coat too. Some Shallows of the richer sort had large entrance lodges to their outer courts, such as may be seen at Charlotte, near Stratford-on-Avon, where the Sir Thomas Lucy lived who caught Shakespeare stealing his deer. Others, again, would have no court at all, and, consequently, would need neither door nor entrance-lodge in the wall thereof; but, in a house with any pretensions to be considered a mansion, there would most probably be a courtyard.

On the other side of the court lies the house, fair, square, and symmetrical, with a projecting gabled wing on either side, a porch in the middle, and here and there a canted bay-window serving to relieve the general squareness of the building. The windows have narrow lights and thick stone mullions and transoms, for people were then hardly alive to those beauties of prospect which afterwards led them to adopt the wide and lofty sashes of the palmy days when Queen Anne (who is now dead) sat upon the throne.

Each floor is marked by a string or cornice of more or less incorrect classic profile, while the summit is crowned by an open balustrade running from one dainty gable to another, and connecting together the great chimney-stacks which rear themselves aloft in the semblance of classic columns. At intervals along the balustrade and at every corner where it starts on a new career, rise square pedestals, supporting perhaps an heraldic animal, perhaps an urn, perhaps merely a ball, but always serving to give rhythm to the composition. In the blank spaces of the walls below you may frequently see niches containing an unflattering image of some ancient worthy,—a monarch, a soldier, a philosopher, or a poet,—or else the counterfeit presentment of one of the heathen gods, which, if it be a faithful likeness, wraps one in unspeakable wonder at the awe those deities inspired. Perhaps, the frieze of the cornice contains a long legend couched in the Latin tongue, but more frequently is to be found something short and pithy over the door or on some of the panels that embellish the porch. Entering the porch, we find at the other end a nail-studded door with a primitive knocker in the shape of a ball of iron hanging by a chain at a convenient length to fall upon one of the largest of the nails.

The porch leads into a vestibule or passage, one side of which is formed by a handsome carved screen, sometimes of stone, but generally of oak, separating it from the hall; the other side is a solid wall, in which appears the buttery hatch. (See the lower of the two plans on the lithographed page of plans. It is not named, but is that of a squire's house, with court and gatehouse.) This arrangement is universal; the passage, never more than 12 ft. wide and generally only 4 ft. or 5 ft., with the hall on one side of it, and the buttery on the other. There was as yet no entrance-hall, as we under-

stand it, that is, a cold waste space devoted to hats and coats, hard chairs, a barometer, and a few bad pictures, though that feature was shortly to appear; but there was always this passage connecting the entrance with the servants' offices, and being in reality part of the great hall cut off by the screen.

The buttery is described in Bailey's "Dictionary" as "a place where victuals are set up," and its importance is manifested by the prominent place accorded to it on all plans of the period. Dinner was served from here, and food (particularly of a liquid nature) was dispensed to all who had any claim to it, and to many who had not. One of the virtues of the "old worshipful gentleman" of the seventeenth century song was that he had "an old buttery hatch worn quite off the hooks." This ancient arrangement and the use of passage, buttery, and hall may still be seen in many of the colleges at Oxford and Cambridge.

The hall itself was one of the chief features of a seventeenth-century house. In its position and size it was a survival from those days when the common hall served as feeding and sleeping-place for the whole household; but by the time of which we treat to-night the servants had been removed to their own separate department, and the family alone used the hall, except on occasions of festivity. The aspect of such a hall is tolerably familiar to all of us,—a large, lofty apartment, panelled half-way up to where the great roof springs from wall to wall, leaving its highest spaces filled with the gloom of low light and much smoke. Its walls are hung, as the old song just quoted says,—

"With pikes and guns and bows,  
With old swords and bucklers that had borne many  
shrewde blows."

At one end is the screen through which we passed from the passage, panelled throughout, and rich with fantastic carving. Over it is the minstrel's gallery, already beginning to sink into silence, but carrying on as yet the ancient traditions of the "joyous science." At the other end is the dais, where at meal times the master sits in state. The dais is another survival from old times, but it still occurs in many of the new houses of the period. It is simply a step, some 4 in or 5 in. in height, stretching across the room. Almost invariably one end of the dais terminates in a large bay window commanding a view of the entrance court. The rest of this side of the hall is taken up with large windows running up to the start of the roof, and filled with coloured glass where the sunlight sparkles amid the scales of the twelve luses of the shallows, or glides the lines of some pale face looking out from a pearl-decked head-dress. Over against these brilliant pictures, whose hues are led by the wintry sun across its fantastic front, is the fireplace,—a cavern wherein a tree-trunk may be burned. Its chimney-piece, like the screen, is panelled all over, sometimes in wood, sometimes in stone. It abounds in wreaths, and knots, and ribands; in grotesque heads growing out of curious pilasters, and crowned with Ionic volutes; in panels of jewels, and straps, and scrolls. Perhaps all this wealth of carving is only a magnificent frame to the family arms: perhaps it serves to surround statues of some Classic abstraction, "Justitia" or "Prudentia," "Arithmetica" or "Geometria"; something sententious it is sure to be, if only a Latin motto. If the central object be the family arms, most likely there will be two shields; one without any quarterings, bearing simply the arms of the family as a family; the other being the arms of the particular member of the family who caused the work to be done, and setting forth all his descents and alliances unto the third and fourth generation, and yet further. The screen, too, among its many ornaments, will have the family device, and so will the panelled ceiling. The house was built for the family, and proclaims its purpose at every turn. The arms, the crest, or the motto occurs in every possible place; in gables, in finials, on the parapet; on the water-spouts, on the weather-cock, on the sundial. They are carved on the screen, they are painted on the windows, they are moulded in the plaster esculichone of the frieze; they are cunningly wrought in the grins at the feet of the looks. The family animal mounded on the gate-post, he sits open-mouthed on the newels of the staircase, you lay hold of him when you poke the fire. He was a godsend to the craftsman of those days, and right well did they make use of their opportunities.

From the hall several doors lead in different directions. Through the screen where we entered is the way to the servants' department. From the dais end the private apartments are approached, and access to the upper rooms is obtained. It will at once be seen, therefore, that the family occupied one side of the house and the servants the other, their common meeting-ground being the hall. Sometimes, indeed, the servants were relegated to the basement, and all their offices were underground, an arrangement constituting (so far as I know) an entirely new departure in house-planning at that time. But, as a rule, they were located on the ground-floor, and their department was usually on a large scale. Country houses in the seventeenth century had to depend entirely on their own resources. They had to provide their own butchers and bakers, grocers and brewers. The larger houses had such offices as these:—laundry, dairy, cheese-room, brew-house, malt-house, hop-house, slaughter-house, fish-house, and bake-house, which shows that they could not rely on the visits of either the washerwoman, the wine and spirit merchant, the butcher, the fishmonger, or the baker. Of course, the principal apartment on the servants' side was the kitchen, almost always a large room with an enormous fireplace (in the chimney of which the smoke-jack turned), and often an oven. Next to the kitchen was the "pastry," a smaller room containing two ovens,—a large one and a small. Reference is made to this obsolete apartment in one of the plays of the time, where it is a recommendation of the heroine as a wife that "she can do pretty well in the pastry." Then there were the pantry, the dry larder, the wet larder, and the boutling-house, or place for boutling meal, that is, separating the meal from the bran. Very frequently there was a "surveying place," which was, probably, a serving-room; and in some houses may be found a "servants' day-room," a "hall for hynds," a place for pewter, a scullery, and a spicery. These, however, were only to be met with in the larger houses; but in every house were the kitchen, the pastry, the larders, and the buttery, with its stairs down to the cellar. These were essentials even in small houses. Reference has already been made to the importance of the buttery; the presiding genius of that place had a position corresponding to his environment. The butler was the principal servant, and acted as *major domo*. He had command of the cellar, the food, and the household stores. He is the favoured servant in the stage plays, and is left in charge when the master goes away. He looks after the young gentlemen, and in one place one of the fraternity tells us how these youths would sometimes cut their supper in the kitchen, and take it to the buttery to eat and to wash down with a good draught of ale.

Let us now again cross the hall and go to the family apartments. Here we find a parlour, or a "summer parlour" and a winter parlour, though not unfrequently the winter parlour is on the same side as the kitchen, perhaps with a view of ensuring hotter dinners. There is sometimes a special "dining chamber," which shows that the hall was gradually losing its old character of the eating-place, and becoming an entrance merely. If the house were large, it would perhaps have a "withdrawing chamber," and a "smoking-room" for the consumption of the new and fashionable weed, tobacco. Many country houses had a "chapel" in them; some had also a "chaplain's room" and "his study"; but these luxuries were reserved for the more wealthy.

Of staircases there was no lack. There were always two, one for the family and one for the servants, and in the larger houses they seem to have been put wherever there was a little spare space. They were one of the features in which the old workmen delighted, and which gave them some scope for design. They were broad and easy of ascent. From landing to landing they went, seven or eight steps at a time; at every turn there was a great newel-post, a solid mass of wood, panelled, and moulded, and sometimes carved; from newel to newel stretched a massive handrail, wide and deep; and from it to the string-board the space was filled with thickest balusters, fat, round, and substantial. No thin, winding mahogany handrail with "inch-square bar balusters every tenth of wrought-iron," and a mean-wreathed end at the bottom, but everything solid, broad, and monumental. Indeed, the grandeur was sometimes carried beyond the strict limits of common sense, for,



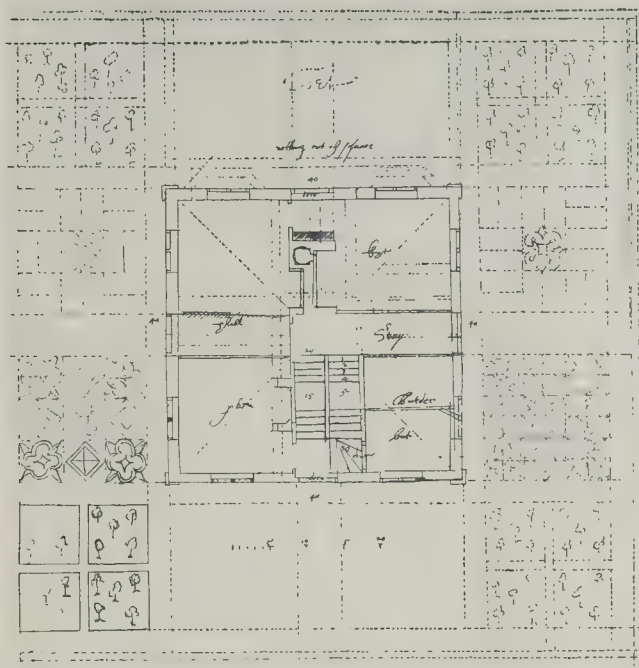


Fig. 1.—Plan by John Thorpe (not named), showing arrangement of flower-beds round the house.

after gaining the principal floor, you may sometimes see the same grand stairs sweeping away up to the empty attics.

The first room that claims our attention upstairs is the Gallery. This is a feature peculiar to the times. Every house having any pretensions to be considered a family residence had its gallery, which was always as long as the house would by any means allow. Not infrequently the house was planned with the express purpose of obtaining a very long gallery, and there were many houses where it was as much as 180 ft. or 200 ft. long. It almost invariably occupied the whole of one flank of the house, thereby obtaining light down one long side, and at the two ends. The next important room was the "Great Chamber," which seems to have been a particularly large bedroom. The rest of the floor was taken up with bed-chambers, or "lodgings," as they were designated.

All these rooms, as well as the parlours, were either panelled with wood, or else hung with tapestry, setting forth with singular impartiality legends from the Bible, heathen mythology, and ancient history. The following, for instance, are taken from a contemporary list:—*Storie of Susanna, the prodigal child, Saul, Tobie, Hercules, Lady Fame, hawking and hunting, Jezabell, Judith and Holofernes, David, Abraham, Hippolitus, Alexander the Great, Jacob, and so forth*; a curious medley of subjects sacred and profane. When Borachio was holding that discourse with Conrade on the Fashion, which led to their arrest by the doughty Dogberry, he talked of the "Hercules in the scorched, worm-eaten tapestry." And Spenser describes the walls of Bayrsane as being covered with the conquests of naughty little Dan Cupid; and in those princely rooms he tells us:—

"Round about the walls clothed were  
With goodly arras of great majesty,  
Woven with gold and silke, so close and nere  
That the rich metall lurked privily  
As faining to be hidde from envies eye:  
Yet here, and there, and everywhere, unawares  
It shewed itselfe, and shone unwillingly;  
Like a discoloured snake, whose hidden snares  
Through the greene gras his light bright burnisht  
back declares."

It was behind such arras that Polonius rashly concealed himself to overhear Hamlet's interview with his mother, and paid for his indiscretion with his life. And it was behind similar hangings, but of a humbler kind, that

Falstaff fell asleep when he took his ease in his inn, and thereby gave Prince Hal an opportunity of picking his pocket of the tavern bill which showed how he had swallowed but a ha'porth of bread to such an intolerable deal of sack.

These hangings were carried from place to place when the family removed from one of their houses to another. In Beaumont and Fletcher's "Wit without Money," a great lady determines suddenly to leave town for her country house. The whole household is thrown into confusion: Ralph calls to Roger to help down with the hangings; Roger cannot go because he is packing the trunks; Humphrey is looking after my lady's wardrobe, and must, perforce, leave to some one else the task of getting down the boxes in the gallery and the coach cushions. The fact is the men, one and all, detest the idea of leaving the pleasant town for the dull country. The carts come, but there is no one to load them; the stuff lies in the hall, the plate is all packed, and above the bustle is heard the voice of my lady's sister, wanting her hat, her fan, and her cloak laid out in readiness; she begs Walter to tuck her little box up behind the coach; to see that the coachman carries her dog carefully, and that Oliver packs her looking-glass discreetly, and is careful that her curls travel well. But suddenly the order for departure is countermanded, my lady has changed her mind, and all the bustle subsides into contented quiet.

From this busy scene of a seventeenth-century household, let us turn to another and more peaceful picture, drawn by the hand of Shakespeare. The scene is a bedchamber: in a great oak bedstead with panelled head and a tester supported by huge and bulbous posts, lies the sweet Imogen, reading by the light of a taper in a book of classic mythology. On the rush-strown floor, at a little distance, is a great trunk, where the villainous Iachimo lies concealed. He himself afterwards described the chamber to Imogen's poor credulous husband, when boasting of a conquest he never made:—

"Her bedchamber was hang'd  
With tapestry of silk and silver; the story,  
Froud Cleopatra, when she met her Roman."

The chimney  
Is south the chamber; and the chimney-piece  
Chaste Dian bathing; never saw I figures  
So likely to report themselves.

The roof of the chamber  
With golden cherubims is fretted. Her andirons  
(I had forgot them) were two winking Cupids  
Of silver, each on one foot standing.

The picture is truly drawn: the great chamber with its fretted ceiling, its tapestried walls, its carved chimney-piece, and the winking Cupids of andirons; the beautiful lady reading in bed, and presently the stealthy Iachimo creeping from his trunk and making his infernal noose.

Reading in bed was a practice not infrequently indulged in even in those days. In an old hall in Worcestershire is still to be seen a sixteenth-century bedstead, with a head formed of panelling with wide ledges. On the panels are painted allegorical pictures, now difficult to define, and more difficult to understand. In this bed some seventeenth-century person had lain awake to read, and for the better deciphering of his text had lodged his candle on one of the broad ledges. Perhaps the book was dull, perhaps a long day in the open air had wearied him, but he seems to have fallen asleep once upon a time, and to have suffered his candle to fall down and set fire to the wood, for there the charred ledges are, and there a poor scorched allegory.

We have now looked through the inside of the house: we have seen the great hall, we have been through the kitchen, and have looked into the stone ovens of the pastry; we have chatted with the butler amid the good things of the buttery; we have passed through the panelled parlours hung with family portraits; we have ascended the broad stairs and traversed the long gallery; we have examined the tapestry of the bedrooms and the great oak bedsteads. Let us now go out of doors and look at the gardens.

In front of the house is the court through which we first entered. It is partly enclosed by the projecting wings of the house, and partly by the stone balustrade, coped at a convenient height to lean upon. Flagged paths cross from one door to another, and the quarters between are of close-cropped grass, in strict accordance with Lord Bacon's instructions. "Let not the court be paved," says he, "for that striketh up a great heat in summer and much cold in winter." It was in such a court that Falstaff, in whose company we recently entered the precincts, inspected the ragged recruits procured for him by Justice Shallow, and finally selected the four worst, because they were not able to buy themselves off. On the kitchen side of the house is the wood-yard, with its out-buildings screening it from observation. This is an important place, for it contains the fuel for the whole household, and from it, as the song says,

"Tom bears logs into the hall,"

wood being the principal fuel in those days, and "a sea-coal fire" a circumstance to remember things by. On a third side is the orchard, reaching quite up to the house and offering delightful facilities for a stroll. Our friend the justice appreciated this, and after a very early supper, as the custom then was, took his guest out into the garden. "Nay," says he, "you shall see mine orchard; where in an arbour, we will eat a last year's pippin of my own grafting, with a dish of carraways and so forth;—and then to bed." "For God," replies Falstaff, looking across at the house glowing in the evening sun, "you have here a goodly dwelling, and a rich." "Barren, barren, barren," bemoans all, bemoans all, Sir John;—"merry, good air,"—and so they sat themselves down in the arbour and chatted and sang till Ancient Pistol came upon them with the news of King Henry's death.

On the fourth side is the garden itself, filled with old-fashioned sweet-smelling flowers, some of which wave beneath the casements of the parlour-bay, and shake their delicate odours into the panelled room. We may read that these flowers were in the poetry of the time; we know them all to-day, and, fortunately, are getting to know them better year by year as the fashion of "bedding-out" declines. They were rosemary and rue, carnations and streaked gillflowers, such as *Perdita* enumerates in the "Winter's Tale":—

"Hot lavender, mints, savory, marjoram;  
The marigold, that goes to bed with the sun,  
And with him rises, weeping. . . . Daffodils  
That come before the swallow dares, and take  
The winds of March with beauty; violets, dim,  
But sweeter than the lids of Juno's eyes,  
Or Cytherea's breath; pale primroses,  
That die unmarried, ere they can behold  
Bright Phoebus in his strength, a malady  
Most incident to maids; bold oxlips,  
And the crown-imperial; lilies of all kinds,  
The flower-de-luce being one!"

Some of these grew at their own sweet will; some were carefully disposed in geometrical

patterns in square beds with narrow walks between, forming a large and flagrant sea of dancing colour. Such formal arrangements may be seen on a few contemporary house-plans; the architect occasionally varying the prose of stone and lime with the poetry of the garden (see plan, fig. 1). Then, round the large open space thus brilliantly set, went terraces, and deep-shaded alleys, artfully contrived on a framing of carpenter's work. It was the remembrance of his garden that stirred the heart of Beaumont & Fletcher's "Noble Gentleman," when, weary of town, he cried out for the country, "where quietly," as he says,—

"Free from the clamour of the troubled court,  
We may enjoy our own green-shadow'd walks,  
And keep a moderate diet without art."

Such was the home of a squire early in the seventeenth century. The picture is not drawn from one particular house, but some of its features may still be found in any Jacobean mansion. In such a house must have lived John Hampden. The home of Francis Tresham, who was concerned in the Gunpowder Plot, exists to this day, and is not unlike the house and garden we have just examined; the country house of Sir Walter Raleigh was another of the same kind. Now let us give a brief glance of a little town house which was to have been built in St. James's for the last-mentioned gentleman.

It is a square house, measuring only some 41 ft. each way (see plan, fig. 2). On the ground-floor it

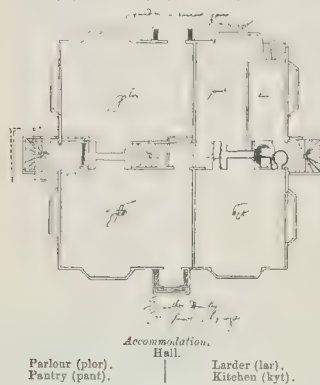


Fig. 2.—Plan, by John Thorpe, of a House for Sir Walter Raleigh, St. James.

is divided into four quarters occupied respectively by the hall, the parlour, the kitchen, the pantry, and larder. Of these the hall and parlour are somewhat larger than the other two quarters. The entrance is through a porch projecting from the middle of one side. There is in this case no passage leading from the porch, the door opens into the hall itself. Opposite the front door is the door of a vestibule leading to the kitchen and offices and to a staircase in the middle of the house. On the same side as this latter door is the fireplace, and beyond that another door leading to the parlour and to another staircase contained in a square turret projecting from the middle of that side of the house.

There is here, therefore, as before, the hall communicating at one end with the offices, at the other with the parlour and staircase. The kitchen (about 18 ft. by 16 ft.) has the usual large fireplace and oven, but there is no pantry and no buttery. On this side of the house there is also a projecting staircase for the use of the servants. Outside, therefore, the house is symmetrical. In the middle of each side is a projection, which in two cases contains a staircase, and in the other two is a porch (for there is a porch out of the parlour to balance the front porch, and leading into the garden). On either side of these projections is a shallow bay window, making two to each side. The hall has two bay windows, the parlour two, the kitchen two, the pantry one, and the larder one. An unnecessary number, perhaps; but, then, symmetry is symmetry. There are also four staircases in all: two on the sides, one right in the middle of the house, and a fourth in one corner of the pantry, and, probably, leading to the cellar. There is no upper plan extant, but it must have contained four bedrooms, possibly five.

Such is the house intended to be built for Sir Walter Raleigh in St. James's. For aught I know, it was built, but, if so, it has entirely disappeared. It is a small unpretending place, and contrasts strongly with some of the enormous palaces built by other favourites of the queen, such as Burleigh House, Kirby Hall, or Theobalds. Let us take, for instance, Buckhurst House, in Sussex, now destroyed, but which was once the home of the Earl of Dorset, who was first a poet and then a statesman; in his youth, the author of the first English tragedy; in his mature years the trusted successor of the great Lord Burleigh in the supreme office of Lord High Treasurer.

This is a vast block of buildings, enclosing one large central court and three side courts for light and air. (See the plan at the top of the page of lithographed plans. It is that of Buckhurst House in Sussex, now destroyed.) You enter through a great archway, on each side of which is the porter's lodge. You are then in the central court, which is about 105 ft. square, and would itself hold four houses of the size of Sir Walter Raleigh's. Advancing across this court, you ascend an easy flight of steps on to a terrace, and so through a porch into the usual passage cut off from the main hall by the wood screen. Here the arrangement is such as has already been described. To the right is the hall, with its dais and bay window; to the left is the buttery, and beyond it are the servants' offices. The buttery is on a larger scale than we have yet seen. It contains not only the buttery, but also "butler's lodging" (or bedroom), and a "breakfast-room." Beyond this is the pantry and the "pantry's lodging." The other servants' offices comprise the kitchen, dry and wet larders, scullery, bolting-house, a place for pewter, and another for trenchers, a "privy bakehouse," and also a surveying place. These surround a small court, and on one side face the woodyard, with its bakehouse, brewhouse, &c. The rest of the house is devoted to the family. Returning to the hall, and going out at the other end, you come to the "chapel," the great staircase, "a wayter's chamber," the parlour with the great chamber above, the "withdrawing chamber," and several suites of apartments, each called "a nobleman's lodging." Such a suite contains, in one instance, his "antechamber," "bedchamber," "servants' lodging," and a room between for "wood, cole, and privy." There is also a tennis-court, 85 ft. long, and upstairs a gallery, 16 ft. wide, and no less than 250 ft. long.

This list of apartments at once marks a house of greater magnitude and pretensions than the squire's house we recently visited. Its grandeur is further emphasised by the fact that the range of buildings on one side of the entrance gateway is called "for my lord's side," and those on the other "for my lady's side." Every arrangement goes to help magnificence and stately display. Such houses frequently had to accommodate royalty itself, with all its enormous retinue, and they were built not only of a size sufficient to do this, but also to do it in a stately and magnificent fashion. It was such a house as this that Spenser had in view when he described his "stately palace built of squared brick," wherein

"High lifted up were many lofty towers,  
And goodly galleries far over laid,  
Full of faire windows and delightful lowres;  
And on the top a dial told the timely hours."

The gardens of such palaces were in keeping with the buildings themselves. Thirty acres is the amount of ground assigned by Lord Bacon as necessary for a nobleman's place, the larger part of which is to be devoted to what is called a desert or heath. The rest is to be occupied by terraces, covered walks, open spaces of grass, lofty mounds with a banqueting-house on the top, and other imposing features, of all which some relics remain to this day in various parts of the country. Here, it is a terrace; there, a walk covered with arching yew, thick-set and cut into fantastic shapes; in another place, a great mound, now overgrown with forest trees and left to the undisputed occupation of a tribe of rabbits. It was amid such surroundings as this that the unhappy Charles I. lived when detained by the order of Parliament at Holdenby in Northamptonshire, and it was on the bowling greens of the neighbouring houses of Althorp and Boughton that the melancholy king found

\* It should be mentioned that the plans are facsimiles (reduced) from John Thorpe's sketch-book in Sir John Soane's Museum, by the kind permission of Mr. James W. Wild, the curator.

his chief solace till the morning when Cornet Joyce came and took him away.

We have now completed our allotted task. We have looked at men and women of the seventeenth century, as drawn for us by contemporary hands, and living in their own fair homes or wandering through their stately pleasure gardens; but, before we take leave of the grey gables, the lofty chimneys, and the many-paned windows looking out into sunlit courts, let us look at the houses we have been through, not as occupied by those who built them but by the builders' descendants in the nineteenth century.

It can hardly be denied that there is an absence of comfort in most houses of that period. The accommodation is in excess of what is required now, and it is badly arranged. There is no scientific planning at all. Convenience, economy, sanitation are hardly studied in the least. Many of the rooms are thoroughfare rooms, or, if not, they are connected by long corridors, not infrequently dark. The hall, the dining-room, the withdrawing-room, and the bedrooms are often terribly scattered, rendering it necessary to take quite a long walk before one can get to the breakfast table. Nothing is more common in these old houses than to see long corridors, which have had to be added in order to go from one side of the house to the other without either making the tour of the rooms or going out of doors. Economy seems to have been almost unknown. The amount of outside wall to some comparatively small houses is astonishing. The waste of space in passages and staircases is something shocking. Sanitation was less heeded than it had been two centuries earlier. Such remains of the latrines of fortified places of the fourteenth century as have come down to us show that ventilation and isolation were carefully attended to. In Jacobean houses they are hardly thought of. An outside wall is chosen when convenient, but otherwise any small spare space is considered good enough, whether it open from a passage, a bedroom, or even a parlour. One house was planned with a common vault, destined to receive all the drainage, placed right in the centre, and from the well thus formed several windows received light and air.

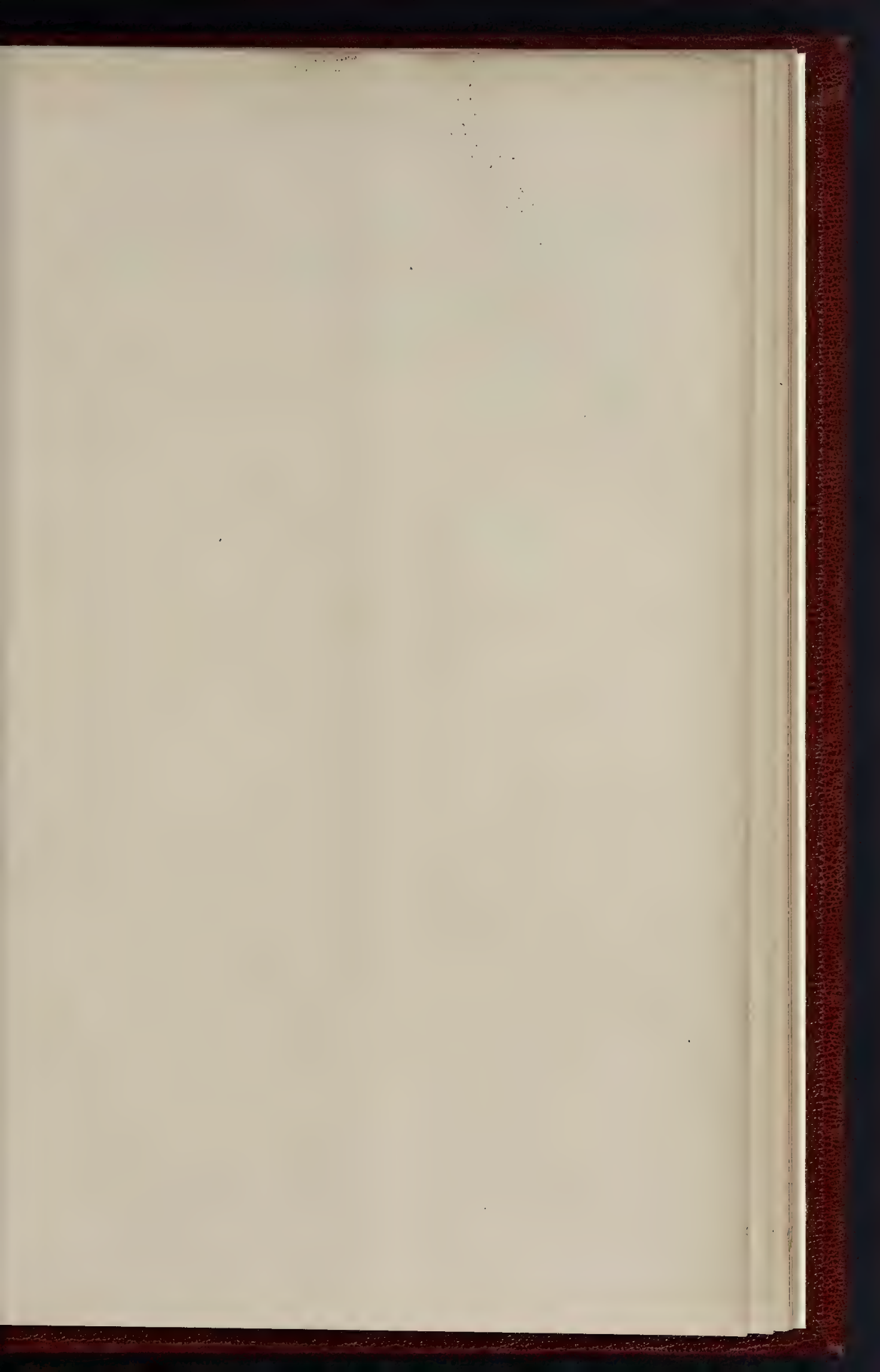
The one department that did receive some care was the kitchen with its neighbouring offices. These are always arranged with a certain degree of attention, and their communication with the hall is generally well contrived. But with this ends, as a rule, the commendation which can be bestowed on the planning of seventeenth-century houses judged by the standard of the skilful planner of to-day.

But let us not complain; we may well leave that to those fortunate people who live in historic halls, and will gladly help them in their endeavours to solve the problem of reducing a seventeenth-century house to terms of the nineteenth century; while, as mere lovers of the picturesque, we cannot but feel that if the houses are straggling they give us long stretches of roof, quaint gables, innumerable chimney stacks, and delightful expanses of lichen-covered wall; and we can cordially echo the remark of Falstaff to his friend the Justice, "Fore God, you have here a goodly dwelling and a rich."

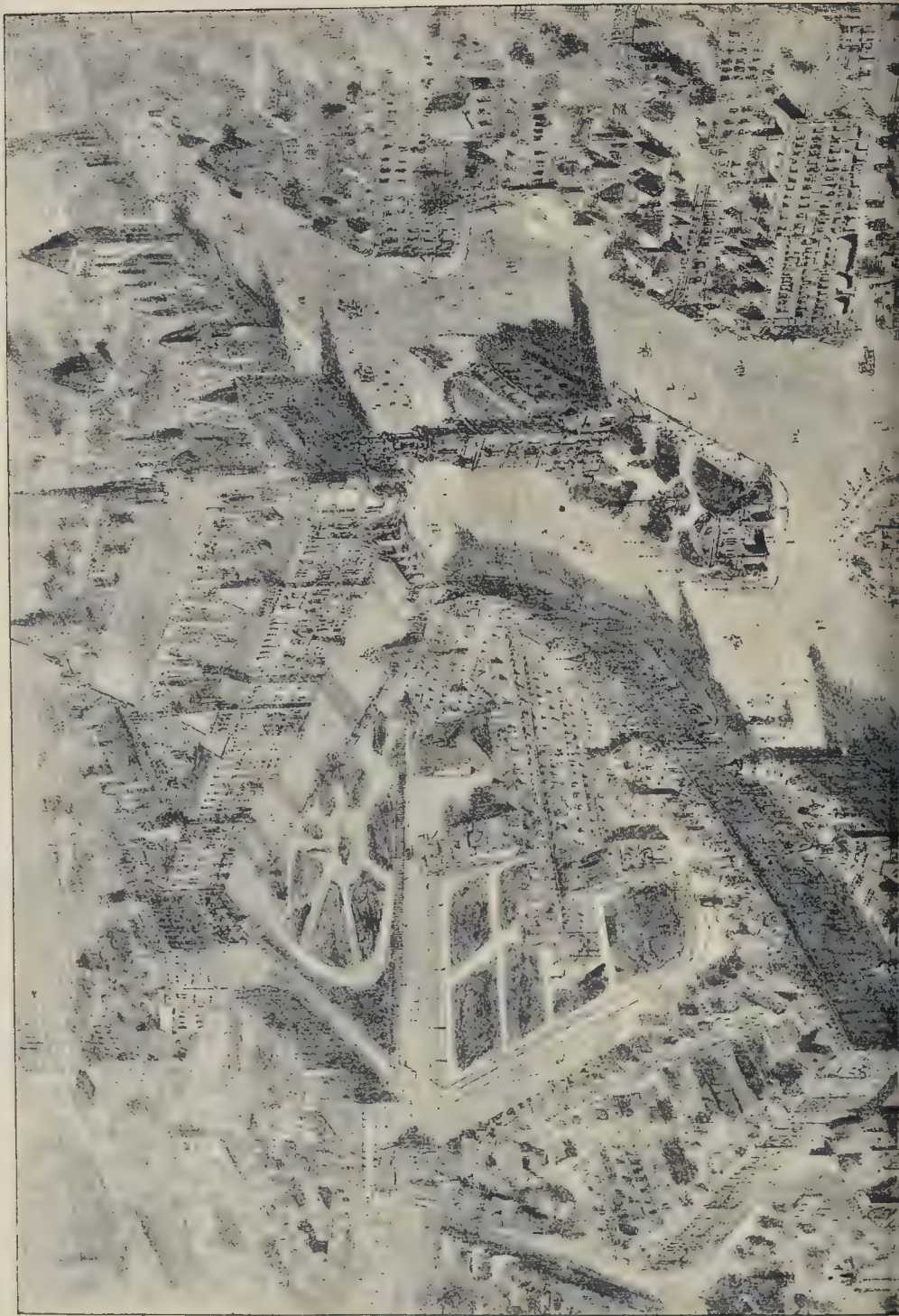
[The paper was illustrated by a series of excellent slides from photographs, taken by Mr. J. L. Robinson, of Dublin, and Mr. J. Gale, F.R.I.B.A., and shown by means of the oxy-hydrogen lantern. These included views of Rushton, Sherborne, Montacute, Stapleford Hall, Canons Ashby, Burford, Lyveden, Knoles, and Hatfield, besides several facsimiles of John Thorpe's plans for country houses.]

The Chairman congratulated Mr. Gotch on the charm of his literary style, and on the excellence of the illustrations. The lecturer was right in calling attention, at the outset, to the broad lines on which the Renaissance was framed. The contrast between the fifteenth and sixteenth centuries was a very marked one, the two epochs being essentially different, and offering contrasts at every turn. In the fifteenth century religious and scientific thought was almost nil. In England people's time was then chiefly absorbed by civil war, while in the following century the wars were principally undertaken for the extension of the empire. The more they studied history, the more they would see that the reverting towards Classic forms in architecture was part of a great movement throughout the world, and thus they would





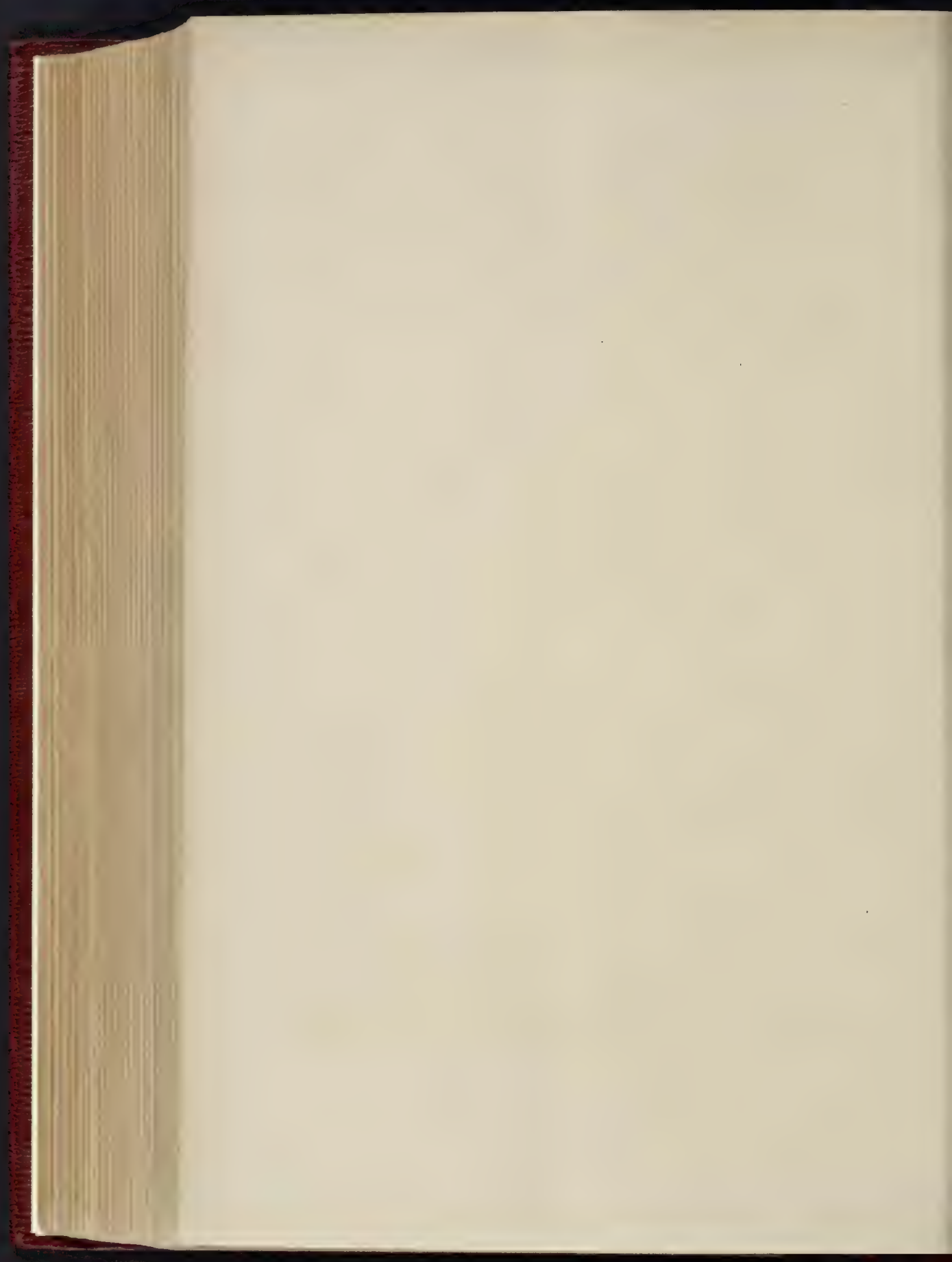
THE BUILDER, DECEMBER 26, 1885.



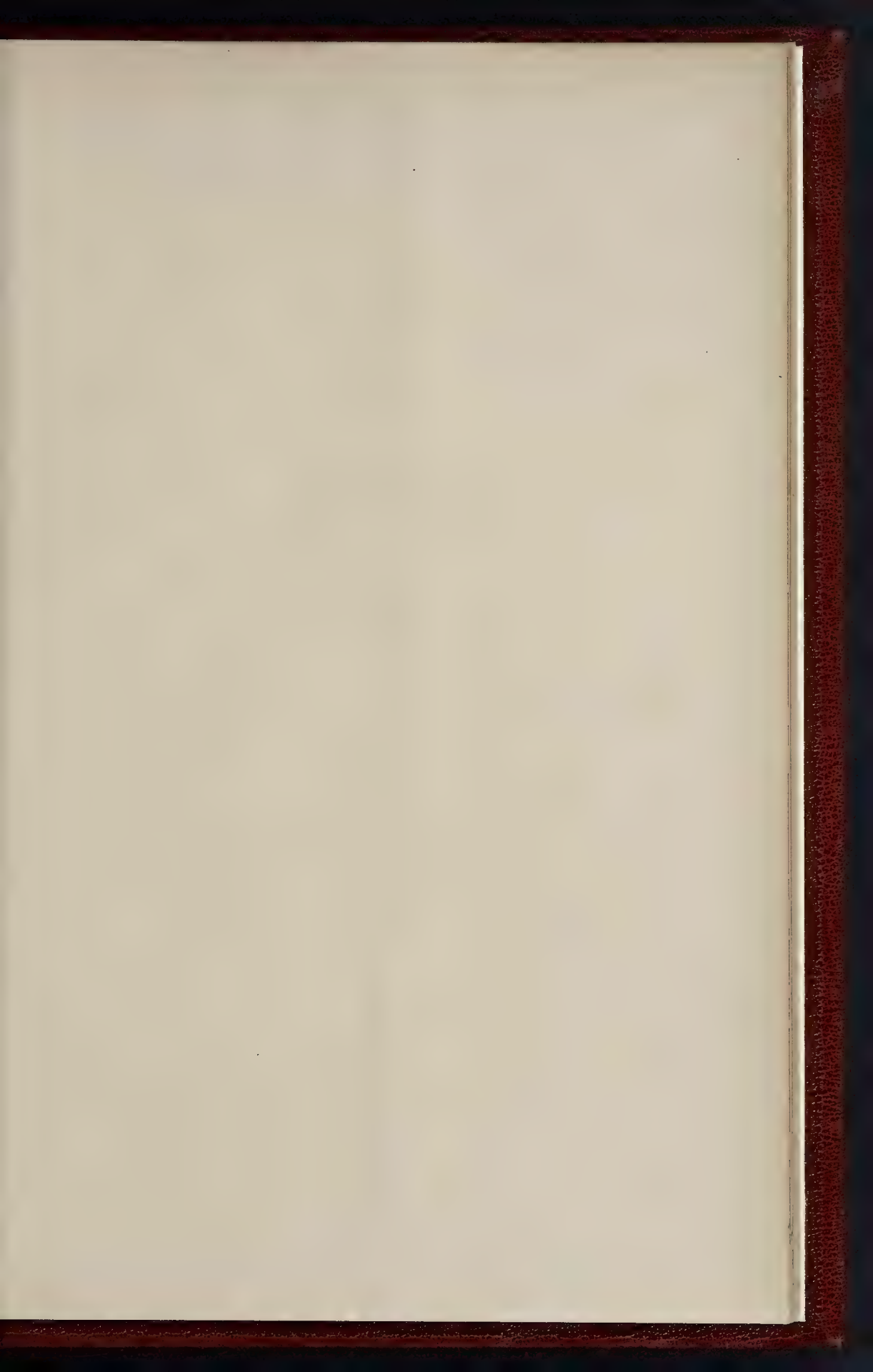




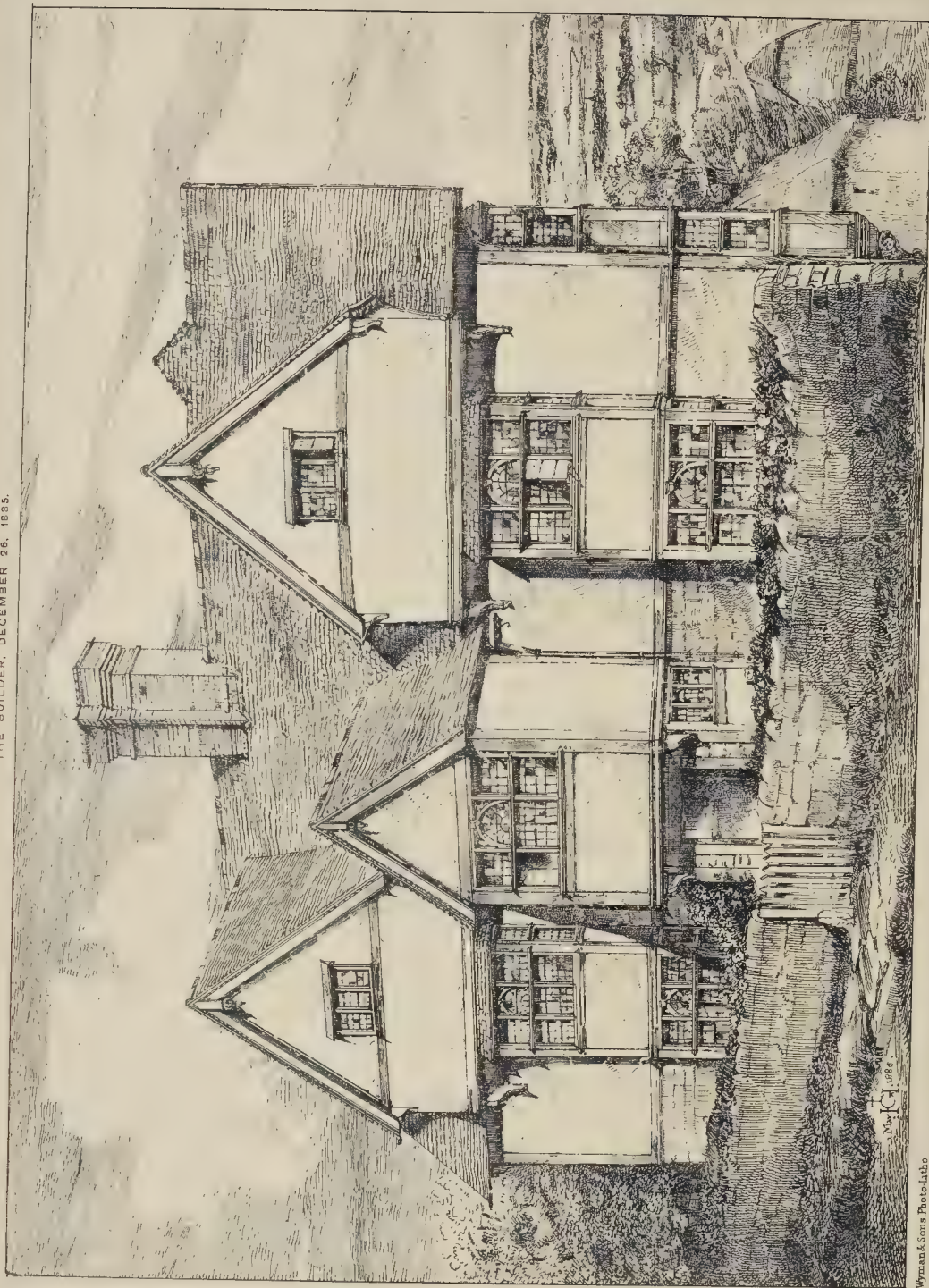
DESIGN FOR WIDENING THE STRAND.  
(AS PROPOSED BY THE "STRAND IMPROVEMENT ASSOCIATION")







THE BUILDER, DECEMBER 26, 1885.

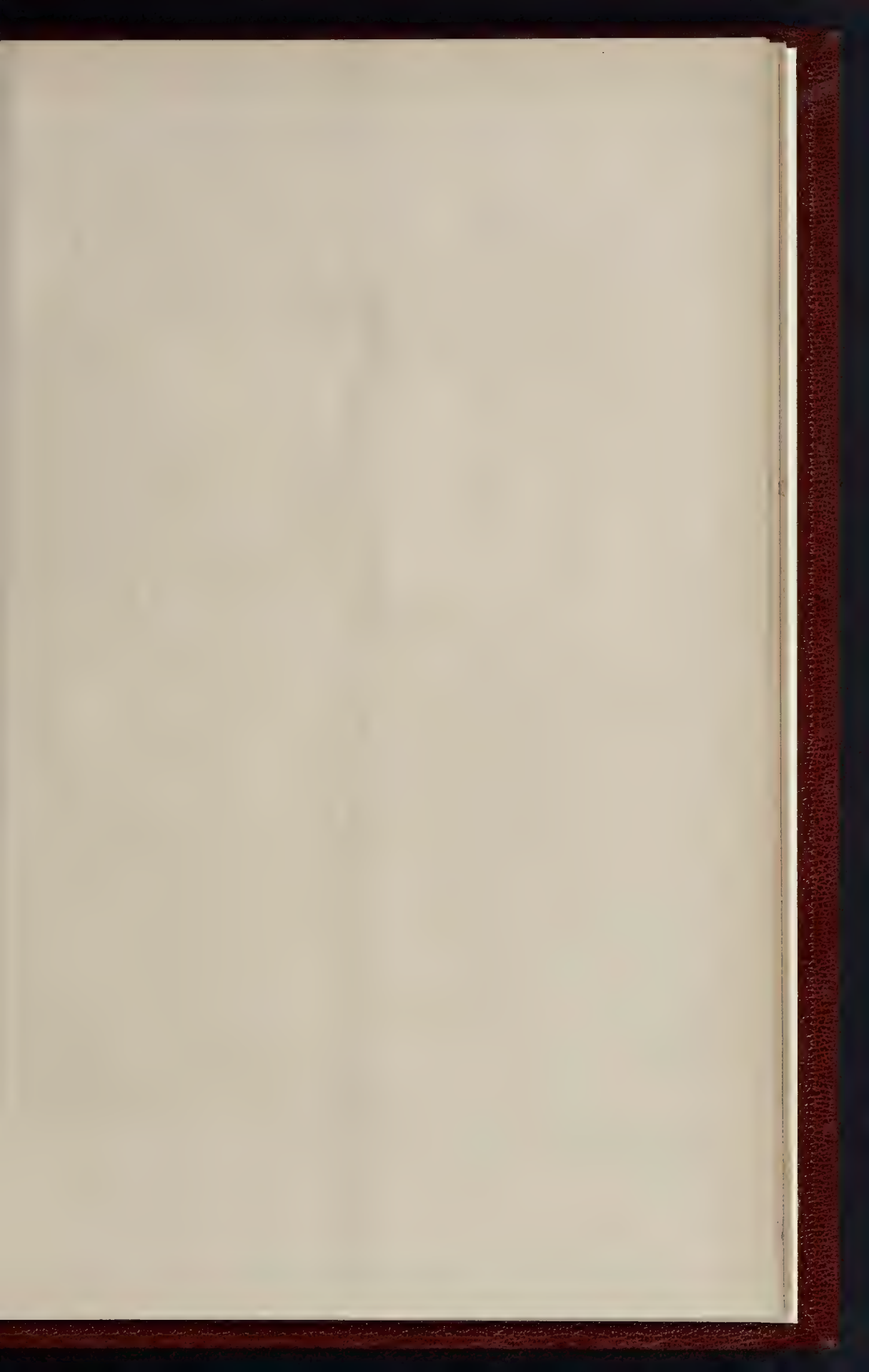


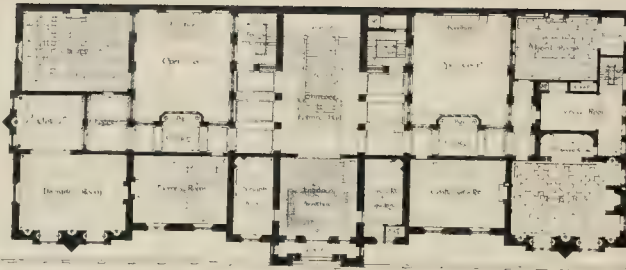
Wyman & Sons Photo-litho

SKETCH OF AN OLD HOUSE AT SUTTON VALENCOR — By Mr. GEORGE H. WYMAN

© Queen St. London W.C.







SECTION THROUGH HOUSE  
showing apartments



ROYAL ACADEMY GOLD MEDAL AWARDED, 1861.

DESIGN FOR "A TOWN HOUSE"

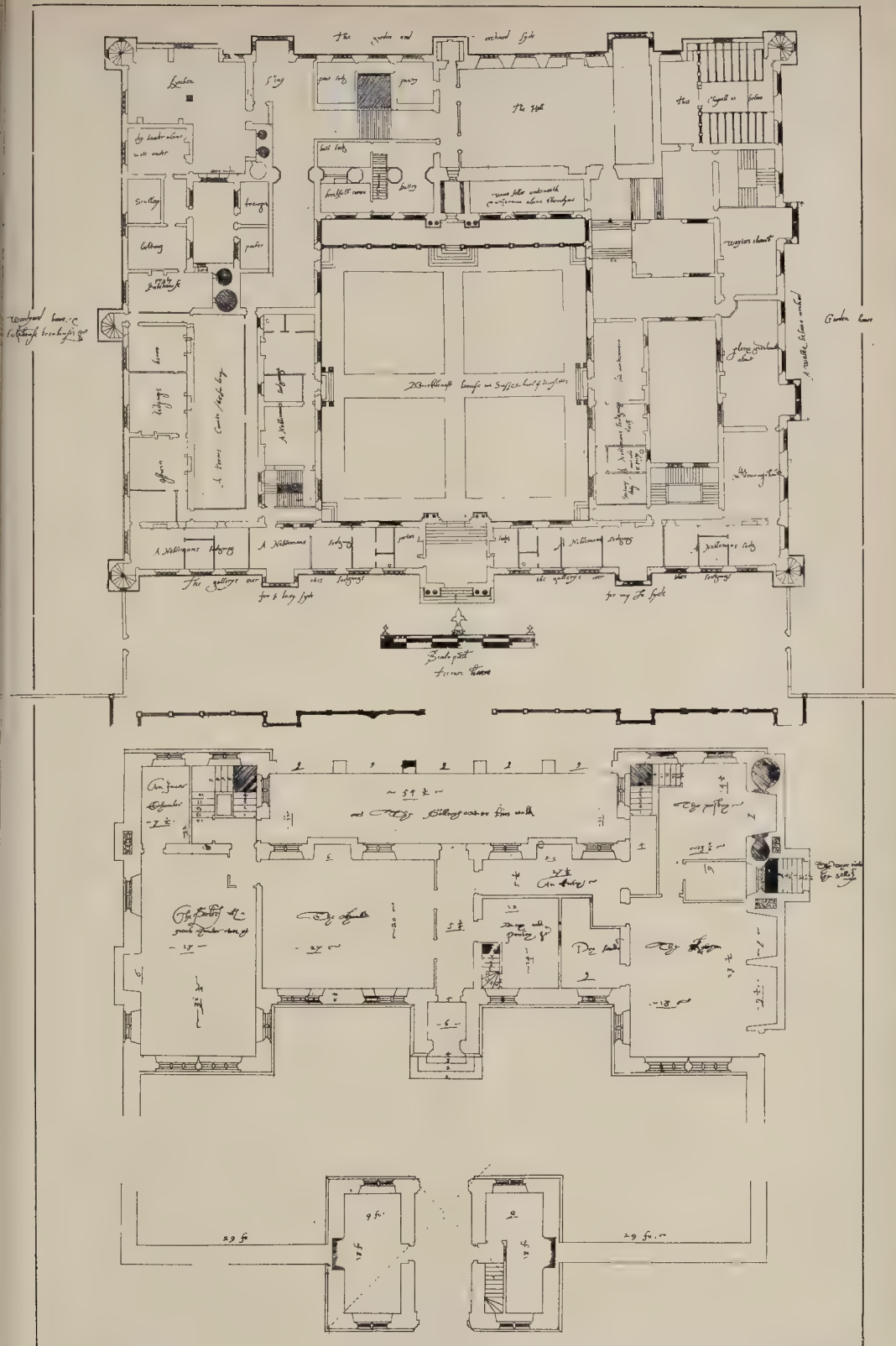




MR. THOMAS MACLAREN





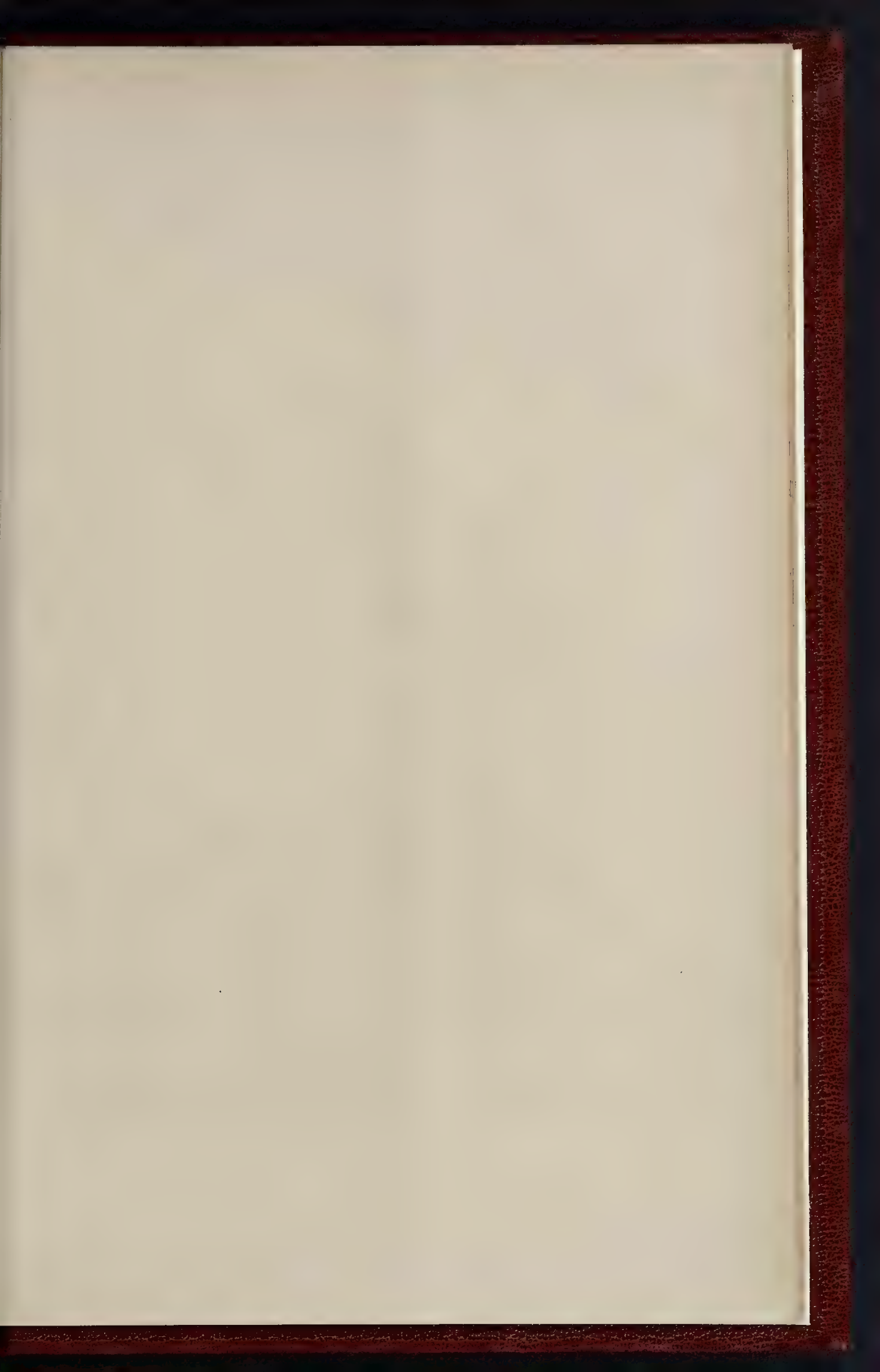


TWO PLANS FROM THE SKETCH-BOOK OF JOHN THORPE, IN THE SOANE MUSEUM

*Illustrating the Paper on "English Homes in the Seventeenth Century," by Mr. J. A. Gatch.*









LONDON  
ARCHITECT FOR EXTERIOR AND  
ARCHITECT FOR INTERIOR.



MBER 26, 1885



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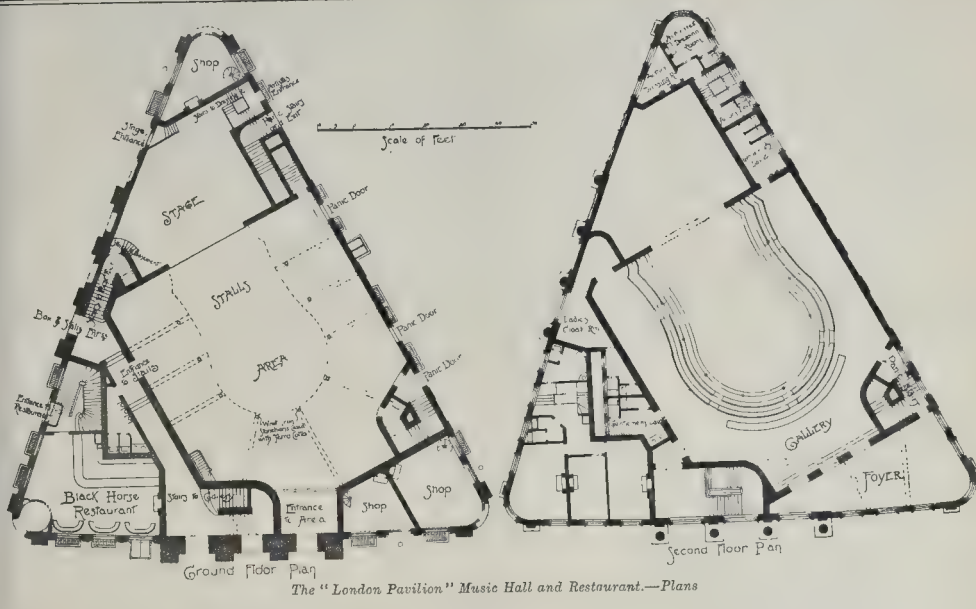
VILION

RANT, MR ROBERT J WORLEY

E. SAUNDERS, F.R.I.B.A







The "London Pavilion" Music Hall and Restaurant.—Plans

be able to appreciate the architectural work of the time, in connexion with the changes in literature and scientific thought. With regard to the excellent illustrations to the paper, it must have been a surprise to some of the less-travelled members to find how rich in Classic architecture England was; but to those who had, year after year, attended the architectural excursions, it was like meeting old friends to have these views thrown upon the screen. Seeing, then, the richness, variety, and beauty of English design during the sixteenth and seventeenth centuries, they must all feel, when so many minds were turned towards Italian work, that in studying it in its purity, the old English work, founded on Italian models, should not be neglected.

On the motion of Mr. S. F. Clarkson, a vote of thanks was given to the lecturer, and the proceedings terminated.

### Illustrations.

#### DESIGN FOR A TOWN HOUSE.

**H**IS design, by Mr. T. Maclaren, gained for its author, as already mentioned in our columns, the Royal Academy Gold Medal for Architecture in the recent students' competition.

The design is a finished and graceful one in regard to its masonic detail, and it is a pity that this is so crushed and overpowered by the portentous pyramid of roof in the centre, which is not only architecturally disproportionate, but a very unpractical way of building, as little good use can be made of the large timber construction thus piled on the building.

Since first noticing the architectural drawings we have learned that a special instructor in regard to them was that the design and arrangement of the house should be such as to allow of the advantageous hanging of pictures. This suggestion emanated, we believe, from an eminent painter among the Academicians, whose views on the competition we have heard, and who considers that his problem is in no way met by this or any of the designs. What is wanted for the purpose is a considerable amount of unbroken wall-space with a side light and no cross lights. It will be seen that only two of the principal rooms in the plan of the present design fulfil this condition; the rest all have cross-lights. The matter is an important one from a painter's point of view, as we are assured by artists that the purchase of pictures is often prejudiced by the fact that so little of the hanging space in London houses is so lighted as to afford any reasonable chance of showing a picture to advantage.

#### THE LONDON PAVILION MUSIC HALL AND RESTAURANT.

THE new buildings of the "London Pavilion" Music-hall and Restaurant have been erected on the commanding site in Tichborne-street, Haymarket, formed by the construction of the new street from Regent-circus to Holborn. This site, which has frontages in Piccadilly, Great Windmill-street, and the new street of about 135 ft., 165 ft., and 155 ft. respectively, has been greatly improved by the demolition of the block of buildings at the east corner of Regent-circus, thus giving an uninterrupted view down Piccadilly and Regent-street.

The elevations up to the capping of the plinth and also the columns have been executed in Portland stone, the upper portions of the elevations in Bath stone (Westwood Ground). The carving has been done by Mr. A. Lonnie, of Portland-place North, Clapham-road, who is also executing the carving to the woodwork in the Restaurant. The iron grilles have been executed by Messrs. Brawn & Co., of Clement-street, Birmingham. The Restaurant, which is situated at the corner of Piccadilly and the new street, will consist of a buffet on the ground-floor, a public dining-room on the first floor, private dining-rooms on the second floor, and kitchens, &c., on the third floor.

The buffet is 17 ft. high and the dining-room 22 ft. 6 in. The latter will have a gallery running round two sides. The upper portions of these rooms, including the ceilings and also the upper portions of the staircase, will be finished in canvas plastering by the Framemakers' Association, of Red Lion-square, Holborn. The buffet and dining-room are to be panelled in walnut. The walls of staircase are finished with marble and tiles. The marble-work was executed by Messrs. Houghton, of Great Portland-street; and the wall tiling by Messrs. Doulton & Co., of Lambeth. Messrs. Ebner have the mosaic paving and parquet flooring to the buffet and dining-room, &c., in hand. Messrs. Goddard & Co., of High-street, Peckham, are fitting up the building with lifts. The whole of the public portion of the Restaurant and the Music-hall has been fitted up with electric light on the incandescent principle by Mr. Cannon, of London-road.

The elevations of the entire block and interior of the Restaurant are from the designs of Mr. Robert J. Worley, of Cannon-street, Mr. Ebenezer Saunders, of Finsbury-circus, being the architect for the interior of the music-hall.

Great credit is due to Messrs. Peto, the contractors for the buildings, for the rapidity with which they have carried out their contract, which was signed on March 2nd, 1885.

The last performance in the old hall took place on the evening of March 26th last, and Messrs. Peto then obtained entire possession of the site (which was covered with buildings) on April 5th, the first brick being laid on May 11th and the first stone on May 18th. The work has proceeded continuously both night and day with the exception of Sundays. The Pavilion was completed for the inspection of the Magistrates on September 25th. It may be interesting to know that the following materials were used in the construction:—About one million and a half bricks, which were laid at the rate of about 40,000 a day; 5,500 ft. cube of Portland stone and 35,000 ft. cube of Bath stone; 60 tons of lead, 90,000 ft. cube of timber, and 1,600 square yards of the Doulton-Peto fireclay flooring (of which we gave a section showing the construction in our last number, p. 877). The use of this latter enabled the contractors to strike the centring directly the flooring was fixed, and to proceed with the plastering at once; 350 men were employed on the building during the day and 150 at night.

The building was completed in four months and seven days after the first stone was laid.

#### DESIGN FOR WIDENING THE STRAND.

WE mentioned a little while ago the fact that a deputation from the "Strand Improvement Association" had waited upon the Metropolitan Board of Works in regard to the desirability of doing something without further delay towards increasing the accommodation for traffic in the portion of the Strand between Somerset House and the Law Courts. The illustration we publish, in the corner of which may be read the signature of a well-known architectural artist to whose advice we may presume the Association are indebted, represents a scheme put forth by the Strand Improvement Association for obtaining the increased street accommodation desired without disturbing either St. Mary-le-Strand or St. Clement Danes churches, and, in fact, adding very much to the architectural effect of both churches. The scheme, as will be seen at a glance, is to acquire property to the north of the two churches, abolishing Holywell-street, driving a wide street through to the north of the churches, and leaving them and the intermediate ground as islands partly formed into gardens; Temple Bar being shown as re-erected as an entrance to one of the gardens. This use of the arch as an entry to such a very small garden is, however, rather a bit of bathos, and we prefer the destination which has already been suggested for it in our columns, viz., the eastern entrance to the Temple precinct. Apart from this detail, the scheme

is a fine, and, we venture think, a practicable one, and if carried out would probably take rank as one of the most successful and popular of London improvements.

#### OLD HOUSE, SUTTON VALENCE.

This picturesque house, standing near a village in Kent, with a name as picturesque as itself, is a charming example of the kind of work which has been the inspiration of much of what is expressive and pleasing in our best recent Domestic architecture. The drawing, by Mr. Gerald Horsley, was in the last Royal Academy Exhibition.

#### PLANS FROM JOHN THORPE'S SKETCH-BOOK.

These plans are referred to in Mr. J. Alfred Gutch's paper on "English Homes in the Seventeenth Century," read before the members of the Architectural Association on the 18th inst., and printed *in extenso* in this week's Builder.

#### THE CHURCH OF ST. BARTHOLOMEW, THE-GREAT, SMITHFIELD.

THE recent excavations made under the direction of the Executive Committee for the proposed restoration of this ancient and historic church were inspected on Tuesday, the 15th inst., at a meeting held in the vestry, with Lord Charles Bruce, M.P., in the chair, to consider the report of Mr. Aston Webb, F.R.I.B.A., upon the condition and requirements of the church; the purchase of the important site of the fringe manufactory lying to the east of the apse having been recently completed, but not without borrowing upwards of 2,000*l.* to make up the sum demanded. Mr. Webb was instructed to explore this erection, which, from the highly inflammable nature of its contents and component parts, formed a source of imminent danger to the church, over the apse of which it hangs. On digging out the soil in the basement of this building, Mr. Webb has laid bare some exceedingly interesting details of the Lady-chapel, which, as far as can be made out at present, was a rectangular apartment, measuring about 60 ft. by 20 ft., running longitudinally along the axis of the church itself in a direct line with the nave and choir. This magnificent early crypt, built with a barrel vault, the ribs of which give 22 ft. segmental span, appears to be composed of rubble walls with chamfered piers standing on square bases, carrying ribs of the same chamfered style, without corbels or capitals. The crypt was lighted by three or four pairs of small windows, splayed inside, and furnished with long shafts, throwing down the light from the old level of the earth outside. The iron-work of one window still remains. The Lady-chapel, over the crypt, was entered from the ambulatory behind the apse, and the jambs of one or more entrances have been found built up into the wall which was erected in the sixteenth century to divide the church from the Lady-chapel when the latter building was converted into a Prior's house. It is probably owing to this conversion that the site became ultimately alienated from the possession of the church. A very beautiful corbel has been uncovered by the removal of the rubble on the south side of the wall. It represents a man's head wearing a flat cap, and is probably of the thirteenth century. The Lady-chapel was lighted by three windows of three lights on each side, and the remains of the jambs give 7 ft. 6 in. as their diameter. The mouldings are of the fifteenth century, and thus indicate that the chapel was rebuilt at that time; the original chapel may have been destroyed by fire, as there are traces of charred substances in the soil now being removed. On the south wall is a small niche or sedile, which may have formed part of the first chapel. Sufficient details are left to indicate the design, and there would be no difficulty in restoring the whole. The original buttresses, of which there are three on the south outside wall, are in good sound condition; but the interior is a complete mass of rotten timbers, floors, and panelling as dry as tinder, and its clearance, which has been sanctioned by the committee, will remove a fruitful source of danger to the church and schools which are incorporated with it. During the course of excavation an ancient sword, a pistol, a bellarmine of gray ware, a finely-oxidised

glass bottle of the fifteenth century, a cuirass or breastplate, a fragment of Early English glazed pottery, and other relics of Medieval antiquity, were met with, as well as several pieces of mouldings and carved stones which had been used up a second time in the later building. One stone in particular has a remarkable appearance, showing on one side the base of a twelfth-century shaft or pilaster, on the other a capital of fourteenth-century work. Professor T. Hayter Lewis, F.S.A., to whose labours the restoration works carried out in 1863 are in great measure due, laid before the meeting his views on the proposals suggested by Mr. Webb, and recommended their acceptance. Mr. Webb's report of works necessary to be carried out may be briefly stated as follows—

1. The completion of the apse and east end, the latter of which appears to have been subject to extensive and important modifications since its first construction. These the removal of the wall blocking out the Lady-chapel from the ambulatory will more fully reveal. The last window on the north side of the clearstory shows by its curve that the clearstory was continued round the apse, and this arrangement will be carried out. Above this the second line of windows will be carried in uniformity with those at present existing in the nave (or rather the choir, as there is very little of the original nave left). This work will cost 1,800*l.*, and the Rev. F. P. Phillips, the patron, has very munificently undertaken to defray the cost of the whole of this part of the restoration, subject to the Restoration Committee clearing the site and obtaining the faculty.

2. The renewal of the roof of the church with oak, at an estimated cost of 800*l.*, is very pressing, as the present arrangements for carrying off rain are seriously defective, and it is found that a considerable quantity of water finds its way into the church and effects much harm by the dampness thereby set up. This general dampness is sensibly manifested by the smell, and the appearance of the walls, to all those who go into the church.

3. Removal of the boys' school from the north triforium and of the girls' and infants' school from the south. These works are urgent, from the constant disturbance of noises plainly heard in the church, and suitable provision could be found for the schools on the site now purchased with the fringe manufactory. The removal of the girls' school would also enable a second and very necessary entrance into the church to be made. These alterations, with removal of the blacksmith's forge, another source of danger and annoyance occupying the site of the north transept, and the rebuilding of the north and south transepts, including removal of the vestry, would necessitate an outlay estimated at 4,000*l.*

4. The reparation of the west end and the nave, including a porch on the west, would amount to about 1,000*l.*, and furniture for the interior of the church (now filled with chairs) to 800*l.* more. The repairs to the aisles and triforium would cost 1,000*l.*

5. New schools, if erected in the Lady-chapel or on the open ground to the south, would cost 2,500*l.*, and the restoration of the Lady-chapel with the crypt below 2,800*l.* if the schools were placed elsewhere.

The great value of the property, and the difficulty which would arise with regard to ancient lights, would practically preclude any attempted restoration of the transepts, beyond opening out the arches at the crossing; but even this would restore some of the original aspect to the church, besides affording additional room for seating the large parochial congregation. Extensive as these suggested repairs and restorations are, the rescue of one of the most sadly-dilapidated churches in London from secular uses and improper application of its component parts is a highly commendable act, and if proper care be taken, as we are sure it will be, by the influential committee, that the historical, architectural, and archaeological character of the building is not interfered with, the recovery of these long-alienated portions and their reparation will redound with credit to all who have assisted in the saving of one of our noblest and oldest churches from disintegration and imminent decay.

Mr. E. Preston Willins, A.R.I.B.A., has been elected Diocesan Surveyor of Ecclesiastical Dilapidations for the Diocese of Norwich.

#### THE PRINCE OF WALES AT MESSRS. DOULTON'S POTTERIES.

The Albert Medal, annually given by the Society of Arts "for distinguished merit in promoting arts, manufactures, or commerce" was this year awarded, as our readers know, to Mr. Henry Doulton, the head of the well-known firm of Doulton & Co., of Lambeth. The medal was presented on Monday last by H.R.H. the Prince of Wales, who, in recognition of the special merit and great importance of the industries so well represented by this firm, visited the Lambeth Potteries in person in order to present the medal to Mr. Henry Doulton on his own premises and in the presence of his friends and *employés*. The ceremony took place in a large show-room in one of Messrs. Doulton's large buildings on the Albert Embankment. The room had been very appropriately decorated, under the direction of Mr. A. E. Pearce, one of the artists employed by the firm. Opposite the door was exhibited one of the four panels now being executed by Mr. George Tinworth on Messrs. Doulton's premises for the Bromley-Davenport Memorial. This was flanked by two figure-panels by Mr. J. Eyre, executed in Messrs. Doulton's new *impasto* ware. On his arrival the Prince of Wales was received by Sir Frederick Abel, Chairman of the Council of the Society of Arts, and the members of Messrs. Doulton's firm.

Mr. H. Doulton having been introduced to His Royal Highness by Sir F. Abel, The Prince of Wales said,—"Ladies and gentlemen, it affords me great gratification to present, on this occasion, the Albert Medal to Mr. Henry Doulton. By the wish and with the unanimous agreement of the Council, and with my approval as having the honour of being the President of the Society of Arts, this medal has been awarded to you, Mr. Doulton, in recognition of the impulse given by you to the production of artistic pottery in this country. It would have been a pleasure to me to have handed you this medal at Marlborough House, but I felt sure that it would be more gratifying not only to yourself but also to your numerous friends and the artisans who work for you, that I should present this medal here to-day. I need hardly remind you of the history of this medal, that it is a memorial to my late lamented father, who did so much to encourage arts, manufactures, and commerce, and who for eighteen years presided over the Society of Arts. This medal was instituted twenty-two years ago, and has been awarded annually to those who for distinguished merit in promoting arts, manufactures, and commerce have been thought worthy of receiving it. From all you have done, Mr. Doulton, not only in this country but throughout all parts of the world, I do not think there is any one more deserving of the high compliment we are now about to pay you. I need hardly say that it affords me great pleasure to present to you personally the Albert Gold Medal.

Mr. Henry Doulton, in reply, said,—"In receiving from your Royal Highness the Albert Medal, instituted by the Society of Arts in 1862 as a memorial of your illustrious father, the late Prince Consort, and bearing his impress, I feel that you are conferring on me a very high honour. As President of the Society of Arts, as well as in other and manifold labours for the good of the people, the Prince Consort gave an impulse to the arts and manufactures of this country which has been growing and widening ever since, and the full measure of which we can even now hardly estimate. When I recall the roll of celebrated men, both Englishmen and foreigners, who, in former years have received this distinction at your hands for "distinguished merit in promoting arts, manufactures, or commerce," it is indeed most gratifying to me to learn that the award of the Council of the Society, composed of so many men eminent in science and art, was unanimous, and that it met with the approval of your Royal Highness. But you have deepened my obligation and enhanced the value of the award immeasurably by graciously coming to Lambeth and conferring this honour upon me in the presence of my fellow-workers. For any services I may have rendered to art industry I am indebted to the able and cordial co-operation of those who have been associated with me. No man ever had more loyal condutors, and it is most gratifying to me that they share with me in the honours of the day. The approval of your Royal Highness will be an incentive to



future efforts. Whatever our shortcomings, we have at least striven to work in the spirit of our motto, "Le Beau est la Splendeur du Vrai." I may, perhaps, be permitted to call to the recollection of your Royal Highness that your first public act was to lay the foundation-stone of the Lambeth School of Art in this neighbourhood twenty-five years ago. In replying to the Rev. Robert Gregory (now Canon Gregory) on that occasion, your Royal Highness expressed a hearty sympathy with the undertaking, and your earnest hope that it would bring instruction in art within the reach of those who otherwise could not have obtained such advantage. That expectation has been abundantly fulfilled. The Lambeth School of Art, under the able guidance of my friend, Mr. Sparkes, has numbered among its students those who have become Royal Academicians. It has sent forth an army of workers, who, as designers in pottery, metal, glass, and other art manufactures, have had a most beneficial influence on the industries of England. In the higher education and in what are analogous to University honours, the Lambeth School has been most successful. The Royal Academy honours gained by Lambeth students from 1863 to 1885, which are traceable, include eight gold medals, forty-one silver medals, and eighteen other awards, as the Armitage prize, Landseer Scholarship, and premiums, making a total of sixty-seven awards. In the same time 100 students have been admitted. As a proof of its continued vitality I may mention that the awards of the Royal Academy to old Lambethians on the 10th of this month comprised Gold Medal, Travelling Scholarship and 200*l.*, for best Historical Painting; the same for best Sculpture; the Turner Gold Medal and 50*l.*; the Creswick Prize; and the Landseer Scholarship; besides many other prizes—a goodly list of honours. The school has given us at the Lambeth Pottery an unflinching supply of artists and workers, among whom I may name one of whom we are all proud, my good friend George Tinworth, the exhibition of whose works two years ago at Conduit-street your Royal Highness and Her Royal Highness the Princess of Wales were graciously pleased to open. His last work,—one of four panels for the Bromley-Davenport Memorial,—is now on the wall before you. By the liberality of the City and Guilds' Institute a Technical School has been established at Kennington, which is in a flourishing state and is doing excellent service in the more technical training of students. It is really an offshoot from the Lambeth School of Art. As illustrating the continuity of English History may I, in conclusion, be permitted to remind your Royal Highness that the place in which we are now assembled is in "the Prince's Ward," or, as I prefer to call it by its old name, "the Prince's Liberty of the Parish of Lambeth," forming part of the Manor of Kennington, of which your Royal Highness is the lord. It might be called the cradle of the Princess of Wales. The arms of your Royal Highness, with the plume of feathers and your noble motto, were first assumed by one of the most illustrious and best-beloved of his race, Edward the Black Prince, who is specially associated with the Manor. Tradition says that it was in Prince's Liberty that the Black Prince gave a grand and sumptuous banquet when he returned home fresh from the honours of Crecy and Poitiers. The conquests of your Royal Highness have been on other fields, but "Peace hath her victories no less renowned than war." And in the paths of artistic and industrial progress, in international exhibitions, and in all humane enterprises for the welfare and happiness of Her Majesty's subjects throughout her vast empire, your Royal Highness has been a leader whom all good men have been proud to follow.

Mr. Edward Bryon, senior, on behalf of the employees of the firm, then presented the following address:—

TO HIS

ROYAL HIGHNESS THE PRINCE OF WALES,  
K.G., K.T., G.C.B., K.P., G.C.S.I., G.C.M.G., P.C.  
We, the Craftsmen, Artists, and Workers employed in the various branches of Messrs. Doulton & Co.'s Lambeth Potteries, desire to express to your Royal Highness our gratification at the honour you have bestowed upon us in thus visiting our Manufactory.

To the interest you have shown in the welfare of the working community, and the efforts made by yourself, by the Princess of Wales, and by your illustrious father, to extend the influence of our national manufactures, we attribute largely the high position which the Lambeth Pottery has now attained.

We are anxious on this occasion to express a hope that we may in the future,—by the excellence of our handiwork,



Examples of Modern Wrought Ironwork.

by the sincerity of our efforts, and by our loyalty to the Throne,—continue to merit the high honour which your Royal Highness has this day conferred upon us and our respected employer.

We are, your Royal Highness's most humble servants,  
On behalf of the workmen employed,

EDWARD BRYON, } in the Pottery Department.  
HENRY BRYON, }  
JAMES RANDALL BROWN, } in the Pipe Works.  
J. EMBERT, } in the Sanitary Engineering Works.  
W. H. MATTIE, } in the Terracotta Department.  
GEORGE TINWORTH, } in the Art Department.  
FRANK A. BUTLER, }

To this address\* the Prince of Wales replied as follows:—Gentlemen, I thank you for your address, and for the kind expressions of loyalty and goodwill in which you allude to the Princess of Wales and myself. I can assure you that I am fully aware of the services that have been rendered by the firm of which Mr. Henry Doulton is the principal partner to the cause of industrial art in this country. Let me congratulate you on having at your head one who is capable of perceiving that the success of a manufacturer chiefly depends upon his securing the hearty co-operation of those who work under his direction, as I congratulate your employer on the success which he has achieved in obtaining the best and most efficient aid in carrying on the beautiful industry in which you are all engaged. I sincerely trust that the kindly relations now existing among you may never be disturbed.

His Royal Highness then left the show-room, and was conducted by Messrs. H. J. D., and H. Lewis Doulton to the art pottery, where his Royal Highness witnessed the various interesting processes by which the wares for which

\* This address, it may be mentioned, consisted of eight pages of vellum, in a cover of dark purple velvet. The address was illuminated by Mr. A. E. Peacock, the crest and arms of H.R.H. being introduced, together with those of Mr. Henry Doulton and the Society of Arts. On the last page but one was a view of Messrs. Doulton's buildings from the opposite side of the river, and in the ornamental border was contained a representation of four of the principal wares manufactured by the firm.

Messrs. Doulton are famed are produced. In the suite of rooms attached to the museum, where a large collection of specimens of the different classes of work had been arranged, the attention of the Prince was specially called to a "Commemorative" vase of Doulton ware, which had been commenced, designed, and completed within fourteen days as a memento of his visit, by Mr. Marshall, one of the artists. The room also included a number of designs in *impasto* for the Colonial Exhibition at Kensington next year, some of them of great size.

#### MODERN WROUGHT-IRON WORK.

We give some further sketches of small works, lamps and railings, executed at the forge of Mr. A. Newman, some of whose larger work we illustrated in the plates in the *Builder* of December 5.

A Medal commemorative of the Erection of the New Council Chamber has just been struck by order of the Corporation of London. The medal has been designed and executed by Mr. Allan Wyon, of Regent-street, chief engraver of Her Majesty's seals, and bears on the obverse a view of the interior of the Council Chamber, which nearly fills the whole of this side of the medal. The outer segments are occupied with the City arms, crest, and supporters, and bear the inscription, "The New Council Chamber, Guildhall, opened 2nd October, 1884." The name of the architect, Mr. Horace Jones, also appears on this side. The design of the reverse consists of an allegorical representation of the Council, and is composed of a figure symbolising the City of London, standing on a low platform in front of the civic chair, attended by Commerce and Justice, and turning towards various personages typical of learning, liberality, and liberty.—*Times*.



## THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

SIR,—The position of our Institute and the extent of its representative character are, as shown by the letter of Mr. Knightley, in last week's *Builder* [p. 877], and by other prominent signs, engaging the attention of all well-wishers of the profession of architecture.

It is probably outside the region of argument that, in England, there is not any architectural society, association, or institute, which, for position, character, and status of members, and outside recognition, approaches the Royal Institute of British Architects.

The elasticity of the draft of the new Charter (as we have seen it) provides for throwing wide open the portals of the Institute to every architectural student, and for encouraging a large accession of Associates and Fellows, thus recognising that the terms of a Charter, fifty years old, do not meet the requirements of the present day.

In all the discussions which have taken place upon the subject of the new Charter, the needs and peculiar position of provincial architects have received consideration, and it is a matter beyond doubt that a very large increase of power to do good would result from the consolidation of all existing architectural bodies in England with that central society which has embraced, and does contain, in the roll of its members, the best men of the profession. Why, then, should not the Institute go to the country supporting a policy something like the following?—

1. Every architectural student, and every man engaged in the study or practice of architecture, to become members of the R.I.B.A., paying to the central body that proportionate subscription which may hereafter be determined.

2. Branches of the R.I.B.A. to be established throughout the kingdom, based upon the lines of the central body when it has gained vigour from the infusion of the health-giving new Charter, and possessing all powers which may be deemed desirable to meet particular local requirements.

3. Each branch to elect its own President, that President thereby becoming, for the time being, a Member of the Council of the R.I.B.A.

4. Towards the establishment and maintenance of each branch, the central body to contribute in proportion to the strength of the branch: thus would be returned, in part, the subscriptions paid to such central body.

5. The accession of wealth and power thus obtained warranting it, to erect in London a new Architectural Academy, designed to meet the needs of technical education and examination, and, towards this, obtain state aid.

6. Let the Royal Academy (which treats architects so scornfully) be left to its painters, and provide in the new Architectural Academy for the annual exhibition of architect's works and of the studies of the students and prize winners.

7. The art of the sculptor being closely woven with that of the architect, invite sculptors to join the R.I.B.A., they paying such subscription as may be determined, and, in the new academy, provide rooms for the studies of sculptors, and for the annual exhibition of their studies and works, with those of the architects.

Thus, upon some such lines as those above indicated, might be created one powerful and completely representative body, dignified, standing out as a society, absence from the roll of which would carry with it the imputation of absence of professional aptitude or of professional rectitude. WM. WOODWARD.

**Birmingham.**—A large piece of building land, situated in Heath-street, Dudley-road, in this town, and having a frontage of about 900 ft., has been leased by the Birmingham Canal Company to a local gentleman for the purpose of erecting "Artisans' Dwellings" and corner shops. The total number to be erected will be about fifty—a portion of this number being already in progress. These buildings will be of very convenient arrangement and substantial character,—a good-sized parlour, living-room and kitchen, bedrooms, attic, cellar, well-paved yard, &c., being given to each house and shop. The front elevation will be three stories in height, of an Early Gothic character. The cost of erection will be about 10,000l. The builder is Mr. E. Airey, and the architect Mr. J. Statham Davis, both of Birmingham.

## "LOWEST TENDER."

SIR,—Will you kindly insert in your widely-circulated paper the following facts concerning the tender for works for Ilford, Chadwell, and Dagenham, consisting of sewers, manholes, roads, and outfall works? On the 30th of October, 1885, were sent in to the Sanitary Authority of the Romford Union. On the 1st of December I received a letter from the engineers for the works, informing me my tender was one of the three lowest, and asking for names of references, and also of my bondsman. On December 2nd I received a request from the engineers to forward to Ilford samples of each pipe intended to be used, viz., 9 in., 12 in., 15 in., and 18 in. December 7th, I was informed my tender was not the actual lowest; inquiries were being made as to the lowest tender, and if found satisfactory, my tender would not be considered. December 10th, I received a telegram to attend at the engineer's office, Doncaster, on the 12th. December 11th a letter was sent me confirming the previous day's telegram, and also requesting my priced quantities, and that the sample pipes had not arrived, causing me to convey a 15-inch pipe with me to Doncaster. I learned my references were satisfactory; my prices were gone into, and questions asked, in which I hope I succeeded in proving to their gentlemen I knew my business. On December 15th, the Sanitary Authority met to decide. I was in attendance, and before the meeting saw the engineer. I offered in lieu of 500l. bond 1,000l. bond, and to execute 1,000l. worth of work before asking for cash. My reason was that I had heard of certain influence which might be brought to bear against me. I stated to be the lowest of the three lowest, as the actual lowest had withdrawn.

After the meeting of the Sanitary Authority I was informed by the engineer that the tender of Messrs. Cooke & Co., Battersea, was the one accepted. The tender of this firm was about 100l. above mine. For seventeen years I have been engaged in works in many counties of England, and during that time I am glad to say I have met with fairness, or, if my tender has been lowest and rejected, some explanation and consideration for loss in cash and time have been given. For the engineer to the Romford Authorities I have not a word of complaint; but for the gentlemen composing that Board I wish they had the days of toil and expenses to bear in working up a tender for 9,488l. 6s. 4d.: they would, I think, consider the labours of others from a far different standpoint to the one on which they decided this contract. Surely, sir, something can be done by the contractors of the United Kingdom in forming an association to guard against their capital and time being wasted, and obtain some guarantee of good faith before venturing on a straw, as now is too often the case.

December 21st, 1885.

J. GREENWOOD.

## FELT ROOFING.

SIR,—In reply to your correspondent "F." [p. 878, ante] it will probably be twenty years or more before the smell of the tar will disappear. It will cease when the pores of the felt, and the cracks in jointing are so filled by the dust that the air will no longer pass through, carrying with it the volatile tar vapours.

The remedy till then is to make the air pass outwards through the boarding, the felt, and the slates, instead of, as now, inwards through the slates, the felt, and the boarding to supply the place of the air passing up the chimney.

Close the chimney as an outlet for the air of the room, except that passing through the fire of an air-heating stove. Feed the air-chambers from the outside of the house, the air forced in will then pass outwards through the crevices of doors, windows, and roof. A large stove, with a low temperature, would be the most effectual.

A. STEWART HARRISON.

SIR,—I observe a letter in your issue of the 19th inst. regarding the smell arising from felt roofing upon a library roof. I am inclined to think your correspondent would find that some Willissen paper laid on the underside of the rafters would stop the odour coming through, but it would be rather a troublesome job, as we doubt he has a plaster ceiling up. I have found that for underlining slates this paper answers extremely well, and it is absolutely without scent of any kind.

HOWARD G. TOZER.

## ENGLISH DESIGNS FOR PAPER-HANGINGS.

SIR,—In your notice of the proceedings connected with the distribution of prizes at the West London School of Art [p. 857, ante], there is a little mistake which I trust you will permit me to correct. I am reported to have said that for seven years I had bought "the whole" of my designs from past or present students in the school, but I really said that "a considerable proportion" of the designs I bought emanated from students of that school. I value the school very highly, and I greatly appreciate the high class of work done by many of its students; but to allow the error

to stand without correction would be a grave injustice to those architects and artists trained in other schools, whose admirable works,—many of which must be well known to you and your readers through the medium of the Great International and other Exhibitions,—it has been my privilege to produce. F. ADMONTER.  
110, High-street, near Manchester-square, W.

## CHURCH-BUILDING NEWS.

**Ashton-upon-Mersey.**—The Church of St. Martin, Ashton-upon-Mersey, has been reopened, after having been closed for nearly twelve months for renovation. The present structure (which replaced a thirteenth-century building) was commenced in the reign of Queen Anne, and finished in that of George III., the stone being brought from Lymn, and the wood from Peover. In 1716 the west gallery was added, and the church re-seated throughout with the wood which now adorns the chancel. The original idea of the present alterations was to re-seat the church and build an organ-chamber and vestries; but when this work was commenced it was found that the church was very much dilapidated, and a great deal of the plaster had to be removed to get at the decayed timber. In doing so a considerable quantity of the stone was bared, and then it was resolved to strip all the walls in the interior. The whole of the church has been re-seated, and the chancel and sanctuary laid in oak parquetry. The frame-work of the old pews has been carefully taken to pieces and used for panelling the chancel from floor to ceiling. The architect for the renovation was Mr. F. H. Oldham, of Manchester, and the builder was Mr. Webster, of Sale.

**Bardwell (Suffolk).**—In the month of May last, the tower of Bardwell Church was struck by lightning. Through the exertions of the rector, the Rev. A. F. Dunlap, and the assistance of the two churchwardens, a sufficient sum of money was raised to enable them to put the tower into a fair state of repair. Two new windows were placed in the belfry, and it is to be regretted that the funds did not allow of the third one being replaced, which is required. The dressings consist of Box Ground stone, the old stone, which was Church, being put aside. The filling-in consists of flint stones, and the windows already alluded to are worked out of Corsham. No scaffolding was used during the repairs. A timber-frame was erected on the top of the tower, from which was lowered or raised, when required, a large wooden cage, suspended by ropes, worked by means of a hand-crank from the ground, the heavy expense of scaffolding being thereby saved. Between 200l. and 300l. has been expended. Mr. Summerville was the consulting architect; Mr. H. Middleitch, Bardwell, the contractor; and Mr. A. H. Hanchett, Bury St. Edmund's, the mason.

**Sewage Pumping Machinery.**—Messrs. Hayward Tyler & Co., of Whitecross-street, E.C., have been busy of late upon sewage pumping machinery for various sanitary authorities. During the past few days they have successfully started the new pumping-engine designed and erected by them for the Twickenham Local Board, under the superintendence of Mr. Ramsay, the Board's engineer. This engine is of the horizontal type, calculated to raise one million gallons of sewage matter per day to a height of 55 ft. There are already two large pumping-engines by the same firm at work at the Twickenham Sewage Station, raising 1½ million gallons daily. For the Corporation of Luton (Bedfordshire) the same firm are now building a pair of pumping-engines to raise 1½ million gallons of sewage matter to a height of 200 ft. through 2,000 ft. of main. The arrangement of these engines is similar to the one just started at Twickenham. Messrs. Hayward Tyler & Co. have also lately supplied two direct-acting steam-pumps for the Walthamstow Sewage Works, each to raise 100,000 gallons of sewage or sludge per day. These pumps are of a special design, similar to that made two years ago for the Leyton Sewage Works.

**Trade Smoking Concert.**—Last Saturday evening the clerks in the employ of Messrs. W. Brass & Son, the well-known builders and contractors, of 47, Old-street, gave a most successful smoking concert at the Champion Hotel, Aldersgate-street, E.C. Several gentlemen from other well-known firms were present, and a pleasant evening was spent.



## The Student's Column.

## DESCRIPTIVE GEOMETRY.—PART II.

xxx.

**F** (fig. 229) one of the directing lines were replaced by a directing surface,  $\Sigma$ , to which the generators  $G$  of the surface,  $S$  would be bound to remain tangent; the curve of contact,  $a, a', a'' \dots$  would be a directing line of the surface. But we do not require that curve to find the tangent plane; for, as the skew surface  $S$  touches the surface  $\Sigma$  in the point  $a$ , both surfaces have the same tangent plane in that point, and, therefore, any straight line of the plane tangent to the surface  $\Sigma$  will do as director of the connecting paraboloid. We need only, therefore, produce in the tangent plane to surface  $\Sigma$  any line  $a, R$ , and use it as a director of the hyperboloid, as well as the two tangents,  $L$  and  $M$ , to the directing curve. This method of finding the tangent planes is especially useful in winding stairs either in stone or in wood. We shall give a practical example of its application in a conoid circumscribed to a sphere.

There are, as we have seen, skew surfaces defined without giving three directors; in other cases, the directors may be given, but we may not be able to produce the tangents to them. In these cases (fig. 230), if the point,  $\Pi$ , on which we desire to get the tangent plane, be placed on the generator  $G$ , we construct on each side of  $G$  a series of neighbouring generators,  $G_1, G_2, G_3$ , and  $G_4, G_5, G_6 \dots$ . Then any plane  $\pi$  passing through  $G$  will cut the skew surface along a curve,  $a, a_1, a_2, a_3, a_4, a_5, a_6 \dots$ , which will cut the line  $G$  in a point  $a$ ,  $a', a'' \dots$ . The plane  $\pi$  contains the generator  $G$ , and also the tangent to the curve  $a, a_1, a_2, a_3, a_4, a_5, a_6 \dots$  in the point  $a$ ; the plane  $\pi$  is therefore tangent to the skew surface in the point  $a$ . Repeating the same operation with two other planes,  $\pi'$  and  $\pi''$ , we get also the points  $\beta$  and  $\gamma$  where these planes are tangent to the skew surface. Drawing any three lines,  $a, \beta, \gamma$ , in the planes,  $\pi, \pi', \pi''$ , we shall have three directors of a connecting hyperboloid, which will allow us to find the tangent plane required.

From what we have seen above we can conclude that in skew surfaces any plane  $\pi$  which contains a generator  $G$  is sure to be tangent to that surface in some point of that generator, but in some special cases the point of contact may be removed at an infinite distance.

If it be required that the plane tangent to the skew surface contain a given line  $D$ , we shall follow the general method given fig. 162 (Sept. 13, 1885). But, if the surface is either a hyperboloid or a paraboloid we have a great simplification. The tangent plane must then contain the line  $D$  and two generators of the skew surface which meet at the point of contact.

Now (fig. 231), if in the last case we find the points  $M$  and  $M'$  where the line  $D$  penetrates the skew surface, and if we construct the two generators  $A$  and  $B$ , or  $A'$  and  $B'$ , which pass through these points, the planes which contain  $D$  and  $A$  or  $D$  and  $B$  will be the tangent planes required. Moreover, the plane which contains  $D$  and  $A$  will also contain  $B'$ , for  $A$  meets  $B'$  somewhere; the plane  $D$  and  $B$  will likewise contain  $A'$ ; and we see therefore that the points of contact will be at the meeting of the generators  $A$  and  $B'$  and of  $B$  and  $A'$ .

We can conclude from the above that the problem is impossible if the line  $D$  does not meet the hyperboloid or paraboloid; except in certain cases, where the line  $D$  is parallel to a generator, or, what is the same thing, meets the surface at an infinite distance. This occurs for the generators of the limiting cone.

If the plane tangent to a skew surface is to be parallel to a given plane  $\pi$  we use a method similar to that of fig. 162, with the difference that instead of cones from two points we have two cylinders parallel to any two lines of the plane given, and again the intersections of the lines of contact give us the points of contact of the tangent planes. But for the following two surfaces we use a shorter operation:—

For the hyperboloid (fig. 223) we find the generators  $A$  and  $B$ ,  $A'$  and  $B'$ , which are parallel to the given plane  $\pi$ . The planes which contain either  $A$  and  $B'$  or  $A'$  and  $B$  are the tangent planes.

For the paraboloid (fig. 225) we find the two generators  $A$  and  $B$  parallel to the plane  $\pi$ . The plane which contains  $A$  and  $B$  is parallel

to the plane  $\pi$  and tangent to the paraboloid in the point where  $A$  and  $B$  meet.

**Important proposition for determining the surfaces of the joints in skew vaults (fig. 232).—In every skew surface  $S$  all the normals  $M, M', M'', M''' \dots$  erected on the divers points of the same generator  $G$  form always the surface of an hyperbolic paraboloid.**

Let us call  $\Sigma$  the surface which contains all the normals, and let us revolve that surface round the generator  $G$  a quarter of a circle, so that the new position  $M'$  of any normal be at right angles with the normal itself  $M$ . After this operation the surface  $\Sigma$  will not have changed its form, but yet, in its new position, every generator thereof  $M, M', M'', M''' \dots$  will be tangent to the surface  $S$ .

Now, if we take any three of the tangents to the surface  $S$ , say  $M, M', M'', M''' \dots$ , and use them as directors of a surface of which  $G$  is a generator, the surface so formed is a paraboloid which has the same tangent planes as the surface  $S$  in three given points of the generator  $G$ . We know, according to our first proposition, that it is a connecting paraboloid tangent to the surface  $S$  in every point of the generator  $G$ , and, therefore, every tangent such as  $M'''$  is contained in that paraboloid. This means that the surface  $\Sigma$  is a paraboloid, and it remains such when it is brought back to its former position of surface of the normals.

## EXAMPLES OF DIVERS SKEW SURFACES.

**The Right Conoid (fig. 233)** in this figure has for directing plane the plane of the plan itself; one of its directing lines is the vertical line  $o, s$ , the other is the curve  $a, s'$  delineated on the elevation plane. The generators are therefore found by horizontal sections such as the one by the plane  $X$ . The lines  $o, b, o, c, o, d$  are generators of the conoid. Observe that if the generators are prolonged beyond the vertical  $o, s$ , they will form a second sheet of the conoid. The line  $o, s$  is called a line of stricture of the surface.

The plane  $P$  tangent to the surface of the conoid in a given point  $m$  will be found by the help of a connecting paraboloid, of which the tangent  $b, t$  is a director, and the line  $o, s$  is the other director. The line  $b, o$  and the line  $t, o$  are evidently generators of the paraboloid. If we cut the paraboloid by a vertical plane passing through the point  $m$ , and parallel to the elevation, the section  $m, p$  will be a generator of the second system of the paraboloid, and, therefore, the tangent plane is the one that contains the lines  $m, b$  and  $m, p$ ; its trace  $P^a$  is parallel to  $o, s'$  and  $P^b$  passes through the point  $b$ .

The same connecting paraboloid would serve to find the plane  $Q$  tangent in any other point  $n$  of the same generator;  $Q^a$  would be also parallel to  $o, s'$  and  $Q^b$  would pass through the point  $b$ .

Observe the elevations of the lines  $b, t, m, p, n, q$  parallel vertical sections of the paraboloid cross one another point  $o$ , for they are generators of the second system of the paraboloid, and will all touch a horizontal line which is a generator of the first system. All parallel sections of this conoid are ellipses, which have the axis  $o, s'$  in common, and the sections of the paraboloid are tangent to these ellipses; on this fact is based very simple and cheap compasses for drawing ellipses.

**The conoid circumscribed to a sphere (fig. 234)** is described by a straight line, which remains always horizontal, and slides on a given line,  $a, l$ , and a sphere. The generators will be found by sections made by horizontal planes, such as  $X$ , which cuts the line  $a, l$  in the point  $c$  and the sphere along a circle; the tangents  $c, m$  and  $c, n$  to that circle are generators of the conoid, and  $m$  and  $n$  are points of contact the series of which form the curve of contact along which the conoid touches the sphere. Observe that on plan the generator  $m, c$  is seen until it reaches the directing line  $a, l$  when it passes behind the surface to form another sheet of the conoid.

To find the plane  $P$  tangent to the conoid in the point  $r$ , we produce a connecting paraboloid which has for directors the line  $a, l$  and any tangent to the sphere in the point  $m$ ; such a tangent is  $a, t$ , the tangent to the meridian of the sphere. The problem is then brought back to finding the two generators of the paraboloid which pass through the point  $r$ , for they are contained in the plane  $P$ . The line  $c, m$  is one of them; to find the other generator we cut the paraboloid by a plane  $Q$  passing through the point  $r$  and parallel to the two directors  $a, l$  and

$s, t$ . The plane  $Q$  contains the lines  $r, u$  and  $r, y$  parallel to  $a, l$  and  $s, t$ , its trace  $Q^a$  passes, therefore, through  $u$  and  $y$ . This trace will suffice to find the intersection of the plane  $Q$  with the paraboloid for it is a straight line  $a, r$ , as we know ( $a$  is at the intersection of  $Q^a$  and  $l$  a generator of the paraboloid). The tangent plane  $P$  contains the lines  $a, r$  and  $c, m$ , its trace  $P^a$  passes through  $a$  and is parallel to  $c, m$ , its trace  $P^b$  passes through  $r$ .

**The Skew Archway (fig. 235).** If you take some of the plans of old French châteaux, you will find that many of the doors and archways were skewed so that the openings should be placed more conveniently on each side of the wall. If these archways had been made cylindrical and the joints had followed the axis of the cylinder, the voussours of the vault would have formed in some parts very sharp angles with the faces of the wall; if the joints had been kept square with the faces of the wall, then they would have formed curves, portions of ellipses, on the inner surface of the archway. To avoid all these drawbacks the old masons used to form the surface of such archways as follows:—They drew the circular archway opening  $a, b$  on the back of the wall, which we will consider our elevation plane so that its plan  $a, b$  is our ground line; then they delineated the circular arch  $c, d$  on the front of the wall. The plan of the archway was then a parallelogram  $a, b, c, d$ ; through the centre,  $o$ , of that parallelogram they drew an axis  $o, z$  which cuts the elevation plane in  $o'$ . They treated the bed joints of their stone work as if they had an archway of diameter  $c', b'$  to deal with, so the planes of all their joints should go through the axis. The inner surface of the archway was not a cylinder but a skew surface formed by the motion of a straight line bound to touch the axis and the circles  $a$  and  $c, d$ . On the elevation such a generator will pass through  $o'$  as  $m, o'$  and its plan, if prolonged, will touch the axis as  $m^b, o_z$ .

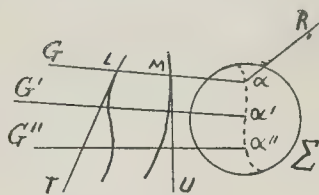
Now, if we want to find the plane  $P$ , tangent to the surface on a point  $l$  belonging to the generator  $m, n$ , we must draw the tangents  $m, t$  and  $n, r$  to be used as directors of a connecting paraboloid. A third director of that paraboloid will be the line  $o, z$ ; it is parallel to the directing plane of the two other directors, and it is contained in the plane tangent to the surface of the archway in the point  $o'$ , for the axis and the generator,  $o, z$ , which belong to that plane, are also two generators of the surface. If we draw a plane which contains the lines  $o, z$  and the point  $r$ , its horizontal trace will be  $o, r, a$ , and its vertical trace will be  $\beta, t$ , parallel to  $o, z$ . This plane cuts the tangent  $m, t$  in the point  $\beta$ , and we can conclude that the line  $\beta, r$  is a generator of the paraboloid. The section of the paraboloid by the vertical plane  $X$  gives us the second generator,  $l, e$ , required. As the plane  $P$  contains both  $l, e$  and  $m, n$ , its horizontal trace is  $P^a$  through  $o$  and  $e$ , and its vertical trace  $P^b$  touches the point  $m$ .

If the joints of the archway are planes, they will not be in every point normal to the surface of the vault, and would present, in some parts, sharp arrises. To prevent this the bed joints may be cut out in the shape of a paraboloid, normal in every point of the joint, and to produce this the tangent planes have to be constructed as above.

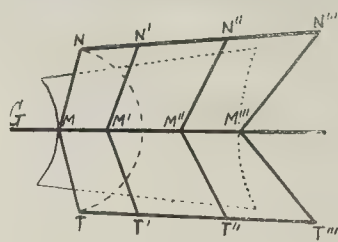
With the exception of a few questions which we may treat hereafter, we have now completed the theoretical part of Descriptive Geometry; its applications to masonry, carpentry, joinery, metal-work, mechanical engineering, and ship-building can be found in various special treatises.

Our readers will have, no doubt, noticed that the First Part of our papers treated specially of the methods employed for delineating geometrical objects and working out problems relative to them; whereas, the Second Part treats of various geometrical lines and surfaces, and illustrates their special properties.

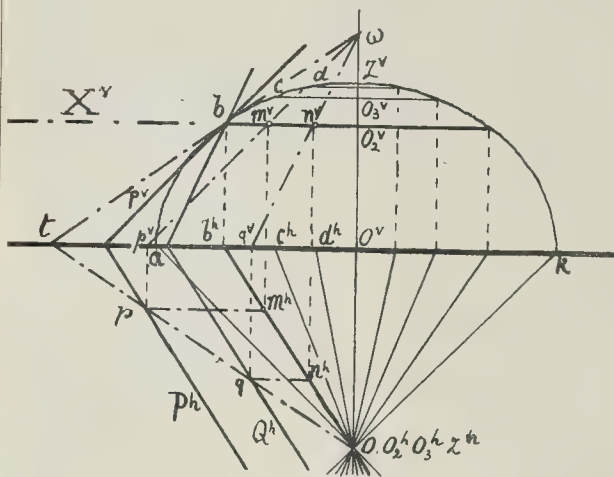
These articles having been written, not for a privileged minority of students with a high mathematical training, but for everybody,—workmen as well as young architects,—we have thought it wise to avoid as much as possible the usual Greek scientific terms, and have adopted some special arrangements for the purposes of demonstration only. Our system of notation has never, to our knowledge, been published before. In other treatises each point is indicated by its two projections; they will say, for instance, the point ( $aa'$ ), the line ( $aa', bb'$ ), in



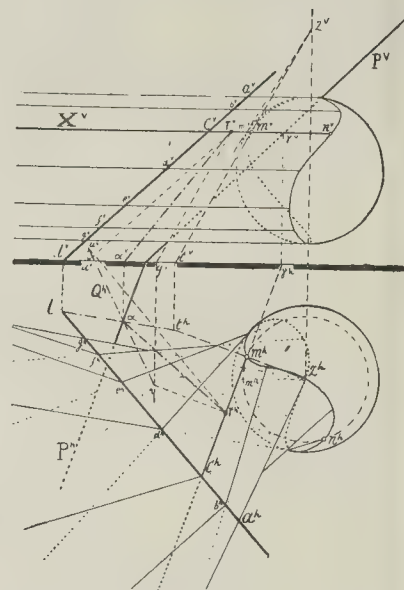
*Fig. 229.*



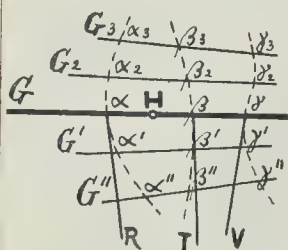
*Fig. 232.*



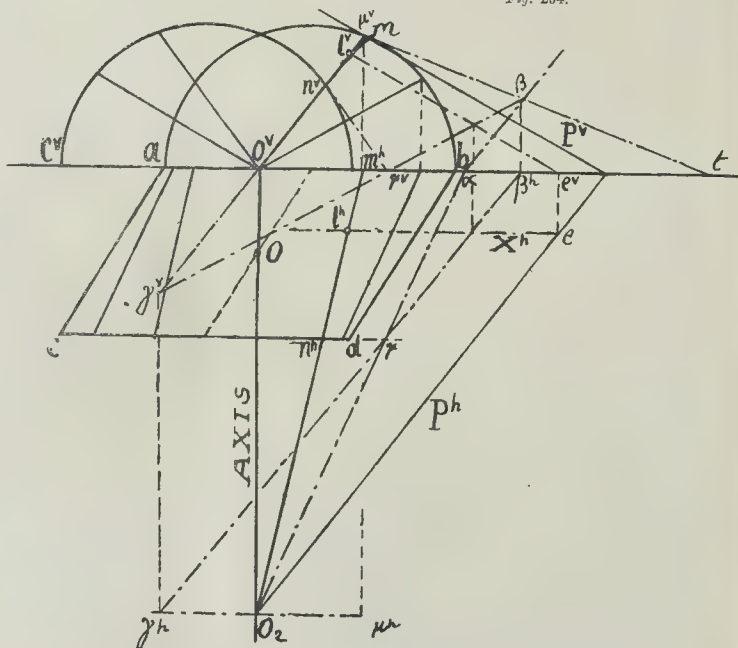
*Fig. 233.*



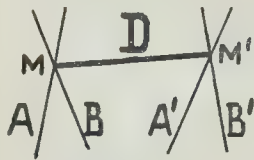
*Fig. 234.*



*Fig. 230.*



*Fig. 235.*



*Fig. 231.*



which *a* or *b* are the plans and *a'* or *b'* are the elevations of points. This is a system which prevents the demonstrator from speaking simply of the operations which take place in space without referring to their graphic representation. The method of notation we have employed is due to M. Cellérier, professor at the University of Geneva. Before concluding, we must warn the students against imitating the thick lines we have used in our drawings. Our drawings have been made solely for the purpose of demonstration, and to make them clearer we have varied the thickness of the lines according to their importance, in the hope that the thicker lines would at once catch the reader's eye and lead him more easily to find his way in the complicated maze of lines which such diagrams often present. Whatever may be thought of this innovation, we beg to say that we are solely responsible for this. In taking leave of our readers we hope that these papers will have brought the importance of this science clearly before the public, and that means will be found for fostering such studies more than has, unfortunately, been the case till now in England.

### Books.

*Inventions and how to Patent Them: a Practical Guide to Patentes.* By T. EUSTACE SMITH, Barrister-at-Law. London: W. H. Kelly, 1886.

THIS is a clear and useful little handbook, which may be read with advantage, not only by those who desire to take out a patent, but by all who wish to acquire in a short space a knowledge of patent law. It is written primarily for those who wish to be their own patent agents, but it may be usefully perused by those who intend to make use of a patent agent, but who still desire to know something of the business which has to be done. There is no more to be said on such a work as this when we have indicated that it is clear and useful. It makes no pretence at anything more. There is one omission we notice,—that there is not a list of standard works on the subject of patents. Mr. Smith gives a list of towns and places which have complete sets of the Patent Office publications; he should have added such a list as we have mentioned. Again, on page 102, the author tells the reader that a collection of the patent laws and regulations of foreign States and of the British colonies can be inspected at the Free Public Library in the Patent Office, but he does not tell him that if he wishes to consult them in his own library he can do so by reading Messrs. Cargoes's work, "Patent Laws of the World," published by Messrs. Clowes & Sons. These are omissions of a kind which detract from the value of a work which is intended to be essentially helpful and practical.

### VARIORUM.

MESSRS. CROSBY LOCKWOOD & Co. announce that Mr. Alexander Watt's new work on "Electro-Deposition," which is now nearly through the press, will be ready for publication in the early part of next month.—The next number of the *Antiquary* commences a new volume. It will open with an introductory article on the "History of the Crown Lands," by Mr. Hubert Hall. Among other articles contributed to the January issue will be one by Mr. Jewitt, on "Quaint Concets in Pottery," by Mr. Clinch, giving a hitherto unpublished letter of Bishop Wainwright's; and a contribution to the history of old London from scarce tracts and satires.—The Christmas number of *Harper's Magazine* contains a well-illustrated article entitled "The Nativity in Art."—The *English Illustrated Magazine* for January contains an illustrated paper by Mr. H. D. Traill, entitled "A Month in Sicily." The illustrations include views of the interesting architectural remains of Girgenti, Taormina, and Syracuse. In the same magazine the Rev. Alfred Ainger discourses pleasantly of "Charles Lamb in Hertfordshire," and is ably seconded by the engraver.—The Christmas Number of the *Gardeners' Magazine* is varied and readable in its contents, and is accompanied by a sheet almanack for 1886, printed in colours.—*Illustrations* is the title of a threepenny monthly magazine, which, under the editorship of Mr. Francis George Heath, will commence in January. It is

designed "to occupy a position not yet filled by any existing journal," and will be "a pictorial review of knowledge of all kinds, comprehending amusements, art, domestic economy, inventions, literature, and science." The publishers will be Messrs. Wells, Gardner, Darton, & Co.—Messrs. Cassell & Co., of La Belle Sauvage-yard, send us their admirable magazines for January. In the *Quiver*, "Two Famous London Churches,"—St. Margaret's, Westminster, and St. James's, Piccadilly,—form the subject of a paper by Mr. W. M. Adams. In *Cassell's Magazine* appears the second of Professor Stuart Blackie's papers on "London for Londoners." The Professor is pretty free in his criticisms of contemporary architecture. When he comes to speak of "Westminster Abbey and the Chapel adjacent," he says:—"This is, indeed, the great stone liad of England, to be ignorant of which should bring to a British schoolboy greater shame than not to have heard of the wrath of Achilles or the filial piety of the son of Anchises." *Little Folks*, Messrs. Cassell's magazine for the young, commences the first number of a new series, and appears in a new wrapper designed by Alice Havers.—From Messrs. Rider & Son, of 14, Bartholomew-close, we have received "The *Timber Trades' Journal* List of Telegraphic Addresses Registered by the Principal Firms in the Wood Trade," which will be very useful.—The *Leisure Hour* for December contains a readable paper entitled "Oxford Revisited," by Cuthbert Bede. There is also an illustrated paper on Nuremberg. The *Sunday-at-Home* for January contains an illustrated article on "Bartholomew's," in which the history of the church of St. Bartholomew-the-Great is discussed. Of the "Boys' Own Paper" for January begins a series of illustrated papers on "Our Great Public Schools," Winchester being the first treated. Of the companion magazine, "The Girls' Own Paper," is publishing a series of articles on "Architecture; or, the Art and History of Buildings," by Mr. H. W. Brewer. The whole four of these excellent magazines are published at 66, Paternoster-row.

### DIARIES AND ALMANACKS FOR 1886.

MESSRS. HUDSON & KEARNS, of 83, Southwark-street, send us a parcel of their professional and general diaries, specially adapted to the requirements of architects, surveyors, engineers, builders, and contractors. No. 11, "The Builder's Diary," is specially ruled and arranged for the use of builders and contractors, and contains a great deal of useful information, such as wages tables, tables of scantlings, and other matter sure to be found handy on one's desk. No. 12, "The Architect's Diary," is specially arranged for the use of architects, surveyors, and civil engineers; while No. 13 is similar to No. 12, except that it is provided with two pages to a day instead of one page. We have frequently spoken of the great merits of these excellent diaries. No. 10 is a very good diary for general use. A speciality now introduced by this firm is their improved "Blotting-Pad Portfolio Diary," which possesses many advantages, especially fitting it for use when travelling. The same firm send us specimens of their date-indicating pads combined with diaries.

MESSRS. T. J. & J. SMITH, of 109, Queen Victoria-street, have sent us a large and varied assortment of their well-known and excellent productions. These diaries have now reached their fortieth year of issue,—a fact that of itself speaks well for them. For the pocket there are some small and cheap (though excellently got-up) varieties. Of these we may mention Nos. 17 and 29, which sell for 6d. each, and Nos. 1 and 15, which are to be had for 1s. each. Messrs. Smith's "Commercial Scribbling Diaries" are likely to maintain the favour with which they have long been received. Nos. 7 and 8 are useful though cheap varieties of the large or foolscap folio size; No. 9, with stiff covers, and with two days on each page, has the same-sized page, but is considerably thicker than Nos. 7 and 8. Of the smaller-sized scribbling diaries, Nos. 6 and 31 will be found very useful. The same firm's "Office-Desk Diary," No. 11, has three days to a page. Washing-books, housekeepers' books, &c., also figure in the list of Messrs. Smith's productions.

"The Railway Diary and Officials' Directory" for 1886 (published by McCorquodale & Co., Limited, of Gardington-street, Euston-square) has a title which is indicative of its contents. It

is a very useful work of reference, containing as it does the weekly traffic returns for 1885, with blank columns for filling in those of 1886; four half-years' accounts of some of the principal companies; and a mass of other information pertaining to the railway service. From the same publishers we receive a copy of the "Railway Almanack,"—a useful sheet for the office-wall.

The "City Diary and Almanack" (twenty-third year of publication) is published by Messrs. W. H. & L. Collingridge, of the *City Press*, 145, Aldersgate-street. It is very well arranged and very creditably got up, and contains a mass of information about City men and City institutions, City churches and City guilds, not to be found in other diaries.

The "Furniture Gazette Diary and Desk-Book" (published by Messrs. Wyman & Sons, 75, Great Queen-street, W.C.) has now reached its tenth year of issue. Its contents include a classified directory of the furniture, upholstery, and decorative trades, and some useful business memoranda having especial reference to the requirements of those trades.

"Calvert's Mechanics' Almanack" for 1886 (London and Manchester: John Heywood) is a cheap and useful little miscellany, chiefly of value, apparently, to those engaged in the mechanical engineering trades.

"Jackson's Church of England Lectern and Parish Calendar" for 1886 (published by J. Westell, 114, New Oxford-street) contains, amongst other miscellaneous matter, some useful hints on the care of churches and their furniture, &c.

### RECENT PATENTS.

#### ABSTRACTS OF SPECIFICATIONS.

16,134, Ventilating Sewers. G. E. Eachus.

The sewer is divided into sections by flap-valves, each section being provided with an upcast and a downcast shaft, built in masonry, concrete, or similar substance. In the upcast, a filter and a silt-box are placed. To promote a draught, a descending stream of water may be used in the downcast, or a flame in the upcast. In some cases, for convenience, one shaft may be enclosed by the other.

15,525, Water-closet. F. R. Hapson.

The basin, which is of the wash-out type, is trapped by a web. The second trap is formed in the usual manner. To facilitate the emptying of the basin at each flush, the space between the seats is connected with an air-pipe to the flushing-pipe, at a point where it is provided with a short, loosely-fitting inner tube, to act as an injector, and exhaust the air from the space between the seats at each flush. A valve is introduced to prevent the return of the air, and the flushing cistern is provided with a poppet-valve operated in the usual way.

15,194, Joint for Lead Pipes. W. Gadd.

Two short tubes are placed inside and over the ends of the pipes. Molten metal is poured in through a hole left in the covering. The two tubes may be connected by a web in the middle. The tubes are heated before making the joint, or the molten metal is allowed to run out through another hole in the covering in order that the pipe ends may be fused and become one with the metal which has been run in.

15,800, Coating Vessels with Lead. I. S. McDougall.

Relates to coating vessels made with copper, or with copper alloys with lead. The vessel or part of it to be coated is treated with chloride of zinc (or its equivalent), then immersed in molten lead, or molten lead is run over the surface, or the lead may be applied in any suitable way.

15,932, Planing and Shaping Machines. W. H. Alday.

This invention is applied to planing-machines, and is used for forming circular concavities and convexities, especially for forming the pistons of rotary blowers, engines, &c. One half of the complete piston may be finished at one setting of the work, the concave and convex portions being formed at different parts of the stroke of the table.

#### NEW APPLICATIONS FOR PATENTS.

Dec. 11.—15,195, E. Coldwell, Apparatus for Burning off Old Paint.—15,214, J. Hancock, Ornamented Surfaces in Representation of Inlaid Woods.—15,233, E. Emanuel, Self-closing Ball Valve.—15,235, W. Macrone, Apparatus for Checking the Time of Arrival of employees.—15,248, O. Eiphick, Improvements in the Joints of Stoneware Pipes.

Dec. 12.—15,255, J. Shankis, Improvements in Water-closets.—15,269, G. Couch, Improvements in Fittings for Doors and Gates.—15,272, J. Davis, Appliances for Opening, Closing, and Fastening Windows, Fanlights, &c.—15,274, A. Elford, Device



for Flushing Sewers.—15,298, J. Baldwin, Door and other Bolts.

Dec. 14.—15,309, E. Horsley, Improvements in Window-fasteners.—15,317, B. Scott, Apparatus for Working the Valves of Water Cutters.—15,326, E. Eligh, Apparatus for Disinfecting and Deodorizing Closets, Urinals, &c.—15,327, A. Rickaby, Improvements in Slotting and Planing Machines.

Dec. 15.—15,334, E. Colton, Improvements in the Manufacture of Encaustic Tiles.—15,366, R. Pitt, Fire-grate with Flue and Draught-plate combined.—15,373, C. Miller, Window-fasteners.—15,404, F. Sorel, Improvements in Glazing.—15,406, J. Laybott, Improvements in Saw Sets.

Dec. 16.—15,423, G. Chapman, Cement for the Manufacture of Furnace Bricks.—15,423, C. Clarke, Improvements in Socketed Pipe Joints.—15,464, E. Preston and E. De Russett, Improvements in Lavatories.—15,477, A. Wilkinson, New Method of Producing Ornamental Effects on Glass.

Dec. 17.—15,480, H. Grundy, Socket for Rain, Soil, or other Waste-water Pipes.—15,487, J. Chew, Sash-fastener.—15,506, T. Whitehead, Improvements in Chimney-tops, Ventilator Cows, &c.—15,512, H. McGowan, Improvements in Screw-drivers, Gimlets, and similar Tools.—15,518, W. Robertson, Ornamental Woodwork.—15,519, H. Bonnycastle and T. Jones, Refractory and Non-conducting Bricks, Blocks, Tiles, Slabs, and Pipes.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

12,221, D. Allport, Arrangement for Lessening the Slamming of Doors, &c.—13,219, F. Moir, Improvements in Window Sashes for Ventilation Purposes.—13,256, F. John, Planing Machines.—13,371, J. and W. Smith, Hanging and Supporting Sliding Window Sashes.—13,837, C. Day, Sash Fastener.—13,898, V. Vaughan and H. Gooch, Improvements in Locks and Latches.—13,945, J. Hill, Apparatus for Opening and Closing Fanlights and Casements.—14,023, J. Weber and W. Lennon, Counter-balancing Window Sashes.—14,234, W. Towler, Cisterns for Water-closets, Urinals, &c.—14,718, G. Thomas, Apparatus for Automatically Removing Water from Gas Pipes.—12,920, C. Howe, Manufacture of Keene's Cement.—13,110, W. Lake, Apparatus for Facilitating the Nailing of Laths.—13,849, J. Taylor, Improvements in Saws to Prevent Buckling.—13,898, Vaughan and Gooch, Attaching Door Knobs to Spindles.—13,923, H. Hadden, Improved Pipe Coupling.—13,934, W. Lake, Machine or Press for the Manufacture of Lead Pipe.—13,968, H. Thompson, Improvements in Grates and Stoves.—14,159, Johnston and Lockwood, Improvements in China or other Tiles.—14,374, E. Theadon, Chimney Tops.—14,500, Muscivite and Prewett, Sewer Line Socket.—14,521, W. Luther, Improvements in Astragals and Sash Bars.—14,619, T. and J. Fawcett, Machinery for Pressing Bricks, Brickettes, Tiles, &c.—14,672, G. Bonehill, Stair Nosings Treads, for Staircases, Floors, &c.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to opposition for two months.

3,596, P. Nevill, Instrument for Measuring Angles.—3,575, W. Latta, Improved Chimney-pot or Smoke Ventilator.—9,171, W. Walker and Others, Fluid-tight Joints for Pipes.—10,411, W. Bruce, Fixing Rain-water, Waste, and Soil Pipes.—11,998, G. Gray and Others, Improvements in Saws for Cutting Wood.—12,929, F. Dickinson, Brushes for Painting Woodwork, &c.—13,326, W. Whitwell and Others, Kinds or Chambers for Burning and Drying Bricks, &c.—13,526, W. & G. Barker, Construction of Open and Close Fire-grates and Stoves.—13,666, W. Alvord, Knob Attachments.—1,961, W. Holt, Chimney Tops and Flues.—2,810, J. Waterworth, Ornamental Panel Work.—5,993, Ford & Archer, Improved Waterproof Material for Covering Roofs, &c.—3,678, J. Banks, Improvements in Door Checks.—13,233, T. Woods, Stonecutters' Tools.—13,670, 13,671, and 13,672, W. Alvord, Improvements in Knob Attachments.

#### RECENT SALES OF PROPERTY.

##### ESTATE EXCHANGE REPORT.

Dec. 14.  
By REYNOLDS & EASON.  
Widford, Herts.—Four copyhold cottages and a plot of land..... 2130  
By T. B. WARRIOR.  
Kentish Town—89 and 91, Harmond-street, copyhold..... 875  
Hamstead-road—No. 96, term 23 years, ground-rent 8s. 6d., two years, ground-rent..... 390  
Camden Town—4, Kentish Town-road, 67 years, ground-rent 10l..... 385  
6, Kentish Town-road, 87 years, ground-rent 20s. 6d., two years, ground-rent..... 870  
Manchester-square—81, East-street, and a ground-rent of 3d. 13s. 6d., two years, ground-rent 7l. 10s..... 60  
By WATHERALL & GREEN.  
Burghead, Berks.—A rent-charge of 43l. 15s. 12d. a year..... 1,985  
Dec. 15.  
By ALFRED RICHARDS.  
Kentish Town—Improved ground-rents of 28l., term 39 years..... 475  
Improved ground-rents of 67l., term 39 years..... 960  
By ANDREW RUTHER & W. WILKINSON.  
Berkeley-square—No. 62, with stabling, 12 years, ground-rent 30l..... 3,500

By MURRELL & SCOBELL.  
Brixton—38, St. James's-road, 37 years, ground-rent 10l. 10s..... 2850  
Richmond, Friar's Stile-road—"Cornwall Lodge," freehold..... 1,600  
Old Kent-road—1 to 30, Swan-place, freehold..... 3,700  
By MULLETT, BOOKER, & CO.  
Hyde Park—24, Oxford-terrace, 44 years, ground-rent 9l..... 1,560  
By DEBENHAM, TAYSON, & CO.  
Ongar, near—Freehold last 7a. 2r. 1p..... 550  
Regent-street—The lease of No. 164, term 15 years..... 1,220  
Dec. 16.  
By RICK BOSCH.  
City—64, Bishopsgate-street Without, freehold..... 2,650  
By F. MATTHEWS.  
Clapton—Freehold ground-rents, 24l. 10s., reversion in 82 years..... 583  
By COOPER & GOULDING.  
Bermondsey—49, George-road, and 26, Bermondsey Wall, freehold..... 2,800  
By D. SMITH, SOY, & CATERLEY.  
Whitechapel—Ground-rents of 37l. 6s., reversion in 19 years..... 1,455  
Ground-rents of 48l. 15s., reversion in 14 years..... 695  
9 to 15 odd, Philip-street, freehold..... 1,550  
Marylebone—Ground-rents of 127l. 13s., term 14 years, with short reversion to rack-rents..... 1,157  
Dec. 17.  
By WALTON.  
Norwood, Clifton Villa—Ground-rents 25l., reversion in 78 years..... 560  
By WOOD & SPINK.  
Islington—49, Gibson-square, 41 years, ground-rent 8l. 10s..... 580  
By T. FORD.  
Walworth—88 and 90, Penrose-street, 69 years, ground-rent 8l. 13s..... 670  
Old Kent-road—1 to 8, Henry-road, 30 years, ground-rent 21l..... 700  
By NEWBORN & HARDING.  
Barnesbury—5 and 7, Albion-grove, three years, ground-rent 7l..... 85  
28, Albion-grove, 59 years, ground-rent 3l. 10s..... 500  
78, John-street, 59 years, ground-rent 4l. 4s..... 410  
15, Huntingdon-street, 64 years, ground-rent 8l..... 680  
2 and 3, Crescent-street, 63 years, ground-rent 14l..... 630  
King's-cross—28, 30, and 32, Wharfedale-road, 58 years, ground-rent 15l..... 1,175  
2 and 3, Railway-street, 62 years, ground-rent 10l..... 575  
Pentonville—10 and 11, Lloyd-square, 26 years, ground-rent 10l..... 690  
By A. G. O'LEARY.  
Marylebone—1 to 6, Upper Dorchester-place, 24 years, ground-rent 65l. 6s..... 555  
97 and 105, Boston-place, 24 years, ground-rent 25l. 4s..... 150  
By BALL, NORRIS, & HADLEY.  
Shepherd's Bush—43, Adelaide-road, 78 years, ground-rent 7l. 7s..... 150  
By WALTON & LEE.  
Hendon, Welsh Harp—A freehold plot of land, 1a. 1r. 8p..... 900  
Dec. 18.  
By McLAUGHLIN & SONS.  
Clapham Common—The freehold residences, called "Springfield" and "Northside," containing 7½ acres..... 16,000

#### MEETINGS.

WEDNESDAY, DECEMBER 30.  
Civil and Mechanical Engineers' Society.—Mr. G. H. Blagrove, A.R.I.B.A., on "Vibrations," 7 p.m.  
Builders' Foremen and Clerks of Works' Institution.—Annual Meeting of Directors, 8.30 p.m.  
Archæological Section of the Birmingham and Midland Institute, 8 p.m.

#### Miscellaneous.

**Edinburgh Architectural Association.**—On the 17th inst. a well-attended meeting of the Edinburgh Architectural Association was held in the Professional Hall, George-street.—Mr. Washington Browne in the chair,—when an interesting paper on "Foundations" was read by Mr. David M. Westland, C.E., who pointed out, in the first place, the necessity of equalising the pressure on the foundations of different portions of buildings which varied in height, and showed how this could be done so that the pressure per square foot in the foundation of a tower 250 ft. high need not be greater than that of a two-story building. He next gave examples of the safe weights which could be borne by foundations, and described the different methods adopted to obtain a stable foundation in soft or treacherous ground. In conclusion, as instances of large and difficult works of the kind, he gave some details of the foundations of the St. Louis Bridge at New York, which, he stated, were of a far more gigantic character than even those of the Forth Bridge at Queensferry. A discussion followed. On the motion of Lord Dean of Guild Gowan, a vote of thanks was given to Mr. Westland for his paper.

**Bow.**—The Children's Home, Bonner-road, Bow, has just been presented with two Munich stained-glass windows, representing the figures of Faith and Hope. They have been designed and executed by Messrs. Mayer & Co.

#### Crystal Palace School of Engineering.

On Saturday last, December 19th, the thirtieth year and thirty-ninth term of this school closed in the usual manner by the presentation of the certificates awarded to the students by the examiners. The chairman on this occasion was Sir F. A. Abel, F.R.S.; the examiners were Messrs. S. C. Homersham and G. G. André. From statements made at the meeting we learn that the school commenced with nine students, now increased to nearly ninety,—eighty-nine being the number in the term preceding the one just closed. The last student entered was the six-hundredth that has entered the school. Students who have passed through the school are now filling important posts as engineers or otherwise in all parts of the world. The lecture examination for the term was on "Materials and their Manufacture." Forty-eight students had attended these lectures; forty-three were eligible for examination; and twenty-six passed with from 241 to 108 marks; the highest number of marks attainable was 273. Three students,—W. Bosman, J. F. Harrison, and F. Stewart,—had each 241 marks; Bosman was also one of the three first for work in the drawing-office; the other two being E. R. Dangerfield and F. B. Dixon. For work in the pattern-shop R. P. Verral was first in order of merit; and J. F. Harrison (mentioned above) first in the fitting-shop. The firsts in the second year's course,—civil engineering,—were,—first term, M. Mawson; second term, E. H. B. Clayton; third term, E. H. Stillgoe. Five certificates were also awarded to students in the Colonial Section. An interesting and thoroughly practical address was delivered to the students by the chairman, who said that he had long desired an opportunity of examining the school, its course of instruction and training, and the work done in it; and he was happy to say that the knowledge he had acquired concerning its character and results had highly gratified him, and even exceeded his expectations, high although these had been.

**Metropolitan Sewage Disposal.**—The Metropolitan Board of Works are proposing to expend a further sum in respect of deodorisation works for the treatment of sewage, and are evidently hoping that the sludge will be used by farmers, and that the Board will be saved the expense of carrying it out to sea. Dr. Voelcker's opinion is said to have led to this hope, and it would undoubtedly be a great boon to the metropolis if its refuse should be a source of profit; but the project is not very encouraging. It is believed that of seventeen shillings per one hundred tons given as the theoretical value of town sewage, only two shillings lay in the suspended matter, and hence, as the recent Royal Commission has pointed out, the precipitated solids could, at the best, represent only about one-eighth of the value of the original sewage. London will not, however, begrudge the expenditure of money if its river can be freed from pollution. This is the first consideration, and is an absolute necessity; and it is better not to dwell too much upon profit, which must, at the best, be of a very doubtful character.—*Lancet*.

**American Elevators.**—The American Elevator Company have just been awarded the contract for two additional elevators to be erected in the Warndon-court Buildings, Throgmorton-street, opposite the Stock Exchange. This building was equipped with one of the Standard hydraulic elevators about a year ago, and the two others above referred to are for the new part which is just reaching completion. It is intended to have a typical American lift service in this building, and no expense is being spared to effect this. All three lifts take their supply from the same tank on the roof, and discharge into another tank in the basement. The water is pumped back again by a Worthington compound pump, and thus the cost of working all three lifts is the cost of pumping. It is claimed that this will be the most efficient and the most economical lift service in London.

**The Influence of Weather upon Sandstone.**—Protracted observations bearing upon the above subject have been made by Julius Stocklass, who (according to the *Chemiker Zeitung*) divides the process into four stages. The first is the oxydation of the ferro-combinations (which causes the stone to become yellow); the second is the lixiviation of the carbonates; the third is the gradual disappearance of half the entire proportion of carbonate of calcium and the regular increase of silicates and sand; while the fourth is the decomposition of the mass.



**Royal School of Mines.**—Prof. Warrington Smyth, F.R.S., in continuing his lectures in the theatre of the Geological Museum, Jernyn-street, spoke of the operations of "costeaning," or "prospecting," as being sources of considerable expenditure of capital, often without return, and especially of the display of great ignorance in regard to the particular class of rock in which they should be carried out. The first difficulty in the way of these particular methods of search for a lode is the presence of surface material in the form of sand, gravel, vegetable matter, and vegetation. Search operations are necessarily dependent, therefore, to a large extent, upon observations made upon a small portion of ground, which shall be applicable to very large areas. It results from these conditions that a large proportion of those mines which could be pointed out as notable ones have been discovered by accident, e.g. one lode in the neighbourhood of Tavistock was discovered by some boys out fishing, who found the gossan of a copper lode, with a small quantity of ore in it; the Plynlimmon Mine, on the flanks of the mountain of that name, was similarly discovered by some men while fishing; pellets picked up by game birds had led to the discovery of gold in Lower Hungary; and in Australia ducks and geese, having picked up grains of gold from the beds of the streams, had directed attention to profitable situations. The famous silver mines of Potosi were discovered by an Indian, who, taking hold of a bush to prevent his falling, pulled it up by the roots, and thereby disclosed some masses of native silver. The copper mines of Wallaroo, in South Australia, recently brought into prominence, were discovered by observing some green copper in the material thrown out by a little burrowing animal,—the wombat. Finally, a discovery of gold by Col. Sutter, a Swiss emigrant, while cutting a small water-course in California, has led to momentous results in so far as it gave rise, not only to a "rush" to that particular district, but also to numberless search operations for similar deposits in North America, Australia, and other parts of the world.

**The New Bridge at the Tower.**—At the meeting of the Court of Common Council on Thursday, Dec. 17, an agreement was sealed in triplicate between the Corporation of London, Mr. Horace Jones (City Architect), and Mr. J. Wolfe Barry, C.E., for the superintendence and erection of the new Tower Bridge, which the Corporation are empowered to construct under the Act of Parliament to which the royal assent was given on August 14 last. That agreement, which was prepared by the Comptroller and Remembrancer, and settled by counsel and approved by Mr. Horace Jones and Mr. Barry, carries into effect a report of the Bridge House Estates Committee, adopted by the Court of Common Council on October 8. After giving the matter their careful consideration, the committee agreed that the sum of 30,000, should be paid to the City Architect and Mr. Barry, in such proportion as they might mutually agree upon, for superintending the erection and construction of the bridge, such sum to include the salaries and expenses of all superintendents and clerks of the works. The total cost of the bridge is estimated at 610,000.

**The Runic Monument at Ruthwell.**—It is proposed to shelter the runic monument at Ruthwell, near Annan, from the weather, which is gradually effacing its interesting legends, especially the more lightly-chiselled runes,—in a building adjoining the parish church, in which it formerly stood. The cost of the building is estimated at about 250l., towards which the Earl of Mansfield has given 25l., and other donations have been promised. This is a laudable project; but why should the minister of Ruthwell call it the "proposed restoration of the runic monument?" *Thi omen averant.*—*Athenaeum.*

**Sanitary Reforms at Naples.**—According to the *Chemiker Zeitung*, serious measures have at length been taken for the improvement of the sanitary condition of Naples. It had been found that no fewer than 2,182 wells had to be closed on account of their containing foreign substances of a more or less dangerous character. On account of scarcity of water forty-four habitations had to be closed in the Santo Giuseppe district, and fifty-six in Monte Calvario. If the orders now given be not modified, there will have been removed within a short time 3,175 unhealthy dwellings, and 2,882 polluted wells in Naples alone.

**York.**—The *York Herald* describes the new Probate Registry and Wills Offices, which are being erected in York by the Government on a site in Duncombe-place. The style of architecture is Early English. The materials used are Bradford wall stone, with Stainton stone dressings, lined with brick. The building is being erected from plans prepared by Mr. Tanner, Surveyor to the Office of Works. The clerk of works is Mr. Patterson. The contractors for the erection of the building are Messrs. Bull, Sons, & Co., of Southampton.

**The Glyptothek at Munich.**—According to the *Berliner Börsen Courier* the King of Bavaria has intimated his intention to sell the "Glyptothek" (the Museum of Sculpture), at Munich, the value of which is estimated at no less than 25,000,000 marks, or 1,250,000l. sterling.

#### PRICES CURRENT OF MATERIALS.

| TIMBER.                                  |          | £. | s. | d. | £. | s. | d. |
|------------------------------------------|----------|----|----|----|----|----|----|
| Greenheart, B.G.                         | ton      | 6  | 10 | 0  | 7  | 10 | 0  |
| Teak, B.I.                               | ton      | 12 | 10 | 0  | 15 | 10 | 0  |
| Secund, U.S.                             | do. cube | 0  | 2  | 6  | 0  | 2  | 9  |
| Asb, Canada                              | load     | 3  | 0  | 0  | 5  | 0  | 0  |
| Birch                                    | do.      | 3  | 0  | 0  | 4  | 10 | 0  |
| Walnut, U.S.                             | do.      | 3  | 10 | 0  | 5  | 0  | 0  |
| Fir, Dantisc, &c.                        | do.      | 1  | 10 | 0  | 4  | 10 | 0  |
| Oak                                      | do.      | 3  | 0  | 0  | 5  | 0  | 0  |
| Canada                                   | do.      | 8  | 0  | 0  | 7  | 0  | 0  |
| Fine, Canada red                         | do.      | 9  | 0  | 0  | 4  | 0  | 0  |
| " yellow                                 | do.      | 3  | 15 | 0  | 5  | 5  | 0  |
| Lath, Dantisc                            | fathom   | 4  | 10 | 0  | 6  | 0  | 0  |
| St. Petersburg                           | do.      | 5  | 0  | 0  | 7  | 0  | 0  |
| Waincoat, Leg                            | do.      | 2  | 15 | 0  | 4  | 10 | 0  |
| Odessa                                   | do.      | 3  | 12 | 6  | 3  | 15 | 0  |
| Danls, Finland, 2nd and 1st.             | std. 100 | 7  | 10 | 0  | 8  | 10 | 0  |
| Riga                                     | do.      | 6  | 0  | 0  | 7  | 10 | 0  |
| St. Petersburg, 1st yal.                 | do.      | 9  | 0  | 0  | 15 | 0  | 0  |
| " 2nd "                                  | do.      | 7  | 0  | 0  | 8  | 15 | 0  |
| " white "                                | do.      | 8  | 0  | 0  | 10 | 10 | 0  |
| Swedish                                  | do.      | 6  | 0  | 0  | 15 | 10 | 0  |
| White Sea                                | do.      | 8  | 0  | 0  | 18 | 0  | 0  |
| Canada, Pine 1st                         | do.      | 17 | 0  | 0  | 31 | 10 | 0  |
| " 2nd "                                  | do.      | 12 | 0  | 0  | 17 | 10 | 0  |
| " 3rd, &c.                               | do.      | 7  | 0  | 0  | 10 | 0  | 0  |
| " Spruce 1st                             | do.      | 9  | 0  | 0  | 13 | 0  | 0  |
| Waincoat, Leg                            | do.      | 6  | 0  | 0  | 8  | 0  | 0  |
| New Brunswick, &c.                       | do.      | 6  | 0  | 0  | 7  | 0  | 0  |
| Battens, all kinds                       | do.      | 4  | 0  | 0  | 12 | 0  | 0  |
| Flooring Boards, sq. 1 in.—Frased, first | do.      | 0  | 9  | 0  | 0  | 13 | 0  |
| Second                                   | do.      | 0  | 7  | 6  | 0  | 8  | 6  |
| Other qualities                          | do.      | 0  | 5  | 0  | 0  | 7  | 0  |

| TIMBER (continued).   |      | £. | s. | d. | £. | s. | d. |
|-----------------------|------|----|----|----|----|----|----|
| Cedar, Cuba           | foot | 0  | 0  | 3  | 0  | 0  | 4  |
| Honduras, &c.         | do.  | 0  | 0  | 3  | 0  | 0  | 4  |
| Australian            | do.  | 0  | 0  | 3  | 0  | 0  | 4  |
| Malagany, Cuba        | do.  | 0  | 0  | 5  | 0  | 0  | 7  |
| St. Domingo cargo av. | do.  | 0  | 0  | 5  | 0  | 0  | 7  |
| Mexican               | do.  | 0  | 0  | 4  | 0  | 0  | 6  |
| Tobacco cargo av.     | do.  | 0  | 0  | 4  | 0  | 0  | 6  |
| Honduras cargo av.    | do.  | 0  | 0  | 4  | 0  | 0  | 6  |
| Maple, Bird saye      | do.  | 0  | 0  | 3  | 0  | 0  | 6  |
| Rose, Rio             | ton  | 5  | 0  | 0  | 10 | 0  | 0  |
| Bahia                 | do.  | 5  | 0  | 0  | 14 | 0  | 0  |
| Box, Turkey           | do.  | 5  | 0  | 0  | 18 | 0  | 0  |
| Satin, St. Domingo    | ft.  | 0  | 0  | 0  | 0  | 0  | 0  |
| Porto Rico            | do.  | 0  | 0  | 0  | 0  | 0  | 0  |
| Walnut, Italian       | do.  | 0  | 0  | 4  | 0  | 0  | 6  |

#### METALS.

|                           |     |   |    |   |   |    |   |
|---------------------------|-----|---|----|---|---|----|---|
| Iron—Pig in Scotland      | ton | 3 | 2  | 6 | 0 | 0  | 0 |
| Bar, Welsh, in London     | do. | 4 | 15 | 0 | 5 | 0  | 0 |
| " " in Wales              | do. | 4 | 7  | 6 | 4 | 10 | 0 |
| " Staffordshire, London   | do. | 5 | 15 | 0 | 7 | 0  | 0 |
| Sheets, single, in London | do. | 7 | 10 | 0 | 9 | 0  | 0 |
| Hoops                     | do. | 6 | 5  | 0 | 7 | 5  | 0 |
| Nail-roads                | do. | 6 | 15 | 0 | 7 | 0  | 0 |

| COFFEE.                 |     | £. | s. | d. | £. | s. | d. |
|-------------------------|-----|----|----|----|----|----|----|
| British, cke, and ingt. | ton | 44 | 0  | 0  | 45 | 0  | 0  |
| Best selected           | do. | 45 | 0  | 0  | 46 | 0  | 0  |
| Sheets, strong          | do. | 0  | 0  | 0  | 0  | 0  | 0  |
| " India                 | do. | 48 | 0  | 0  | 48 | 0  | 0  |
| Australian, fine cash.  | do. | 0  | 0  | 0  | 0  | 0  | 0  |
| Chili, bars             | do. | 41 | 0  | 0  | 41 | 0  | 0  |
| YELLOW METAL.           | lb. | 0  | 4  | 0  | 0  | 4  | 0  |
| LEAD—Pig, Spanish       | do. | 12 | 3  | 6  | 12 | 6  | 0  |
| English, com. brands    | do. | 12 | 12 | 6  | 0  | 0  | 0  |
| SILVER.                 |     | £. | s. | d. | £. | s. | d. |
| Silesian, special       | ton | 15 | 3  | 6  | 15 | 7  | 6  |
| Ordinary brands         | do. | 14 | 17 | 6  | 15 | 0  | 0  |
| TIN.                    |     | £. | s. | d. | £. | s. | d. |
| Banca                   | do. | 96 | 0  | 0  | 0  | 0  | 0  |
| Billiton                | do. | 94 | 0  | 0  | 0  | 0  | 0  |
| Strait                  | do. | 92 | 15 | 0  | 93 | 5  | 0  |
| do. Australian          | do. | 92 | 15 | 0  | 93 | 5  | 0  |
| English ingots          | do. | 97 | 0  | 0  | 0  | 0  | 0  |
| ZINC.                   |     | £. | s. | d. | £. | s. | d. |
| English sheet           | do. | 0  | 0  | 0  | 0  | 10 | 0  |

#### OILS.

|                       |     |    |    |   |    |    |   |
|-----------------------|-----|----|----|---|----|----|---|
| Linseed               | ton | 20 | 0  | 0 | 20 | 10 | 0 |
| Cocoon, Cochiti       | do. | 30 | 0  | 0 | 0  | 0  | 0 |
| Ceylon                | do. | 28 | 10 | 0 | 0  | 0  | 0 |
| Copra                 | do. | 0  | 0  | 0 | 0  | 0  | 0 |
| Palm, Lagos           | do. | 29 | 10 | 0 | 0  | 0  | 0 |
| Palm-out Kernel       | do. | 25 | 0  | 0 | 25 | 10 | 0 |
| Refined, English palm | do. | 23 | 10 | 0 | 0  | 0  | 0 |
| " brown               | do. | 21 | 15 | 0 | 0  | 0  | 0 |
| Cottonseed, refined   | do. | 18 | 0  | 0 | 23 | 0  | 0 |
| Yellow Oil            | do. | 25 | 0  | 0 | 40 | 0  | 0 |
| Lubricating, U.S.     | do. | 7  | 0  | 0 | 10 | 0  | 0 |
| " Refined             | do. | 4  | 0  | 0 | 10 | 0  | 0 |

| TURPENTINE.       |      | £. | s. | d. | £. | s. | d. |
|-------------------|------|----|----|----|----|----|----|
| American, in cks. | cwt. | 1  | 6  | 9  | 1  | 7  | 0  |
| Tar—Stockholm     | cwt. | 0  | 18 | 0  | 19 | 0  | 0  |
| Archangel         | do.  | 0  | 11 | 8  | 0  | 12 | 0  |

### COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

#### COMPETITIONS.

| Nature of Work.                   | By whom required.     | Premium.                | Designs to be delivered. | Page. |
|-----------------------------------|-----------------------|-------------------------|--------------------------|-------|
| Construction of Vessel for Sewage | Met. Board of Works   | 500l. (if not accepted) | Jan. 25th                | ii.   |
| New Wing to Buildings             | East London Hospital. | Not stated              | March 1st                | i.    |

#### CONTRACTS.

| Nature of Work, or Materials.                                       | By whom required.                        | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page.  |
|---------------------------------------------------------------------|------------------------------------------|-----------------------------------|--------------------------|--------|
| Brick and Pipe Sewer                                                | Lowestoft Town Council                   | R. H. Inch.                       | Jan. 4th                 | ii.    |
| Sewerage Works.                                                     | Beaumaris Corporation                    | Shone & Ault                      | do.                      | ii.    |
| Roads and Sewers                                                    | Com. of H.M. Works                       | Official                          | do.                      | ii.    |
| Collection, &c., of Dust                                            | Wandsworth Bd. of Wks                    | do.                               | Jan. 5th                 | ii.    |
| Concrete and other Sewers                                           | Ramsgate Town Council                    | W. C. Barley                      | do.                      | ii.    |
| Additions to Police Station, Worthing                               | W. Sussex Constabulary                   | Ellice Clark                      | Jan. 6th                 | xviii. |
| Brick Sewer                                                         | Tottenham Local Board                    | De Pape                           | Jan. 12th                | ii.    |
| Works and Materials                                                 | Parish of St. Marylebone                 | Official                          | Jan. 14th                | ii.    |
| Breze, Ashes, and Dusting                                           | do.                                      | do.                               | do.                      | ii.    |
| Cutting Slops and Sweepings                                         | do.                                      | do.                               | do.                      | ii.    |
| Watering Streets and Roads                                          | do.                                      | do.                               | do.                      | ii.    |
| Broken Stone, Footway Kerb, and Kerkshire and other Footway Paving. | do.                                      | do.                               | do.                      | ii.    |
| Passenger Station                                                   | do.                                      | do.                               | do.                      | ii.    |
| Boundary Walls, Abutments, &c., for Bridge                          | Lon. & N. W. Ry. Co.                     | S. P. Worthington                 | Jan. 18th                | ii.    |
| Ironwork for Bridge                                                 | Colne and Marsden L. B.                  | H. Bancroft                       | Feb. 2nd                 | ii.    |
| Cast-Iron Mains, &c., for Water-Supply                              | City of Bombay                           | Official                          | do.                      | ii.    |
| New Stabling, Lodge, &c.                                            | Lon. and Suburban Sanitary Survey Assoc. | Ed. Tidman                        | March 16th               | ii.    |
| Extension of a Pier at Greenhithe.                                  | do.                                      | Parr, Strong, & Parr              | At once                  | xviii. |

#### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised.   | Salary.           | Applications to be in. | Page. |
|------------------------|-----------------------|-------------------|------------------------|-------|
| Assistant Surveyors    | Civil Service Com.    | Not stated        | Jan. 5th               | xvi.  |
| Building Inspector     | Willesden Local Board | 2l. 10s. per week | do.                    | xvi.  |

#### TENDERS.

|                                                                                                                                          |        |   |   |  |
|------------------------------------------------------------------------------------------------------------------------------------------|--------|---|---|--|
| BATTERSEA.—For caretaker's house, &c., at Wintley-road School, Battersea, for the School Board for London. Mr. T. J. Bailey, architect.— |        |   |   |  |
| C. Wall                                                                                                                                  | 2516   | 0 | 0 |  |
| Lathey Bros.                                                                                                                             | 493    | 0 | 0 |  |
| Hobson & Co.                                                                                                                             | 493    | 0 | 0 |  |
| Rice                                                                                                                                     | 415    | 0 | 0 |  |
| Holloway Bros.                                                                                                                           | 414    | 0 | 0 |  |
| W. Johnson                                                                                                                               | 403    | 0 | 0 |  |
| BATTERSEA.—For caretaker's house, &c., at New-road School, Battersea, for the School Board for London. Mr. T. J. Bailey, architect.—     |        |   |   |  |
| W. H. Castle                                                                                                                             | 21,078 | 0 | 0 |  |
| Hobson & Co.                                                                                                                             | 1,048  | 0 | 0 |  |
| H. Mallett                                                                                                                               | 970    | 0 | 0 |  |
| Altherton & Latt                                                                                                                         | 963    | 0 | 0 |  |
| Nightingale                                                                                                                              | 932    | 0 | 0 |  |
| Lathey Bros.                                                                                                                             | 917    | 0 | 0 |  |
| Holloway Bros.                                                                                                                           | 897    | 0 | 0 |  |

**FINCHBURY.**—For additions and alterations to Paul-street, Finchbury, for the Royal London Friendly Society. Mr. H. H. Collins, architect, Old Broad-street, E.C. Quantities supplied by Messrs. Balstone Bros., Cannon-street:—

|                | Building. | Fittings. | Total.   |
|----------------|-----------|-----------|----------|
| Trent Bros.    | 21,799 0  | 0         | 21,799 0 |
| Colls.         | 21,474 0  | 1,420 0   | 22,894 0 |
| Asby & Horner  | 3,445 0   | 1,387 0   | 4,832 0  |
| Shurmer        | 3,399 0   | 1,398 0   | 4,797 0  |
| Sage           | 1,343 14  | 0         | 1,343 14 |
| Outwaite       | 1,320 0   | 1,340 0   | 2,660 0  |
| Downs          | 3,320 0   | 1,386 0   | 4,706 0  |
| Boyes          | 3,310 0   | 1,294 0   | 4,604 0  |
| Drew & Cadman  | 1,240 8   | 0         | 1,240 8  |
| Emery          | 1,234 0   | 0         | 1,234 0  |
| Kirk & Randall | 1,130 0   | 0         | 1,130 0  |
| Croaker        | 1,188 0   | 1,278 0   | 2,466 0  |
| Sparks         | 1,170 0   | 1,160 0   | 2,330 0  |
| Laurence       | 1,185 0   | 1,184 0   | 2,369 0  |
| Nightingale    | 1,169 0   | 1,300 0   | 2,469 0  |
| Hunt           | 1,065 0   | 1,180 0   | 2,245 0  |
| Mark Gentry    | 1,045 0   | 1,125 0   | 2,170 0  |
| Lascelles      | 1,041 0   | 1,041 0   | 2,082 0  |

\* Accepted for the whole.

**HAMPSTEAD.**—For gardeners' cottage and lodge, Wells Charity Estate, Hampstead. Mr. H. S. Legg, architect:—

|                            |         |   |         |
|----------------------------|---------|---|---------|
| Burford, Hampstead         | 2,583 0 | 0 | 2,583 0 |
| Hackworth, Hampstead       | 685 0   | 0 | 685 0   |
| Watts, Hampstead           | 559 0   | 0 | 559 0   |
| Gould & Brand, Camden Town | 548 0   | 0 | 548 0   |
| Butcher                    | 539 0   | 0 | 539 0   |

**LONDON.**—For the erection of Mission Hall, Hart's-lane, Bethnal-green-road, for the Bedford Institute Committee. Mr. Edward Saunders, architect. Quantities by Mr. H. W. Dobbs:—

|                                                      | Price.   | Alternative. |
|------------------------------------------------------|----------|--------------|
| Sergeant                                             | 21,998 0 | 21,924 0     |
| Dove Bros.                                           | 4,785 0  | 4,760 0      |
| Adams                                                | 4,779 0  | 4,691 0      |
| Brass & Sons                                         | 4,397 0  | 4,402 0      |
| Woodward                                             | 4,409 0  | 4,427 0      |
| J. Higgs, Upper Park-place, Dorset-square (accepted) | 4,337 0  | 4,267 0      |

**LONDON.**—For engineering and constructional iron-work in new warehouses to be erected on the site of the East London Aquarium, Bishopsgate. Messrs. Gordon & Lowther, architects:—

Marshall & Hatch (accepted) ..... £1,050 17 0

**NOBBITON.**—For the erection of additional stabling for thirty-six horses, at Messrs. Carter, Paterson, & Co.'s depot, Manor Gate-road, under the superintendence of Mr. Wm. Eve, Union-court, Old Broad-street, E.C.:—

Higgs, Station Works, Loughborough Junction. [Accepted on a schedule of prices.]

**ROTHERHAM.**—For the erection of St. Bartholomew's Church. Mr. W. T. Allen, architect, Southampton-street, Strand. Quantities by Mr. F. W. Davis:—

|                   |           |   |
|-------------------|-----------|---|
| Higgs & Hill      | 210,325 0 | 0 |
| Wm. Downs         | 10,328 0  | 0 |
| Perry & Co.       | 10,221 0  | 0 |
| Nightingale       | 1,113 0   | 0 |
| Lawrence & Sons   | 9,821 0   | 0 |
| Jas. Morter       | 9,897 0   | 0 |
| Stephens & Bastow | 9,300 0   | 0 |

**STOKE NEWINGTON.**—For the erection of additional hospital stabling for thirty-one horses, and Turkish bath, for Messrs. Carter, Paterson, & Co., under the superintendence of Mr. William Eve, Union-court, Old Broad-street, E.C.:—

|                             |          |   |
|-----------------------------|----------|---|
| Exton                       | 21,158 0 | 0 |
| Adamson & Son               | 2,110 0  | 0 |
| Brass & Son                 | 2,791 0  | 0 |
| Lawrance                    | 2,728 0  | 0 |
| Godfrey & Son               | 2,668 0  | 0 |
| Ferry & Co.                 | 2,530 0  | 0 |
| Morter                      | 2,520 0  | 0 |
| Downs                       | 2,494 0  | 0 |
| Harris & Wardrop            | 2,487 0  | 0 |
| Holland, 183, Brunel-street | 2,433 0  | 0 |

\* Accepted.

**WESTMINSTER.**—For alterations, &c., to Baptist Chapel, Romney-street, Westminster. Mr. Vincent C. Brown, architect:—

|                           |         |   |
|---------------------------|---------|---|
| Warne & Sons              | 2,693 0 | 0 |
| Stephens & Bastow         | 639 0   | 0 |
| Haward Bros.              | 619 0   | 0 |
| Brown                     | 555 0   | 0 |
| Holliday & Greenwood      | 515 0   | 0 |
| W. Johnson                | 495 0   | 0 |
| Holloway Bros. (accepted) | 487 0   | 0 |

**YARMOUTH.**—For re-seating and other works at the Wesleyan Chapel, Great Yarmouth. Mr. W. B. Cockrill, Gorleston, architect:—

|                    |          |   |
|--------------------|----------|---|
| Leggett            | 21,576 0 | 0 |
| Leach, Lynn        | 703 0    | 0 |
| Cooper             | 777 0    | 0 |
| Bray               | 702 0    | 0 |
| Bly                | 760 0    | 0 |
| Bedwell, Lowestoft | 693 0    | 0 |

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 48, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

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Registered Telegraphic Address, "THE BUILDER, LONDON."

"Faith" (we cannot print letters without authentication by the writer's name; not necessarily for publication, of course). Each letter, &c. (ditto). O.C. (the designs of that school are well known; our object was to illustrate a school of artists not so generally known).—H. A. (expressed in our list).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointed out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications. Letters or communications (beyond mere news items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR. All communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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Registered Telegraphic Address, "THE BUILDER, LONDON."

The "NEW YEAR'S NUMBER" will be published on FRIDAY, the 1st of JANUARY next, Price 1s. Advertisements for this special issue should be sent to the Office as early as possible.

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Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.  
The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

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must reach the Office before TEN o'clock on WEDNESDAY mornings.

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**Asphalte.**—The Snyssael and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [Adv.]

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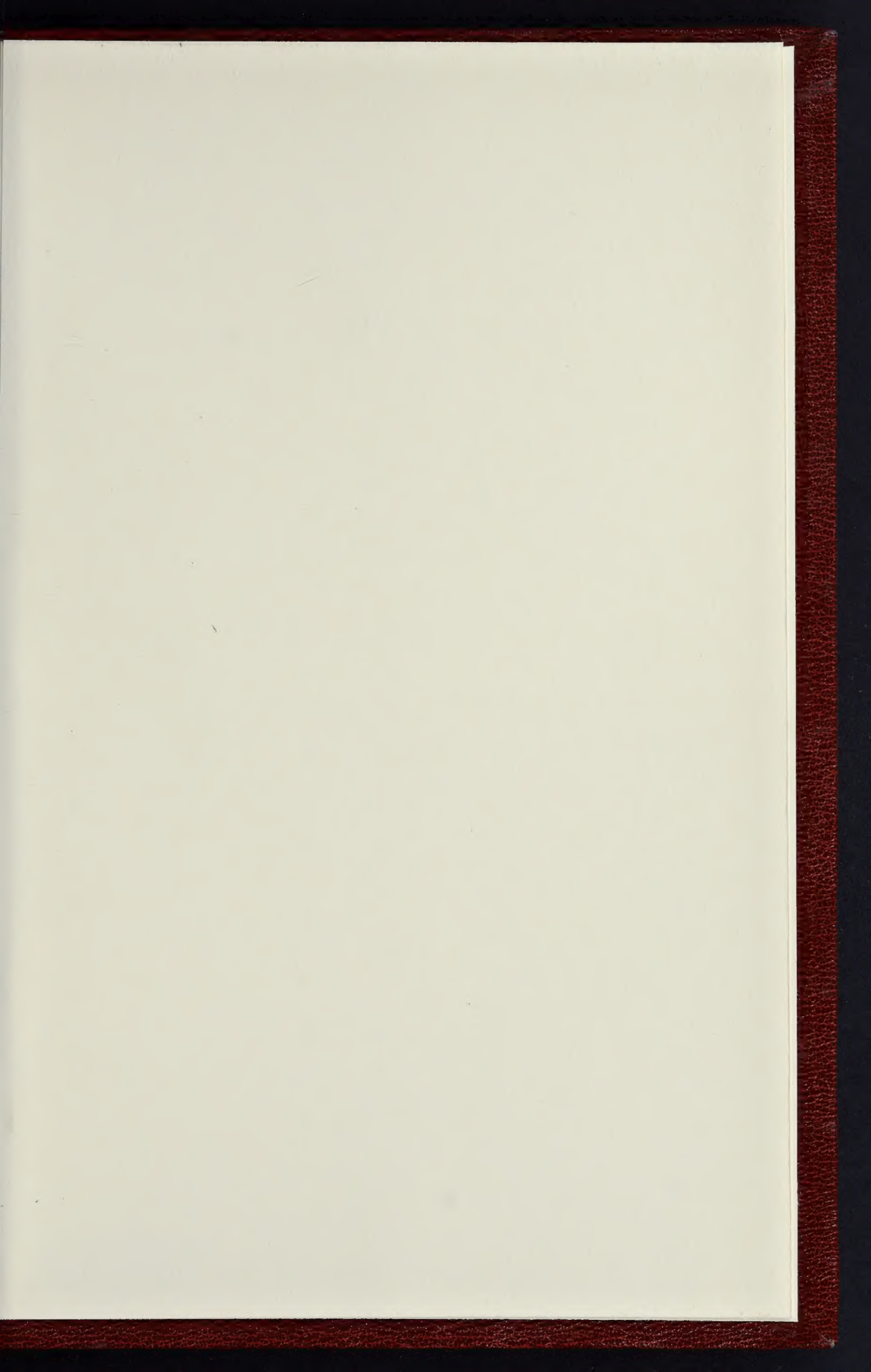
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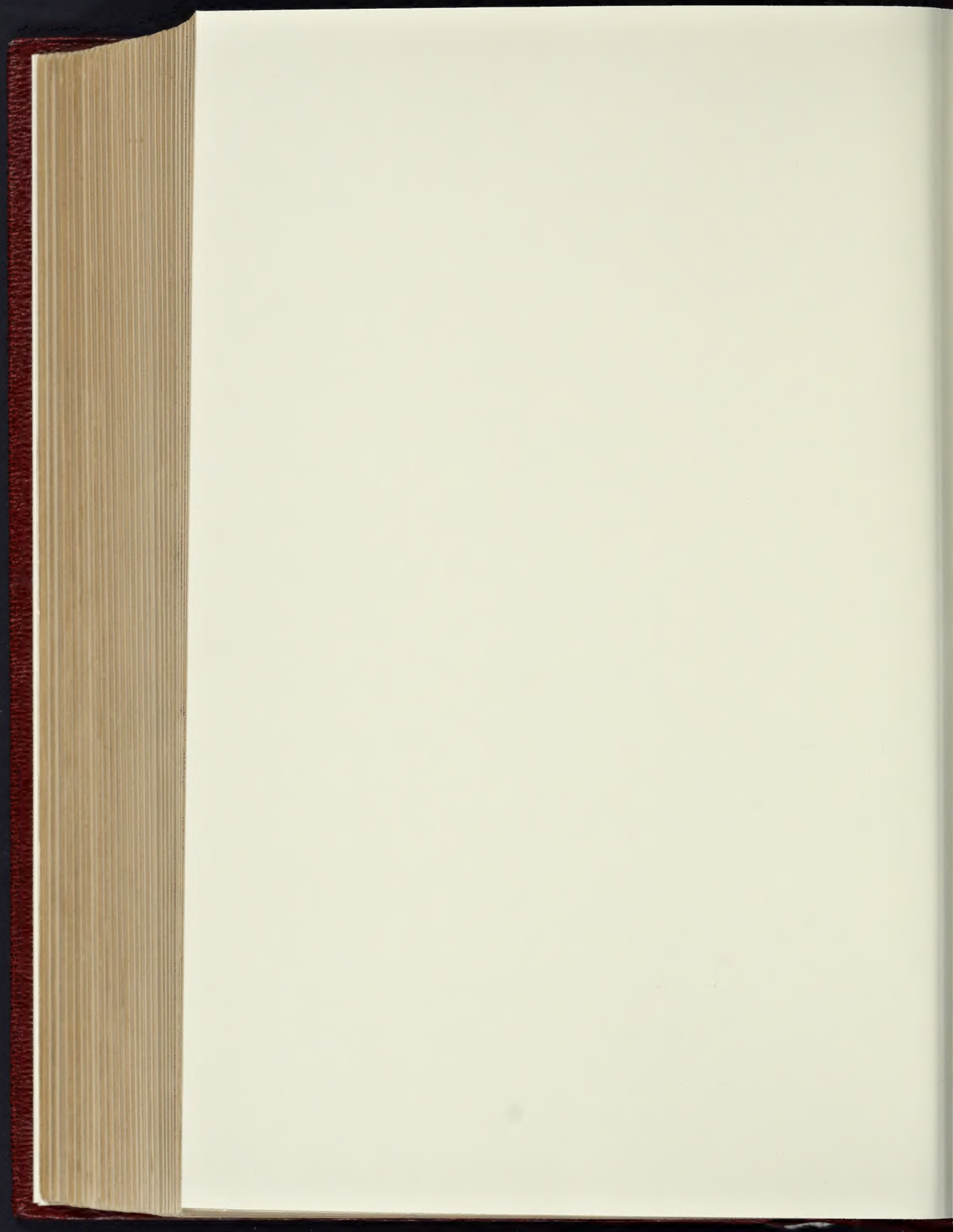
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